China: Hubei Jinzhou Historic Town Restoration and Protection Project

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
EXECUTIVE SUMMARY

AUGUST 2015

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1. INTRODUCTION

The proposed Hubei Jinzhou Historic Town Restoration and Protection Project (herein after "the Project") is located in Hubei Province of central China (See geographic locations in the Figure 1). The project will support the sustainable protection and utilization of the cultural heritage through restored historic town walls, rehabilitated water networks, improved transportation and tourism infrastructures, surrounding landscaping, temple restoration and protection, and institutional capacity development.

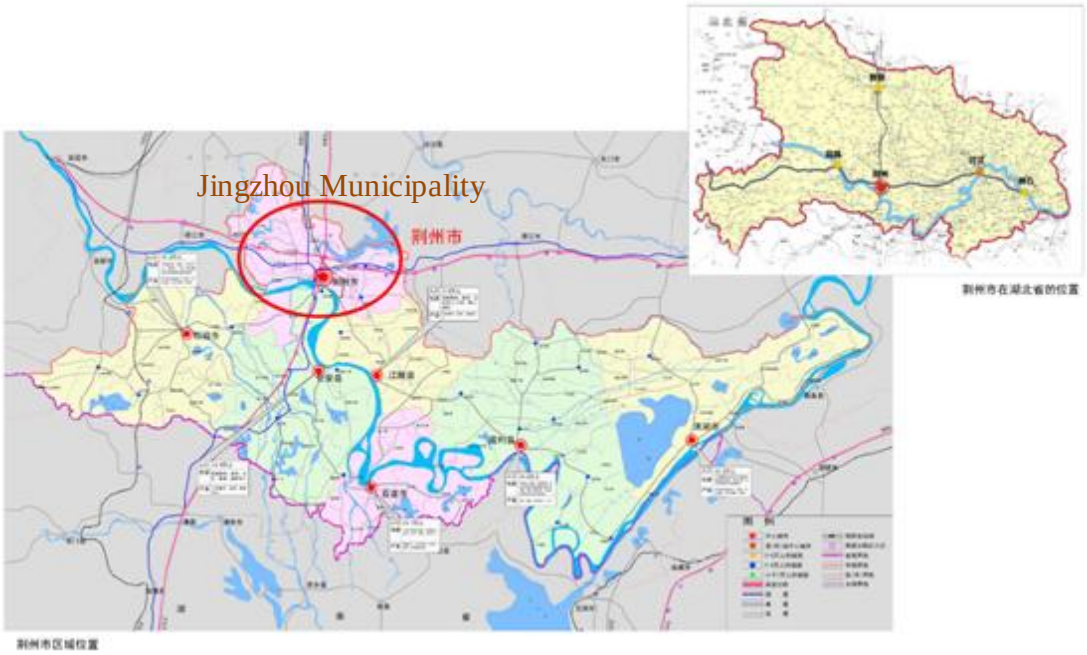


Figure 1 project locations

Considering its potential environmental and social impacts, this project is classified as a Category A as per the World Bank Operational Policy OP4.01-Environmental Assessment. The following World Bank safeguards policies are triggered: (1) OP4.01 Environmental Assessment; (2) OP4.12 Involuntary Resettlement; (3) OP4.11 Physical Cultural Resources; and (4) OP4.04 Natural Habitats. In addition, these World Bank policies are also applicable including: (1) BP17.50 Access to Information; and (2) Environmental, Health, and Safety Guidelines of IFC/WB group.

Environmental impact assessment (EIA) report (Appraisal Version) has been prepared for the Project by Hubei Provincial Academy of Environmental Sciences (HAES), a prestigious EIA consultant that has provided EIA services for many World Bank financed projects. The preparation of the EIA and an associated ESMP followed the relevant laws and regulations of China, World Bank safeguards policies, as well as EHS guidelines, with continuous guidance from the World Bank task team. Besides these environmental safeguards documents, social safeguards documents have also been prepared following the requirement of OP4.12, including a Social Assessment (SA) Report and a Resettlement Action Plan (RAP). The drafts of these documents were submitted to the Bank during the project preparation. They have been locally disclosed in local newspapers, Project Management Offices in Jinzhou Municipality and in local districts, and also have been disclosed in the World Bank Mission workshops.

This document summarizes the potential environmental and social impacts of the proposed Project based on above-mentioned safeguards documents. It highlights the key environmental and social safeguards issues related to the project construction and operation, describes the main findings and conclusion of impact assessment, and summarizes main mitigation measures and implementation management plan/frameworks.

In summary, the proposed project will have significant positive impacts of (1) improvement of ecological environment and water quality in the river networks; (2) improvement in employment opportunity and income level through the tourism development; (3) improvement in living conditions through better accessibility; and (4) improvement in cultural heritage protection and conservation. It will not significantly degrade or convert the ecological environment; neither will it adversely affect known physical cultural resources. Thorough Environmental and Social Management Plan has been developed that can adequately avoid, minimize, and mitigate the adverse impacts to acceptable level.

2. PROJECT DESCRIPTION

The overall development objectives of this project are to assist Jingzhou Municipality in conserving its cultural heritage, promoting tourism development and enhancing the quality of life of residents in the perimeters around the Historic City. The proposed project has four core components including: (A) cultural heritage conservation and tourism development; (B) improving the water environment of the historic town; (C) improving accessibility of the historic town; and (D) project management and institutional capacity building.

- **Component A: Cultural Heritage Conservation and Tourism Development.** This is the core component of the project and it aims at the conservation of physical cultural heritages in historic town and promotion of tourism development.
- **Component B: Improving the Water Environment of the Historic Town.** This component is to improve the water quality of the moat surrounding the Historic Town and the lakes within the Historic Town.
- **Component C: Transport Improvement in and around the Historic Town.** This component aims at enhancing the accessibility of the Historic Town through an improved multi-modal transport system.
- **Component D: Assistance to Project Management and Capacity Building.** This component aims at strengthening the institutional capacity of the Project Management Office.

Among the above 4 components, the former three are focusing on physical interventions and the last one is focusing on non-physical interventions. Each component is composed of several sub-components that can be further divided into sub-projects. The detailed contents of project are listed in **Table 1**. The detailed locations of each subproject are illustrated in the Figure 2.

Table 1 Project Composition and engineering content

Component	Sub-component	Sub-project	Content
A. Cultural Heritage Conservation and Tourism Development	A1. Ancient City Wall Rehabilitation and Protection	A1-1: Protection of West City Wall	Repair of brick city wall: 12609m2, repair of brick buttress wall: 2196 m, repair of walkway on top of city wall: 4831.2 m2,1518.3 m3, repair of mud city wall: 6307.6 m3
		A1-2: Construction of retaining wall of ancient city wall	960 m3 retaining wall
		A1-3: Plant protection and restoration	1. Reservation and protection of good vegetation; 2. Removal and replacement of poor vegetation 3. Plant more good vegetation; total area of 94800 m2
	A.2 Conservation of Kaiyuan Taoism Temple	A2-1: Kaiyuan Taoism Temple Landscape upgrade	The landscape upgrade around the temple.
		A2-2: Attractions Development	Construction of the external square, internal square, the Sinyun Pavilion, the Handan seven-king site, the Shuangtingbei Corridor, etc.
		A2-3: Protection and Exhibition of movable relics	Repair or Jinshibei tablet, protection and exhibition of multiple stone monuments, protection of original sites of Shimacao.
	A.3 Upgrading of the Jingzhou Museum	A3-1: Precious relics hall upgrade	Adjust tourist routes, improve the public service facilities; increase disability service facilities; seismic resistance upgrade; energy conservation upgrade; water proof upgrade; external upgrade
		A3-2: Precious relics hall exhibition	Chu Music Hall; Jinzhou Phoenix Mountain No.168 Han Dynasty tomb; Ancient paint wood craft exhibition; Chu and Han dynasty textile exhibition.
		A3-3: Precious relics hall Equipments	AC and security facility
		A3-4: Landscaping and associated facility	Demolish existing gate and turn it to a rest kiosk in the left and the sight viewing platform associated disability slope.
	A.4 Piloting	A4-1:Piloting conservation	Two construction areas are selected, including 13

Component	Sub-component	Sub-project	Content
	conservation and Regeneration of Historic Street	and Regeneration of Historic Street	historic buildings and land plots as a demonstration area for the restoration and re-utilization of historic building in the protection project of historic towns. It covers 4282m2 in total.
	A.5 Xiongjiazong Archaeological park	A5-1:Landscaping and Infrastructure	Include Landscaping, farmland rehabilitation, parking lot (Phase II), pavement for parking lot and main roads, scholar exchange center upgrade, outdoor sprinkler system, tourist service facilities.
		A5-2:Preservation and demonstration of the relic sites	Exhibition hall for Chariot and Horse Fleets of King of Chu, and the sacrifice pit.
		A5-3:Construction of comprehensive exhibition hall	exhibition hall and its landscaping, internal decoration, equipment procurement for the multi-function hall.
		A5-4:Signage and guiding system	Signage, guiding system and online museum.
		A5-5:Management system	Public management system and security system
	A.6 Support to Tourism Development	A.6-1:Tourist reception center	2451 m2 tourist reception center at east gate, parking system.
		A6-2: Landscaping	-
		A6-3: Tourism signage and information guide system	-
B. Improving the Water Environment of the Historic Town	B.1 Dredging the Moat and Lakes	B1-1:Sediment dredging moat and lakes within the historic towns	3,019,000 m3 dredging in the moat, fish ponds on both sides, Xihu Lake, pond in the northeast.
	B.2 Internal Drainage Network and Interceptor Sewer	B2-1:Sewage pipe networks	New sewer main outside the moat; improved in-city interceptor for the combined sewer; improved in-city collection sewer
	B.3 Wetland Creation along Moat and Lakes	B3-1:city moat and lakes wetland	Moat bank wetland; ecological embankment; pond wetland.
	B.4 Enhanced Interconnectivity of Water Bodies and Flow Augmentation	B4-1: Improvement of water resources connection and ecological construction of rivers and lakes	To connect the whole lines of the water network in the ancient town; water source improvement; and pump stations

Component	Sub-component	Sub-project	Content
C. Transportation Improvement in and around Historic Town	C.1 Urban Roads Improvement	C1-1:Reconstruction of inner ring road	upgrade parts of the motorized lanes and sidewalks
		C1-2: Improve intersections of inner ring road	Optimize intersection channelling design; increase pedestrian crossing and non-motorized vehicle lane, adopt joint control by signal light for intersections between Inner Ring Road and Yindu Road, Aimen Road, Renming Road, Tuotafang Road, Jinnan Road.
		C1-3: Improve key intersections within the historic town	Optimize the intersection channelling design, setting up more signal lights, introducing signal timing plan and pedestrian crossing facilities for intersections between Jinzhong Road/Yindu Road, JIngzhong Road/Quyuan Road; Jinzhong Road/Renming Road; Jinbei Road/Renming Road.
		C1-4: Improve key intersections of Jinzhou Avenue and Jinnan Road	Optimize the intersection channeling design, setting up more signal lights, introducing signal timing plan and pedestrian crossing facilities for intersections
		C1-5: East Gate Tourist Center Intersection	Channelize upgrade and signal control.
	C.2 Non-Motor Transport (NMT) Improvement	C2-1: Improvement of bike system	(1) colored asphalt bike lane for 1.5 + m wide lanes; (2) for one-way roads install isolated bike lanes; (3) in the parks install colored asphalt bike lane; (4) bike lane signages.
		C2-2: Improve pedestrian system	(1) increase isolation pillars for 6+ m wide roads (Jingbei Road, Quyuan Road, Jingzhong Road, Jingdong Road) to prohibit motor vehicle traffic, clear up road-occupying parking; (2) upgrade of inner ring road sidewalk and crossing; (3) repair horse lanes.
		C2-3: Crossing facility	Upgrade 12 locations of zebra crossing; install yellow flash lights; adjust 4 location of signals.
	C.3 Public Transport	C3-1: Shuttle bus system	Line 1: 18 stops;

Component	Sub-component	Sub-project	Content
	Improvement	upgrade	**Line 2: 15 stops;**
		C3-2: In-city bus system upgrade	12 bay-type bus stops and 1 kiosk bus stop; 28 physical electric bus stop signs; 50 hybrid vehicles for Line 15, 18 an 103.
		C3-3: Ancient town to Xiongjiangzhong Bus	40 km bus route from East gate tourist center to Xiongjiazong. 1.5 intervals; 2 stops. 10 hybrid bus.
	C.4 Transport Signage	Static Signage	Including traffic signs within and outside the historic town
		Variable Message Sign (VMS)	Including traffic information system of surrounding roads, three-level parking guidance information system and dynamic traffic guidance control center.
D. Assistance to Project Management and Capacity Building	D.1 Design Review, Project Management and Monitoring Evaluation		Project management, tendering, RAP, safeguard external monitoring
	D.2 Office Equipment		Collaborative office management system; engineering project management system.
	D.3 Training		Overseas and domestic training; tourism service training; cultural sites protection training and management training;
	D.4 Studies		Hydraulic modeling; website development and planning

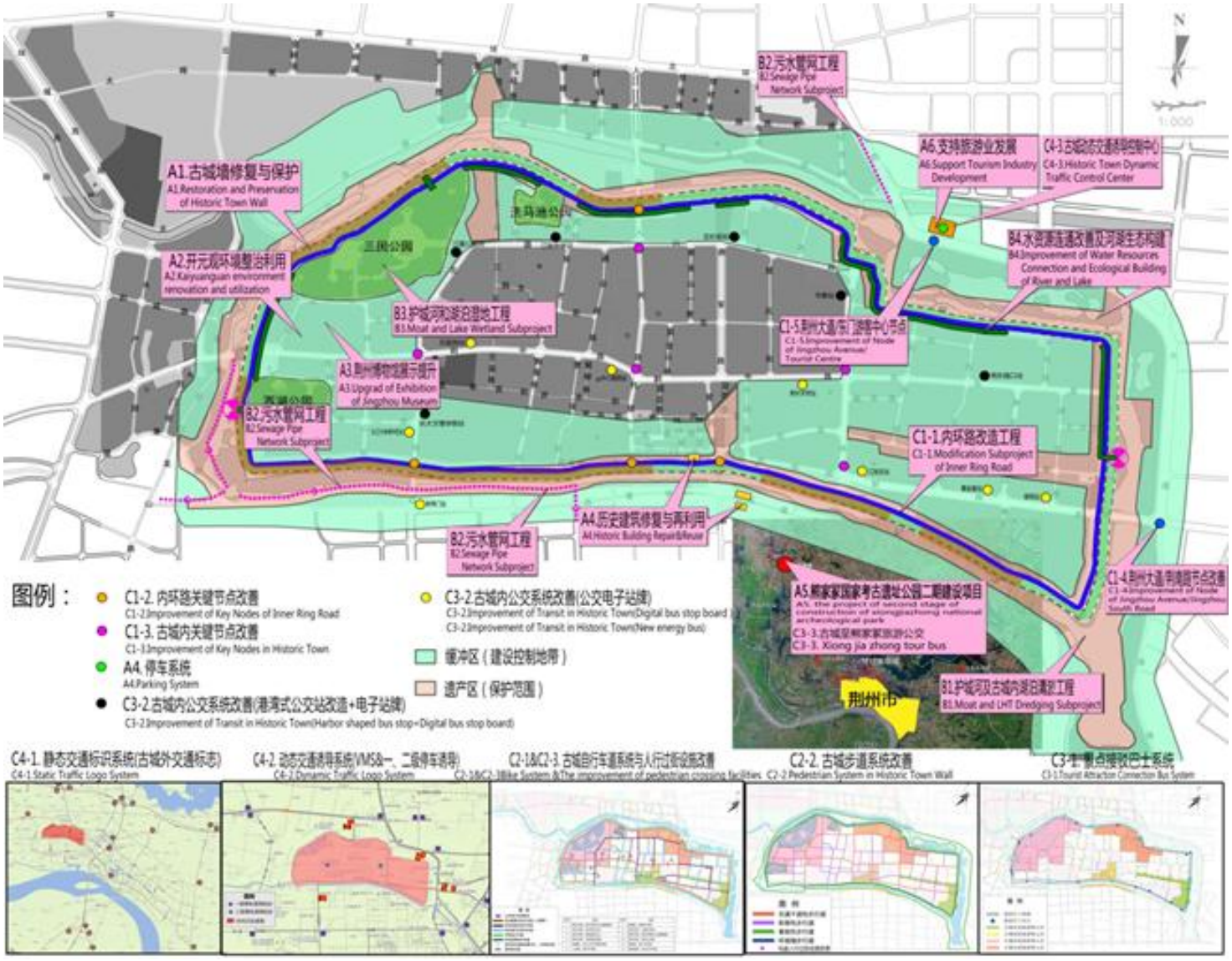


Figure 2 Locations of sub-projects

3. REGULATORY AND LEGAL FRAMEWORK

The environmental assessment was conducted in accordance with relevant Chinese laws/regulations and the World Bank safeguards policies.

Chinese Laws and Regulations

According to the Chinese laws and regulations, the Project will need a comprehensive Environmental Impact Assessment (EIA) to be prepared by licensed EIA consultant and approved by local (provincial) environmental protection agency. Two rounds of public participation during the assessment are required including relevant information disclosure. As the project will have potential impacts on environmental elements including ambient air, water, sound, and ecologic environments, relevant technical guidelines for these environmental elements should also be followed.

Currently an EIA has been prepared fully in compliance with relevant China national laws, regulations, technical guidelines and standards. Compliance with a selective list of key Chinese regulations and EIA technical guidelines are summarized in **Table2**.

Table 2 Compliance with Key China Domestic Laws and Regulations

China Laws and Regulations	Project Compliance
Environmental Impact Assessment Law: Units constructing project that cause pollution to the environment must observe the state provisions concerning environmental protection for such construction projects. The environmental impact statement on a construction must assess the pollution the project is likely to produce and its impact on the environment and stipulate the preventive and mitigation measures. The EIA statement shall, after initial examination by the authorities in charge of construction project, be submitted by specified procedures to the competent department of environmental protection administration for approval. The department of planning shall not ratify the design plan description of the construction project until after the environmental impact statement on the construction project is approved.	• EIA prepared by licensed EIA consultant, reviewed and approved by local environmental protection agency.
Categorized Directory for Environmental Management of Construction Project	• Individual EIAs have been prepared according to proper classification
Interim Measures for the Public Participation in Environmental Impact Assessment: (a) Two rounds of information disclosure: • Project owner shall issue public notice within 7 days of hiring EA institute, announcing the start of EIA preparation, project brief and key issues requiring public opinions. • Project owner shall carry out second round of information disclosure before submission of EIA report for	• Two rounds of public consultation conducted in the affected communities and entities, and info disclosure through website of Jingzhou Municipal Government and in the affected communities and entities.

China Laws and Regulations	Project Compliance
approval, disclosing the key findings of EIA in terms of impacts and mitigation measures, as well as the ways to get simplified version of EIA report and provide feedbacks. The project owner is obliged to disclose the simplified version of the EIA report in certain places, or internet, or through other ways convenient to public. (b) Public consultation: Project owner or EA institute shall, after public announcement and disclosure of simplified EIA report, carry out public consultation through public survey, consultation with experts, public meetings, discussion workshop or hearings etc to seek public opinions.	
Series of EIA Technical Guidelines on Atmospheric Environment, Surface Water Environment, Groundwater Environment, Noise Impact Assessment, Ecological Environment, and Regional Development Areas etc.	• Impact assessment follows the technical requirements of these guidelines
Series of National and local Regulations on Ambient Air, Lake Management, Soil Conservation, etc.	• Impact assessment follows the technical requirements of these guidelines

World Bank Safeguard Polics

Of the ten safeguards policies, the following are triggered: (1) OP4.01 Environmental Assessment; (2) OP4.12 Involuntary Resettlement; (3) OP4.11 Physical Cultural Resources; and (4) OP4.04 Natural Habitats. Relevant assessment and safeguards documents have been developed accordingly. In addition, the WB/IFC Environmental, Health and Safety General Guidelines is referred for the development of mitigation measures in the ESMPs.

Table 3 Compliance with World Bank Safeguards Policies

World Bank Policies	Project Compliance
Environmental Assessment (OP 4.01)	• Category A project. • Full EIA and ESMP have been prepared. • Consultation conducted as part of EIA process.
Physical Cultural Resources (OP4.11)	• Cultural resources survey identified the city wall of the historic town, the Xiongjiazhong, the Jingzhou Museum, the relevant historic street, and the Kaiyuan Taoism Temples as physical cultural heritage in the project area.Measures and alternatives are developed in to avoid, minimize and mitigate the impact, relevant experts and departments have been consulted during the public consultation process. • Chance-find procedure has been developed in ESMP.
Natural Habitats	• The baseline survey investigated wild lives using the moat as

World Bank Policies	Project Compliance
(OP4.04)	natural habitats.
Involuntary Resettlement (OP4.12)	• Resettlement Action Plan has been developed.
Environmental, Health and Safety General Guidelines	• Mitigation measures for waste management, community health and safety and construction management equivalent to EHS guidelines requirements are developed in the ESMPs.

4. ENVIRONMENTAL AND SOCIAL BASELINES

The description of the prior-project environment (biophysical, ecological and socio-economic) establishes (i) the environmental setting within which the project will be implemented, and therefore needs to be designed to suit, and (ii) the environmental elements which will be changed (either negatively or positively) by the project.

4.1 Natural Environment

Landform: The project area is located in the Jingzhou Municipality, which between the mountainous area in the west with maximum elevation of 815 m and the plain area in the east with elevation below 50 m. The landform mainly features with mountains and hills in the west and north and low-lying ground in the east. The mountainous area accounts for 1840 km2, or 13.1% of total area in the municipality. The plain area accounts for 12219 km2, or 86.9% of total area in the municipality.

Climate: The Jingzhou Municipality has a subtropical monsoon climate that favours agricultural production. The yearly average temperature varies in the range from 15.9^{o}C to 16.6^{o}C. The annual precipitation is in the range from 1100 mm to 1300 mm.

River system: The Jingzhou Municipality has many river and lakes with total area more than 80,000 ha. In the Historic Town the river system is composed of the moat and a series of inner lakes and ponds including the Xihu Lake, the Beihu Lake (also called Sanguo Park), the Ximachi Pond, and other small ponds. The total water area is 0.88 km2 including the moat (0.61 km2) and the lakes and ponds (0.27 km2).

***Ecological environment*:** The project areas are mainly in the urban area. The ecological systems feature mainly the urban ecological system, with some small woods, grassland or waters that are heavily modified by human activities. The fauna and flora survey has been conducted by the EA team for the moat and the waters within the influence area of the proposed project. It is found that, through document review and consultation, there are no rare or endangered species protected at any levels or no sites for migratory, feeding and spawning within the survey area.

4.2 Quality of Sediment

The proposed project will dredge the lakes of Xihu Lake, Dongbei Pond, and the moat (included the ponds on the both sides of the moat) in a combined area of 653,308 m^2. Totally 301,900 m3 sediments will be dredged requiring disposal. The hydraulic method will be used to remove the upper layer of the sediments of the waters at a depth averaging 60cm in the moat, 76cm in the Xihu Lake, .and 40cm in the Dongbei Lake. The quality of the sediments to be dredged has been

analyzed through a carefully designed sampling and analysis program conducted in line with the Technical Specifications for Soil Environmental Monitoring (HJ/T166—2004) during June 2014 by the licensed institute, Jingzhou Municipal Environmental Monitoring Station. The analyzed results of the sediments quality is compared with the applicable standards in China environmental system for solid waste management so as to determine the proper method to disposing of the sediments to be dredged. The results show that the quality of the sediments meets the standard for construction materials and landscaping. The quality of sediments is shown in the annex I.

As required by Hubei EPB, the leaching test of heavy metals has been conducted for the sediments sampled with the same procedure of the the Technical Specifications for Soil Environmental Monitoring (HJ/T166—2004) in Aug. 2015 by Jingzhou Municipal Environemntal Monitoring Station. The result of the test shows that the sediments to be dredged are not toxic materials. The test result for the heavy metal leaching is attached in Annex 2.

5. Socio-economic Context

The Jingzhou Municipality is located in the west of Hubei Province, with an area of 14,067 km^2 and a population of 6.4 million. The Jingzhou Municipality recorded a GDP of 133.49 billion CNY in 2013, a 10.4 % increase from the previous year. Under the municipality's jurisdiction, there are 3 county level cities, 3 counties, and 2 districts. The proposed project is located in the Jingzhou District. The income levels in Jingzhou Municipality are summarized in the Table below.

Table 4 Income level in the Historic Town

Indicator	2013	2012
Per capita income (RMB)	20,047.15	18,027.58
Per capita disposable income (RMB)	18,705.9	17,010.34
Per capita expense (RMB)	17,564.97	16,143.57
Per capita consumer spending (RMB)	12,760.69	11,881.35
Per capita housing (m^2)	-	37.72

The Historic Town is under the Jingzhou District. The town is 3.75 km long in east-to-west direction and 1.2 km wide in south-to-north direction. The total area is 4.5 km^2. Within the town there are 106,240 registered residents. Among these people, approximately 1700 belongs to minority ethnic groups including Tujia, Manchu, Hui, Mongolian, Hmong, Zhuang, Uygur, Dong, Zhang and Buyi, Li, Yi and Yao. However, these minorities are blended in the Han groups with no clustered concentrated minority residential areas. In the Historic Town, there are 2494 poverty household (or 5196 people) receiving poverty subsidy. The city of Jingzhou has a brilliant resource for tourism development and the income generated from tourism represents 10% of the GDP of the city.

5.1 Environmental and Social Sensitive Sites/Areas

The Component A is focusing on the conservation of the cultural heritage sites and the development of tourism facilities. The sensitive sites are mainly the cultural heritage sites and the residents in proximity to these works. The Component B is focusing on the upgrading of the water networks. Therefore the sensitive sites are mainly the water bodies and residents in proximity to the works. The Component C is focusing on the upgrading of the facilities for the

transportation system. Based on the nature of these proposed components, the EIA has identified sensitive sites in the project affected area that will need to be protected during project implementation. The sensitive sites are mainly the physical cultural resources, the residential areas and the waters in proximity to these proposed facilities under the Project. These sites are identified as sensitive sites due the below reasons, the impacts and associated mitigation measures are discussed in Section 5 and Section 8.

The physical cultural resources are subject to impacts during project construction and these impacts can cause potential damage of these resource and lead to irreversible loss of cultural value;

The communities, particularly the schools and hospitals, are subject to impacts during project construction in terms of traffic congestion and safety issues and noise, and in operation stage in terms of noise.

The water bodies are subject to impacts during project construction and operation and these impacts can cause potential pollution of the water quality.

Physical Cultural Resources

Jingzhou is a famous city with historic significance. The municipality is rich in tourism resource especially due to its historic cultural resources. Within its jurisdiction, there are 595 cultural heritage sites among which 15 are national level protection units, 52 are provincial level protection units and 527 are municipal level protection units. The historic cultural resources in or near the project area are identified with local cultural bureau and experts during the consultation and summarized in the Table below.

Table 5 Cultural Heritage Sites in Project Area

No.	Name	Location	Category
1	City Wall of Historic Town	Historic Town	National Level (Batch 4 in 1996)
2	Xiongjiazong: Tomb of Chu Dynasty	45 km to the north of Jingzhou City	Provincial Level (Batch 2 in 1981)
3	Jingzhou Museum	Jingzhou Road (north side)	4A Scenery Area (2000)
4	Historic Buildings	Along Dongdi Street and Nanmen Street, 13 places	No. 18 and No. 10 Dongdi Street, and No. 46 Nanmen Street are provincial level cultural protection units. Others are cultural resource sites and traditional residential houses.
5	Kaiyuan Taoism Temple	To the west of Jingzhou Museum	National Level (Batch 6, 2006)
6	Bingyanglou Building	Near East Gate	National Level (Batch 4, 1996)

Communities

- For Component B, the sensitive receptors are 1 recovery center for disables and 2 schools, and there are 37 households (150 persons) of the Fanrong Street is the sensitive receptor because it is in the west side of the temporary site for stacking sludge.
- For Component C, 1560 households(3750 persons) lived along the inner ring road, since construction is not carried out in the night, it has minor impacts on the residents, there is no

significant sensitive receptors are the residents along the inner ring road. The summary of communities are summarized in the table below

Table 6 Sensitive receptors in the Project Area

Component	Sensitive receptors	Location	No. of Households	No. of affected people
Component B	Jingzhou Recovery Center for Disables	North of Nanmen Street		170
	Jingzhou Vocational Technology School	East of Historic Town		300
	Jingzhou Science and Technology School	East of Historic Town		500
	Residents in Fanrong Street	West of the West Gate	37	150
Component C	Residents along inner ring road	Along inner ring road	1560	3750

Water Bodies

- The moat around the Historic Town;
- The Xihu Lake in the town;
- The Ponds in the northeastern area of the town.

Table 7 Water Bodies in the Project Area

No.	Name	Location	Function
1	Moat	Outside the city wall	Landscaping
2	Xihu Lake	West side of the town	Landscaping
3	Ponds	Northeast site of the town	Landscaping

6. IMPACTS ASSESSMENT AND MITIGATION MEASURES

The proposed project aims at assisting Jingzhou Municipality in conserving its cultural heritage, promoting tourism development and enhancing the quality of life of residents in the perimeters around the Historic City, it can bring in multi-folder positive benefits. The positive benefits include (1) improvement of ecological environment and water quality in the river networks; (2) improvement in employment opportunity and income level through the tourism development; (3) improvement in living conditions through better accessibility; and (4) improvement in cultural heritage protection and conservation.

Meanwhile, there are also potential adverse environmental and social impacts envisaged during the project construction and operation stages. Based on the environmental impacts assessment reports and social safeguards documents, the adverse impacts are primarily related to:(i) impacts on ecological environment; (ii) impacts on river systems; (iii) impacts on physical cultural resources, (iv) community impacts such as resettlement and land acquisition, noise, dust, odour, solid waste, community disturbance and safety etc, and (v) social impacts.

These impacts are carefully assessed in EIA and SA, and measures have been developed in ESMP and RAP. In summary, the project will not have significant adverse environmental and social impacts, will not result in significant degradation or conversion of ecological environment,

and will not have significant impact on physical cultural resources. The mitigation measures in the ESMP would avoid, minimize, and mitigate the impacts to acceptable levels. The key findings of potential impacts and mitigation measures are summarized as follows:

6.1 Impacts on Ecological Environment

Vegetation. The project is located mostly in urban areas that have been affected by intensive human activities. According to the field investigation conducted by the EIA consultant, there is only vegetation along the old city walls in the project area. Other areas are developed with minimal vegetation. The project will permanently acquire 17.94 mu of state owned construction land. The occupation of these lands will cause permanent vegetation loss in the area. However the field investigation also confirmed that these areas are current developed with housing buildings. Therefore the vegetation loss is not significant, especially as there will be post-construction landscaping to offset any potential vegetation loss.

It is noticed that there are some cypress trees in the project area. Special care is needed during construction to avoid damage to these trees. Necessary protection measures have been identified and included in the ESMP.

Aquatic system.

The dredging will have adverse impacts on the aquatic system in the moat and lakes. The EIA suggested the hydraulic method for dredging activities to minimize impacts on the aquatic system, particularly the benthic species. When the dredging is completed, the river functions will be restored immediately. Given that the moat and lakes are not spawning sites or migrating routes for fish species and the species are common in the region, these dredging activities will not cause significant adverse impacts on the aquatic ecological systems. Strict mitigation measures and monitoring plans have been developed and included in the ESMP.

6.2 Impacts on River System and Mitigation Measures

There are 3 water bodies likely to be subject to the wastewater impacts and dredging impact. The wastewaters during construction are mainly construction wastewater, domestic wastewater and sediment filtrate. The construction wastewater is mainly from the cleaning of vehicles and equipments that contains high SS and oil content. The domestic wastewater is mainly from the construction workers and has high content of COD, BOD and SS. Among these wastewater, the sediments filtrate will have the highest volume, reaching up to 1400 m3/day. The sediment filtrate contains high SS, COD, TN, and TP. To address these impacts, adequate mitigation measures have been developed in the EIA and in the ESMP, such as collecting and treating the construction wastewater through oil-separation and sedimentation, and recycling the wastewater after treatment; the use the local sewers to accommodate the domestic wastewater; add coagulants to sediment filtrate as pre-treatment to Standard IA before discharging into the moat; and proper management of material storage and construction site drainage.

The dredging can cause re-suspension of sediments and release of pollutants contained in the sediments. The EIA strongly suggested using environment-friendly dredging technologies to minimize the environmental impact. With use of advanced technologies and equipments, the impact of dredging can be minimized.

The proposed project also includes an “Enhanced Interconnectivity of Water Bodies and Flow Augmentation” subproject which will introduce fresh water from the water resource allocation

plan of local government to help improve the self-purification capacity of the water bodies and improve the water quality in them. Currently the associated works for the water introduction has been completed, and the proposed project will construct the connection works including the pumping house to hydraulically connect the water introduction works with the proposed project.

During operation the wastewaters are mainly the domestic wastewater from the tourists induced by the improved tourism. The wastewater will be conveyed to the Caoshi Wastewater Treatment Plant for treatment through existing sewers. Therefore it will not impact the river system in the town. During operation, the flow augments by improved connectivity and pumping houses will cause increased flow rate. Discrete monitoring and control can reduce the sediments re-suspended and pollutant release if the flow rates do not exceed certain range. In addition, mitigation measures have been developed to mitigate accidents-induced impacts by enforcing speed limit when crossing the sensitive water bodies. All these measures have been included in the EIA and ESMP.

6.3 Physical Cultural Resource

There are six physical cultural resources in or near the project area, among them 5 are direct target of protection in Component A. Currently most of the cultural heritage sites, especially the city wall, are in poor condition. This project will improve the physical conditions of the cultural heritage sites using the internally adopted good practice. At the same time, this project will support the capacity development in cultural heritage protection and management to achieve sustainable cultural heritage conservation.

Component A is specifically designed to conserve the physical cultural heritage in the Historic Town. The interventions include: (1) use of reversible technology to repair the main body of the cultural heritage; (2) reinforce the carrier of the cultural heritage; (3) monitor and prevent natural disaster; and (4) Strengthen cultural heritage management. These interventions will not adversely impact the main body of the heritage using the internal good practice but will help maintain the historic value in a sustainable manner. Therefore the project will have significant positive impacts on the physical cultural resources.

During the preparation of the EIA, the local cultural bureau and experts have been consulted for screening and scoping of the potential impacts on the physical cultural resources and their suggestions for mitigation measures. The draft EIA and ESMP have also been provided to the bureau and experts for comments during the second round of public consultation. During the construction stage, improper protection plans or improper construction conduct will cause potential adverse impact to the cultural heritage sites. For example, the soil excavation near these sites might cause damage to the foundation of the sites that could undermine the structural integrity. The vibration from the heavy construction vehicles or machines can also weaken the historic structures. In addition, the excavation of the ditches for construction of the wastewater pipelines near the ancient wall may cause effect on the foundation of the wall by reducing the groundwater level leading to subsidence of soil under the foundation. However as the ditches is only 1 m deep and 1 m wide as per to the design and will be constructed section by section, so the excavation of the small ditches would not significantly modify the hydro-geological condition near the site, thus causing minor impact on the safety of the ancient wall. The dredging of the moat will adopt the hydraulic method that will not cause the depletion of the ground water, thus avoiding the impact of the soil subsidence under the historic structures. An ECOPs have been prepared based on the comments from the experts and the cultural bureau by the EA team for the Component A and a monitoring plan has been developed as an integral part of the environmental monitoring plan. In addition, trainings need to be provided to the construction

workers to improve the awareness of the cultural heritage protection to avoid potential impact from misconduct and the training need has been considered in the overall training plan under the ESMP. With these measures properly implemented, the potential adverse impacts on these physical cultural resources can be effectively mitigated.

In addition, the chance-find procedure has been developed and included in the EIA and ESMP.

6.4 Natural and Social Impacts

(1) Land Acquisition and Resettlement

The proposed project will have social impacts related to the need for land acquisition and demolition of a number of structures. There will be a total of 17.94 mu of State owned lands to be permanently acquired which are mostly construction land. The acquisition of this land will affect 38 household (125 people) and 2 institutes. A total of 8180 m^2 GFA (gross floor area) of buildings will be demolished on this land, among which 3980 m2 are household buildings and 4200 m2 are shops and office buildings owned by the 2 institutes.

In addition there will be 566.5 mu of collective owned land to be temporarily acquired during construction, in which 317 mu belongs to the city gardening bureau and the other 249.5 mu belongs to the Jingcheng Village. The details are also discussed in Section 9.

To address the community impacts of land acquisition and resettlement, a Resettlement Action Plan (RAP) has been prepared in line with relevant Chinese laws and regulations, and World Bank OP 4.12. The RAP has adequately addressed the impact, compensation standards, institutional arrangement, public participation with consideration of gender issues; budget arrangement and grievance redress mechanism.

(2) Noise and Dust

The noise sources during construction mainly come from construction machines/equipment and material hauling vehicles. Along with noise, earth excavation, backfilling and pavement can cause secondary dust impacts on nearby communities. Such noise and dust impact is of temporary nature, but can be a major nuisance to the local communities.

The dewatering process of the sediments from the dredging activity also will generate noise affecting the residential buildings 50 m from the dewatering equipment. The noise level on the residential buildings is estimated to be in compliance with the standard; however the monitoring plan includes the noise monitoring activity for the residential buildings to determine the need for establishment of noise barriers.

To address such nuisance, effective mitigation measures have been developed in the EIA and in the ESMP, e.g. ban of night-time construction near communities; proper arrangement of construction schedule to avoid impacts on schools; enforcement of speed and horning control; utilization of low noise techniques and maintenance of machinery/vehicles; application of frequent water-spraying to quench dust; enforcement of truck cover for material transportation; enforcement of proper management of material storage; timely removal of spoil waste etc. With effective implementation of the mitigation measures, the nuisance of noise and dust from construction can be adequately mitigated.

During operation stage, the traffic on the project roads will have potential impacts of vehicle traffic noise on the nearby communities. However, the acoustic environmental quality is expected to be improved due to smooth traffic achieved by the proposed project. Traffic noise mitigation measures for those communities subject to noise exceeding applicable standard have been developed and budgeted in the ESMP, including vehicle control and speed limit/no-horning signage. Thus the impact on the acoustic environment by traffic noise is minor and easily be mitigated.

During operation stage, the operation of the project facilities, i.e. venting and air conditioning system of parking lot, and pumping system in pumping houses, will also have potential impacts of equipment noise on the nearby communities. The site survey indicates that there are no sensitive receptors, such as residential area, in close proximity of the pumping house. Mitigation measures such as adoption of low-noise equipments and sound barrier walls are proposed in the EIA and included in the ESMP. In addition, the pumps will be installed underground, the noise level will be reduced to the perspective standard of the boundary of the pumping house by these measures.

During operation stage, the tourism facilities will receive larger volume of tourist which will cause noise. However, the noise prediction results suggested that the noise level in the tourist centers will not exceed standard value limits.

(3) Exhaust gas and odor

The exhaust gas sources during construction mainly come from construction machines/equipment and material hauling vehicles. Such impact is of temporary nature, and will not be a major nuisance to the local communities.

The dredged sediments will be temporarily stored in ponds for further treatment and drying before use as construction material for site grading. A buffer distance of 30 m has been designed between the ponds and the residential areas nearby, so as to reduce the potential odour to the standard at the residential area.

During operation the exhaust gas sources mainly come from vehicles on the project roads. As the project will improve the road traffic by Component C, the vehicular emission will be reduced by the improved traffic conditions. The odour source mainly come from the, toilets of the tourist centers and garbage collection stations. With effective implementation of mitigation measures, the nuisance of exhaust gas and odour can be effectively mitigated. These measures are also included in the ESMP, such as timely collection and transport of garbage, routinely spray of odour reducing materials, etc.

(4) Solid waste

The solid wastes during construction are mainly the construction waste and the domestic waste from construction workers. Mitigation measures have been developed according to the national regulation, i.e. the Standards for Construction Site Environmental Management, and included in the ESMP, such as reusing the spoil for filling and grading, enhance construction site management, and timely collect and transport offsite, etc.

The dredging works will remove 302,000 m3 sediments from the lakes and moat which will increase to 604,000 m3 with water content ranging from 70% to 95% during the dredging requiring treatment and disposal. Hydraulic method will be used to dredge the sediment which

will then be pumped through pipeline to a booster pump station to the dewatering equipment installed to reduce the water content of the sediments to 40% for temporary storage and use as construction materials in municipal works for landscaping and construction of constructed wetland. The amount of sediments after dewatering is up to be 160,000 m3, the demand for the dredged sediments has been identified and confirmed by the government, among which 151,000 m3 sediments will be used in construction of constructed wetland, and the remaining will be used for landscaping. The two temporary storage yards have a combined area of 48,200 m2, which will become 41,000 m2 net of the buffer distance of 30 m. The temporary yards have adequate space to accommodate the dewatered sediments before the sediments being used. The temporary yards will be constructed with lining system and the wastewater from the yards during the sediments storage will be treated using coagulation and sedimentation process to the quality for being discharged into the rivers. In case that the amount of dewatered sediments exceeds the storage capacity of the two yards, the Baishuitan yard in the development zone will be used to accommodate the surplus sediments. The temporary storage of the sediments may cause health concern on the operating staff and the public. The sediments storage may cause breeding of flies and vectors if they are not transported out of the yards in timely manner. The protective gears will be provided to the operating staff and the piles of the sediments will be covered with soil to reduce the breeding of flies and vectors.

The solid wastes during operation are mainly the domestic garbage. Mitigating measures have been developed and included in the ESMP, such as enhance community garbage management by timely collecting and transporting, etc.

(5) Traffic Interruption and Safety

Construction activities will inevitably cause interruption on traffic, including blocking or narrowing existing road surface, traffic congestion, increase of material hauling vehicles through communities etc. These will adversely impact the daily life of nearby communities and villages, and cause potential increase of traffic accidents, particularly near the schools and hospitals. To address these impacts, mitigation measures have been developed in the ESMP, e.g. safety fences and signs; traffic diversion plan and staff; information disclosure and prior notice; community safety education; community participatory monitoring; ongoing public consultation plan during construction etc.

(6) Local Business and Shops

Construction activities will inevitably cause disturbance on local business and commercial activities by blocking the accessibility and cause inconvenience, as well as high noise and dust may cause the customers to dodge away from the business. To address these impacts, mitigation measure has been developed in the ESMP such as provision of access roads, water spray and use of lower noise equipment. In addition, compensation will be provided to offset the potential loss caused by the project.

6.5 Induced Impacts

(1) Infrastructure

After the project is completed, it is estimated the tourist visit will increase. The increased volume of tourists will pose pressure on existing infrastructures. The current Feasibility Study (FS) estimated that the tourist volume will increase to 4.01 million/year (or 11,000 per day) by 2020. the tourism development plan of the city indicates that there are already sufficient accommodation capacity in hotels and sanitation service in place for the increased tourists.

The increased tourist volume will create approximately 1100 m3/day of wastewater. The sewer service in the historic town area is covered by the Chennan Wastewater Treatment Plant (WWTP) and the Jingzhou Caoshi WWTP. The Chennan WWTP has a design capacity of 140,000 m^3/day and is currently operating at 47,400 m3/day (average). The Jingzhou Caoshi WWTP has a design capacity of 120,000 m^3/day and is currently operating at 26,900 m3/day (average). Therefore the WWTPs have sufficient treatment capacity to address the increased domestic wastewater from tourists in the ancient city. However in the Xiongjiazhong area, there are currently no sewer collection and wastewater treatment for the small amount of wastewater. The EIA therefore suggested that the management organization of the Xiongjiazhong area should consider install small on-site wastewater treatment facilities to address the increased wastewater production.

The increased tourist volume will create approximately 11 tons/day of garbage. The garbage treatment service is covered by Jimei municipal solid incineration plant in Jinan Township to the south of the Jingzhou City. The plant is approximately 7 km away from the Historic Town. The Plant has a design capacity of 1000 tons/day which is sufficient to address the increased garbage production from tourists. In addition, the Jingzhou sanitation system has sufficient collection and transportation capacity to address the additional garbage. Therefore no additional measures on the solid waste management is proposed in the ancient city. However in the Xiongjiazhong area, there are currently no sewage collection and wastewater treatment capacity. The EIA therefore suggested that the management organization of the Xiongjiazhong area should consider garbage collection and transportation facilities to convey the garbage to Jimei plant for disposal. And the suggestion has been admitted by local government.

The increased tourist volume will also create increase in traffic volume. To address the increased demand for transport due to the tourism development, the project will upgrade the inner ring road through structural interventions and upgrade the traffic management through a combination of structural and non-structural interventions without expanding the existing roads. In addition, the project will finance public transportation to connect the ancient city with the Xiongjiazhong Area to handle the tourist flow between the two attractions. After the project implementation, a comprehensive traffic management system including the road network, slow traffic management, parking, public transportation, and traffic signage subsystems will be developed.

(2) Economy

The tourism development will promote local economic development and employment, which will lead to improvement in income level, creation of employment opportunity and living conditions of local people.

6.6 Cumulative Impacts

The methodology for the cumulative impact assessment defined in the Good Practice Handbook-Cumulative Impact Assessment of IFC has been adopted. During the assessment, various VECs were considered based on the nature, location, scale and magnitude of the proposed project. Through the consultation with relevant groups and experts, the VECs selected for further cumulative assessment is the water quality in the city in terms of COD and NH3-N. The relevant projects in the past, present and future have been identified through review of the water pollution load reduction plans for the 11th five-year and 12th five-year plan respectively, and the implementation reports issued by government on the 11th five-year and the progress reports for the 12th year. Thus a matrix method is used to assess the cumulative impacts of these project

and the proposed project. The result of the cumulative impact show that this proposed is an important part of the overall water pollution control effort in the city and the combined reduction of the water pollution loads from the projects exceed the target set by the government. .

7. ANALYSIS OF ALTERNATIVES

7.1 With/Without Project

The proposed project has many advantages as it can help (1) protect the physical cultural heritage in the project area; (2) improve the living condition and promote the sustainable tourism development; (3) facilitate the overall tourism development in Jingzhou Municipality; (4) create a basis for economic re-structuring; (5) facilitate the development of new urban area.

While the proposed project will bring in significant environmental and social benefits, it will also bring in some adverse social and environmental impacts during implementation including the construction and operation phases. The construction phase impacts mainly include some social and environmental disturbance such as traffic congestion, noise, wastewater, solid waste and vegetation damage. However, most of the impacts are temporary in nature and can be avoided or mitigated through proper measures. The operation phase impacts mainly include the waste (air, water, and solid waste) produced by the increased volume of tourists and the cultural conflicts brought by the tourists. These impacts can be mitigated through proper measures easily be developed. The mitigation measures have been developed and included in the safeguard documents including the EIA and the ESMP.

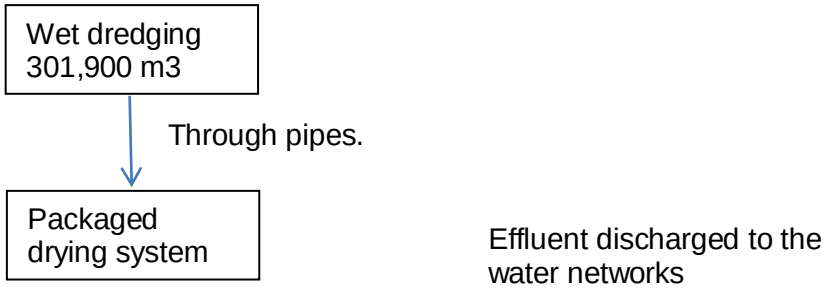
7.2 Dredging

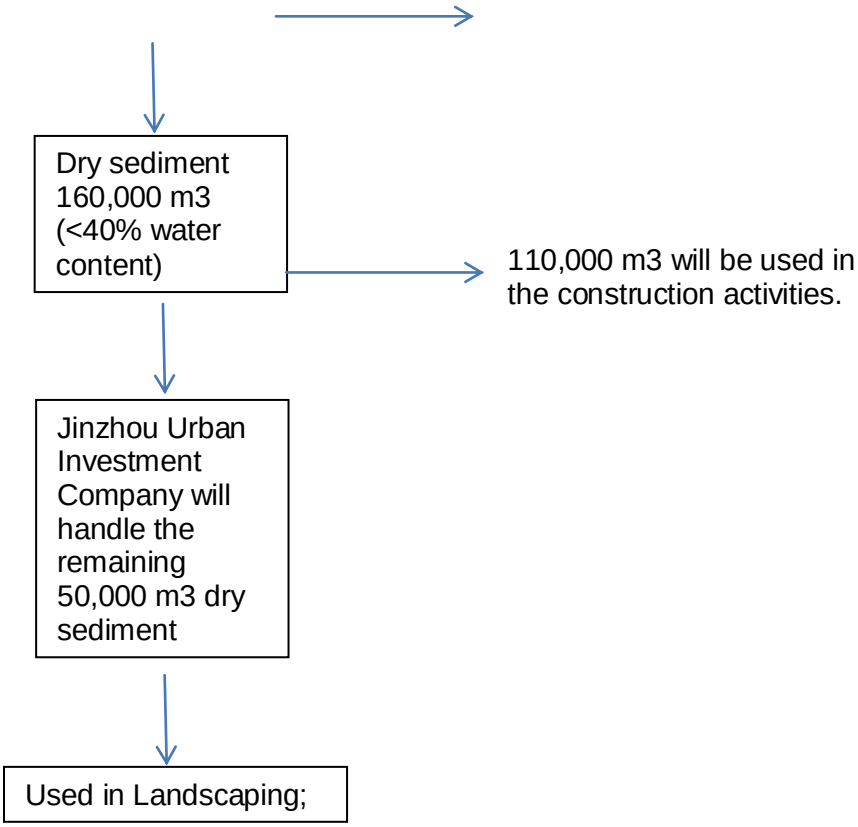
The EIA compared dry dredging (use cofferdam to form a dry area and use excavator to remove the sediment) and wet dredging (use dredging boat to cut and suck the sediment out). The dry dredging methods have the advantage of lower cost, however the drying of sediments will cause significant environmental impacts, particularly depletion of groundwater that would damage the foundation of the historic structures nearby. The wet dredging methods, on the other hand, have insignificant impacts on the environment. In addition there are more choices of disposal methods for the sediments if wet dredging is adopted. It creates opportunity of beneficial utilization of the sediments. Therefore the wet dredging method is recommended in the EIA.

7.3 Sediments disposal

For sediments disposal, the EIA compared sanitary landfill, incineration and use as construction materials for site grading and landscaping. The use as construction materials method has the minimal impact on environment. Therefore the use of sediments as construction materials is recommended.

The complete sediments flow diagram is illustrated in the Figure below:





7.4 Artificial Wetland

The EIA also compared different options for artificial wetland. The water purification capacity is the major consideration. After comparing different options, the EIA recommended the option 3 that adopts the surface flow + vertical submerged flow for Xihu Lake 1, horizontal submerged flow for Xihu Lake 2, and surface flow for Beihu Lake.

8. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Public consultation and information disclosure have been conducted following the national laws and regulations, as well as World Bank *OP4.01 Environmental Assessment*. The first round of public disclosure was on September 26, 2014 by publicizing the EIA outline on the official website of HAES and at project sites. The second round of public disclosure was conducted on March 24, 2015 by publicizing the full EIA report and ESMP on the official website of HAES and project sites. In addition, the EIA report was also published on March 26, 2015 on the local newspaper and the official website of the Jingzhou Municipality.

Table 8 Summary of Information Disclosure

	Date	Methods	Content
1st round	September 26, 2014	Poster at project sites; HAES website: http://www.hbepb.gov.cn/wsbs/gsgg/hpgs/hpdwhp/201409/t20140926_72710.html	Project title and construction content and potential impacts; the project developer's contact; appointed EIA agent and EIA agent's contact; main tasks of EIA; method for submitting public opinion

	Date	Methods	Content
2nd round	March 24, 2015	Poster at project sites; HAES website: http://www.hbepb.gov.cn/wsbs/gsgg/hpgs/hpdwhp/201503/t20150324_76021.html	Project title and construction content; summary of potential environmental impact and mitigation measures; key points of EIA put forth in environmental impact assessment report; particular method for consulting public opinion
I	March 26, 2015	Local newspaper: Jingzhou Daily Poster on site; The official website of Jingzhou Municipal People's Government: (http://www.jingzhou.gov.cn/article/zxgg/138612.html	Revised draft of Project EIA report and environmental & social management plan

The first round of consultation was carried out during November 2014 through a combination of public meetings, field interview, and questionnaire survey with project affected people and groups.

The affected people were consulted in influence area of the project. The project received a broad support from the public consulted who expressed strong wishes to speed up the project implementation. The key environmental and social concerns from the public are mainly related to dust and noise impact, and traffic disturbance during operation stage. These concerns have been adequately considered in the mitigation measures in the ESMP and EIA, and will be closely supervised and monitored during construction period. As an integral part of the consultation, the local government department for cultural resources and relevant experts have been consulted throughout the public consultation process and their suggestions and comments have been responded and considered in the project design, mitigation measures and the monitoring plan.

Table 9 Summary of Public Consultation

	Time	Place	Participants
1st for Resettlement	September to October 2014	Jingzhou historic town	Project management office, FSR consultant, Land Expropriation Compensation Office of Jingzhou District, Xicheng Street Office for resettlement of affected residents, affected enterprises and institutions, affected village cooperatives, affected population, Wuhan University, Jingzhou Cultural and Tourism Bureau and relevant experts
First EIA Consultation	November 10 to November 28, 2014	Affected people; relevant agencies	Individuals: Affected residents in project area; Groups: Jingzhou Environmental Protection Bureau; Jingzhou Cultural Tourism Bureau and relevant experts; Jingzhou Bureau of Land and Resources; Jingzhou Water Conservancy Bureau and etc
Second EIA	March 21 to March 27, 2015	Affected people; relevant agencies	The public in affected area of project construction, Jingzhou Cultural Tourism

Consultation			Bureau and relevant experts, officials from local government and authorities

Between March and October of 2014, a public survey was conducted to collection public opinion on the project's potential social impacts. 447 questionnaires were distributed and received. The feedbacks were collected and analyzed and responded. The findings were reflected in the process of preparing resettlement plan.

Between September 2014 and March 2015, there have also been 6 rounds of public consultation to disclose and discuss the project social impacts, land acquisition and demolishing, resettlement methods and local intentions, housing resettlement policy, compensation policy, and restoration of shops and enterprises.

9. ENVIRONMENTAL MANAGEMENT PLAN

The EIA included an environmental management plan. In addition, a stand-alone Environmental and Social Management Plan (ESMP) has also been developed, which specify environmental management and supervision roles and responsibilities, mitigation measures, environmental monitoring plans, capacity training and budget estimates. Key issues are summarized in this section while the details can be referred to the EIA and ESMP documents.

9.1 Roles and Responsibilities

The implementation of ESMP requires the involvement of multi institutions, each fulfilling a different but important role to ensure effective environmental management for the project. The main responsibilities of various stakeholders are summarized in the following table.

Table 10 Key Environmental Management Responsibilities

Task	Institutions	Responsibility
Environmental management	Jingzhou Municipal PMO	• Establish environmental and resettlement department with dedicated staff; • Ensure incorporation of ESMP measures into bidding document and civil work contracts; • Supervise the implementation of ESMP; • Organize and coordinate safeguards trainings; • Provide semi-annual environmental and social safeguards progress reports to the World Bank; • Entrust external environment expert to monitor the project; • Receive and resolve public complaints and provide resolution results to the public; • Ensure proper archive of project documents.
Environmental supervision	Jingzhou Municipal EPB	• Review and approve EIA • Supervise the environmental compliance of construction and operation.
	Jingzhou Municipal Cultural and Tourism Bureau	• Review and approve the heritage protection plan before the construction commence • Supervise the heritage protection compliance of construction and operation • Final check and accept the heritage protection

Task	Institutions	Responsibility
		construction
ESMP measures implementation	Contractor	• Implement mitigation measures as per bidding documents, contract and ESMP; • Prepare mitigaiton measures and submited to the environemntal supervisor/cultural relics experts for approval • Establish environmental management system with dedicated staff; • Receive supervision and guidance from project owner, environmental supervision engineers and local governments; • Provide regular environmental reports to PMO
Consultant	Design institute	• Prepare FSR and project designs • IncoRAPorate ESMP requirements into design documents
	Environmental Supervision Engineer	• Supervise the implementation of ESMP measures by contractors as per contract requirements; • Review and approve the mitigation measures preovided by contractors; • Provide regular supervision reports to PMOs.
	EIA consultant	• Prepare EIA and ESMP
	Environmental monitoring institute	• Licensed institute to conduct monitoring plan of ESMP for both construction and operation stages • Provide monitoring reports to PMOs

9.2 Mitigation Measures

Mitigation measures proposed in pervious sections have been summarized in the EIA and three ECOPs for generic, physical cultural resources and dredging works respectively as an attachment to the ESMP. In addition, the specific mitigation measures for the sensitive receptors have been developed and included in the ESMP.

The mitigation measures follows the national laws/regulations, technical guidelines and construction norms, with references to previous similar project experiences and World Bank safeguards policies and *Environmental, Health, and Safety General Guidelines.*

9.3 Environmental Supervision

During construction, environmental supervision shall be carried out by qualified supervision unit reporting to the PMOs. Each supervision engineer company will be required by contract to assign dedicated Environmental Supervision Engineers to supervise the daily implementation of environmental protection measures by contractors. The key responsibilities of the environmental supervision engineers include:

- Develop environmental supervision plan prior to commencement of construction;
- Review preliminary design and detailed design to ensure that environmental mitigation measures in ESMPs are incorporated into project design;
- Assist PMOs to organize and implement environmental training for contractors and management staff;

- Review environmental specifications of the construction contracts;
- Review the mitigation measures developed by the contractor;
- Review construction organization plan, technical plans and construction schedule to ensure proper handling of environmental safeguards issues;
- Review environmental compliance of construction equipment and machines;
- Conduct daily supervision on ecological protection, water, air and noise impact, and supervise the implementation of environmental mitigation measures, and accept and sign off the completion based on environmental compliance;
- Identify problems of ESMP implementation and enforce correction by contractors;
- Provide regular reports on ESMP implementation status to PMOs.

9.4 Environmental Monitoring Plan

Comprehensive environmental monitoring programs have been designed for construction and operation phases for the community infrastructure facilities and public service facilities. Monitoring includes water quality, noise, and ambient air quality. The PMOs will entrust licensed environmental monitoring institutes to carry out these plans. (Please refer to the ESMPs for detailed monitoring plans)

9.5 Capacity Training

To ensure effective implementation of environmental management plan, environmental training program has been developed. Environmental training will be conducted prior to the commencement of construction, with target groups of relevant staff of all PMOs, contractors and supervision engineers. Training contents will include relevant national environmental laws/regulations; World Bank safeguards policies, environmental management plans, environmental supervision and monitoring techniques and procedures, Environmental Code of Practices (ECOPs), if any, and reporting requirements etc. A total budget of RMB 700,000 has been planned for the environmental training plans in the ESMP.

9.6 ESMP Budget Estimates

All mitigation measures have been budgeted and fully incorporated in project costs including monitoring and supervision. The total ESMP budget includes the environmental protection cost estimate and resettlement cost estimate. The environmental protection budget for the project is USD 1,270,970, (equivalent to RMB 7,880,000), of which USD 220,970 (equivalent to RMB 1,370,000) is included in the engineering cost and USD 1,050,000 (equivalent to RMB 6,510,000) is additionally required by the EA.

Table 11 Cost Estimate for Environmental Management

	Environmental protection measures			Quantity	Investment (1,000USD)	Remark
	Part I. Environmental monitoring					
	Environmental monitoring during construction period			5 years	80.65	Additional
	Environmental protection acceptance and monitoring upon completion			-	112.90	Additional
	Part Ⅱ environmental protection measures					
Construction period	Wastewater	Basic washing wastewater	Reuse after sedimentation	13 sets	12.90	Additional
		washing wastewater	Reuse after oil separation and sedimentation	9	12.90	Additional
		Foundation pit wastewater	Reuse after treatment via secondary sedimentation tank	17	12.90	Additional
		Spoil ground residual water	Discharge after coagulation-sedimentation	2 spoil grounds	241.94	Additional
	Exhaust gas	Fugitive dust	Equip with small tank car to sprinkle road and working face to effectively suppress dust pollution	Self-made	16.13	Engineering cost
	Noise	Construction noise	Set up noise reduction facility such as temporary sound insulation baffle at the location near residential area	10	25.81	Engineering cost
	solid waste	Construction scraps and demolition waste	Reuse in civil work	5,550 t	22.58	Engineering cost
		Domestic waste	Rely on existing municipal sanitation system	375t	8.06	Engineering cost
		Dredged sediment	Reuse in wetland and revetment construction after dewatering and solidification	300,000m3	51.61	Engineering cost

	Environmental protection measures			Quantity	Investment (1,000USD)	Remark
	Ecological protection	Restore temporary land, water & soil conservation, soil restoration			301.61	Additional
	Social	Public	Media and public notice; billboard at construction site	30 locations	6.45	Engineering cost
Operation period	Wastewater	Sewage	Standard Grade-2 handover by Caoshi Wastewater Treatment Plant after sedimentation in the cesspool, then discharged to secondary Caoshi Wastewater Treatment Plant for further treatment	1	46.45	Engineering cost
		Connection channel	Sludge cleaning	9 locations	8.06	Engineering cost
	exhaust gas	Exhaust gas	Forced exhaust fan system	1 set	24.19	Engineering cost
	Noise	Protection at acoustic sensitive point	Sound insulation and noise reduction at pump station	2	19.35	Engineering cost
	Solid waste	domestic waste	Set up sorted trash bin, timely cleaning and pick-up		32.26	Engineering cost
		Common waste				
	Part III environmental management					
	Training of environmental management participants during construction period				112.90	Additional
	Cost for external monitoring				161.29	Additional
	Total environmental protection investment				**1270.97**	

*Costs marked “Additional” are induced by measures required in the EA. Costs marked “Engineering cost” are costs included in the engineering cost.

9.7 Land acquisition and Resettlement

The needs for land acquisition and resettlement has been studied and summarized in the Resettlement Plan (RAP) endorsed by the Jinzhou Municipal Government. The overall needs of land acquisition and resettlement are summarized in the Table below.

Table 12 Needs of Land acquisition and resettlement

Subprojects	State owned land, mu	Temporary land acquisition, mu	Demolished GFA, m2	Affected institutions	Affected shops	Affected households and people
East Gate Tourist Center	17.94	0	8180	2	13	38/125
Dredging and wetland	0	566.50	0	0	0	0
Total	**17.94**	**566.50**	**8180**	**2**	**13**	**38/125**

The compensation standards have been studied and implementation arrangements have been prepared. For the permanent and temporary land acquisition, relevant provincial compensation regulations will be followed to assess the appropriate compensation standards. For the buildings to be demolished on these acquired lands, the entities can either choose for monetary compensation or property swap. Independent property evaluation agencies will be used determine the compensation standards. For the shops on these acquired lands, compensation will be provided both for relocation and for business disturbance. Compensation and livelihood restoration will be provided to all 38 resettled households. Vulnerable groups will be given special care in the resettlement process. The households can choose at their will monetary resettlement or property swap resettlement. Current they are planned to be resettled in the Binhu Community which is approximately 500 m from their current locations. Detailed compensation standards and implementation arrangements are summarized in the table below and in the RAP.

Table 13 Summary of compensation standards

Category	Affected people	Compensation Standard
Temporary land acquisition	Jingcheng Village	RMB 2970/mu-year
	Sanguo Park	RMB 2970/mu-year
House	Land	Market value

Category	Affected people	Compensation Standard
demolish and state owned land acquisition	Private house	Property swap with 1:1 GFA. Subsidy for resettlement: RMB 10/m2 Transitional Subsidy: RMB 12/m2 per month, or RMB 800 whichever is higher. The transition should not exceed 2 years; otherwise the subsidy rate for transition after 2 years will be doubled. For attachment: Landline phone: RMB 100/set; Cable TV: RMB 300/household; Internet: RMB 300/household; AC: RMB 500 (3HP or above) or RMB 300 (below 3HP); Electricity-meter: RMB 400 (1-phase) or RMB 1500 (3-phase); Water-meter: RMB 1500/household; Water well: RMB 300/set; Water heater: RMB 1500/set (solar heated) or ; RMB 200/set (electricity or gas heated); Natural Gas: RMB 2400/household; Resettlement bonus: RMB 200/m2 with ceiling of RMB 20000 and floor of RMB 5000.
	Shops	Suspension subsidy: 5% of assessed value; Resettlement subsidy: RMB 10 /m2
Vulnerable household	Affected vulnerable household	Minimum standard for property swap: 20 m2 GFA (one-person household); 30 m2 GFA (two-person household) and 45 m2 (three and more-person household)

9.8 Budget

The total budget for land acquisition and resettlement is USD 15,916,460 (equivalent to RMB 98,682,048).

Table 13 Resettlement Cost Estimate

No.	Item	Amount, 1,000 USD
1	Basic Cost	13,369.56
1.1	Land acquisition	5,468.01
1.2	Demolishment	7,901.55
2	Other Cost	541.47
3	Administration cost	668.48
4	Contingency	1,336.96
	Total	15,916.46

Annex I Baseline of the Quality of Sediments

Indicators		pH	Water content	Organic matter	Cyanide	TN	TP	Hg	Zn	Cu	Cd	Pb	Total Cr	Total Se	Ni	As
			(%)	(%)	(mg/kg)	(%)	(%)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
1#	1-1 500m to the east of South Gate, H≤0.3	7.56	93	2.37	0.007	0.159	0.211	0.556	274	64.8	0.187	72.4	238	0.389	38.5	2.49
	1-2 500m to the east of South Gate, 0.3<H≤0.6	7.53	87.3	2.38	——	0.113	0.166	0.587	311	94.7	0.363	76.6	288	0.452	47.9	1.92
	1-3 500m to the east of South Gate, H>0.6	7.63	96.1	2.58	——	0.153	0.169	1.27	345	103.4	0.44	89	205	0.437	82.4	0.88
2#	2-1 100m to the east of New North Gate, H≤0.3	7.81	99	1.84	——	0.118	0.138	0.474	268	53.9	0.266	82.6	——	——	——	——
	2-2 100m to the east of New North Gate, 0.3＜H≤0.6	7.79	72.1	2.03	——	0.101	0.12	2.85	343	89.1	0.187	70	——	——	——	——
	2-3 100m to the east of New North Gate, H＞0.6	7.72	91	1.75	——	0.103	0.134	0.829	332	188	0.206	94.6	——	——	——	——
3#	3-1 Sediment in West Lake H≤0.3	7.59	88.4	0.868	——	0.189	0.186	1.02	250	47.4	0.392	81.9	——	——	——	——
	3-2 Sediment in West Lake 0.3<H≤0.6	7.8	79.6	0.408	——	0.126	0.115	0.741	297	69.9	0.544	49.3	——	——	——	——
	3-3 Sediment in West Lake H>0.6	7.57	85.8	0.659	——	0.415	0.228	1.59	349	88.5	0.531	61.3	——	——	——	——
Level II standard in GB15618-1995 Environmental Quality		6.5~7.5	——	——	——	——		0.5	250	200	0.3	300	300	——	50	30

Indicators	pH	Water content	Organic matter	Cyanide	TN	TP	Hg	Zn	Cu	Cd	Pb	Total Cr	Total Se	Ni	As
		(%)	(%)	(mg/kg)	(%)	(%)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Standard for Soils															
GB4284-84 Control Standards for Pollutants in Sludges from Agricultural Use	≥6.5	——	——	——	——		15	1000	500	20	1000	1000	——	200	75
GB18918-2002 Pollutant Discharge Standard of Municipal Wastewater Treatment Plants	≥6.5	——	——	——	——		15	3000	1500	20	1000	1000	——	200	75
GB/T23486-2009 Disposal of Sludge from Municipal Wastewater Treatment Plant – Quality of Sludge Used in Gardens or Parks	≥6.5	40	≥25	——	≥0.3		15	4000	1500	20	1000	1000	——	200	75
GB/T23485-2009 Disposal of Sludge from Municipal Wastewater Treatment Plant – Quality of Sludge for Co-Land filling	5~10	60	——	10	——		25	4000	1500	20	1000	1000	——	200	75
HJ350-2007 *Standard* of Soil Quality Assessment for Exhibition Sites (Interim)	——	——	——	8	——		50	1500	600	22	600	610	1000	2400	80

Annex II Leaching Experiment Result of Sediments

NO.	pH	As(mg/L)	Hg(mg/L)	Cu	Ni	Zn	Pb(ug/L)	Cd(ug/L)	Cr
1	7.15	0.0206	0.00007	ND	ND	ND	8.4	2.2	ND
2	6.89	0.0179	0.00009	ND	ND	ND	7.4	2.0	ND
3	7.02	0.0296	0.00013	ND	ND	ND	5.7	1.2	ND
Detection Limit (GB5085.3-2007)				0.02 mg/L	0.04 mg/L	0.005 mg/L	1 ug/L	0.2 ug/L	0.05 mg/L