

**World Bank Financed Hubei Jingzhou Historic Town Conservation Project**

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**Environmental Management Plan**

**(For the Four New Activities Proposed at  
Mid-term Review)**



**Project Management Office of World Bank Financed Hubei Jingzhou Historic Town  
Restoration and Protection Project**

**August, 2019**

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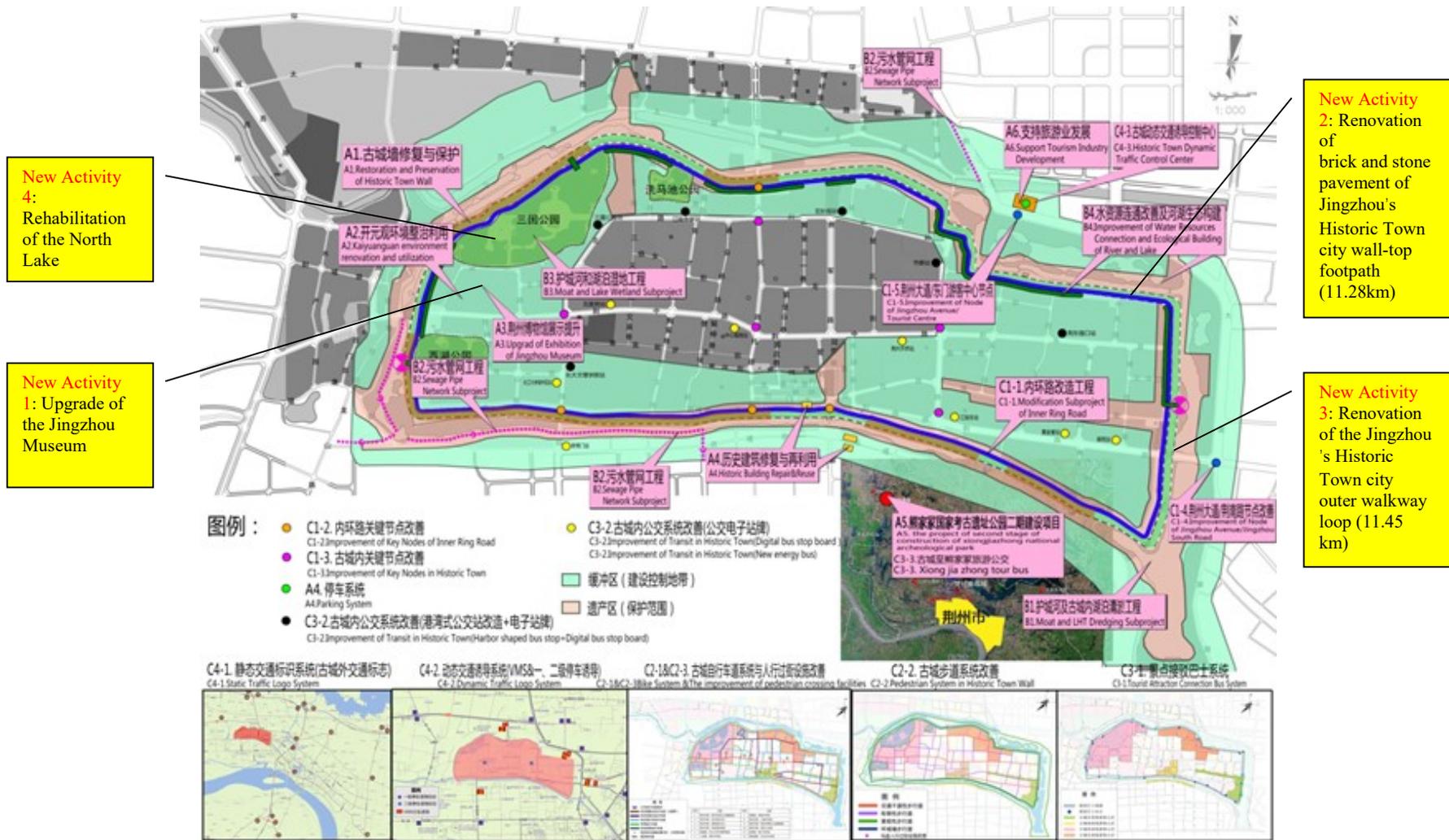
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Map- Illustrative Layout of The Four Proposed New Activities at MTR in 2019 (for detailed descriptions, see Section 1.3)

## A. Project Description

### 1.1 Background and Purpose

The World Bank Financed Hubei Jingzhou Historic Town Conservation Project was approved by the Executive Board of the the World Bank (IBRD) in January 2016, and the loan took effect in July 2016. During the project preparation phase, the Project Management Office of World Bank Financed Hubei Jingzhou Historic Town Restoration and Protection Project (the PMO) developed an environmental and social management plan (July 2015 edition) which was approved by the World Bank. During the project implementation stage, the dredging method and the location of sediment disposal yard in the subcomponent ancient wall moat dredging under the subproject *B-Improvement of Ecological Environment and Water Environment of Historic Town* were changed. Accordingly, the original environmental and social management plan was updated and approved in June 2017.

In 2018, during the project mid-term review, the PMO proposed to include four new activities in the original project scope, i.e., **upgrade of the Jingzhou Museum, renovation of brick and stone pavement of Jingzhou's Historic Town city wall-top footpath (11.28km), renovation of the Jingzhou's Historic Town city outer walkway loop (11.45 km) and rrehabilitation of the North Lake**. All those four proposed new activities are kept within the original project scope, featured as further enhancement, extension or optimization of the original project, and those are identical or very similar with the original project, so are the expected potential environmental impacts and corresponding mitigation measures. As such, the PMO developed this environmental management plan<sup>1</sup> (EMP, solely for the proposed four new activities at mid-term review) with the technical assistance from the consultant, Wuhan Zondy Green Environmental Technology Co., Ltd. The document will be submitted to the World Bank project team for review, and will be subject to revise after incorporating the opinions of all parties. Similar with the original environmental and social management plan, this EMP (for the proposed four new activities at mid-term review) is prepared as a part of environmental impact assessment. Final plan will be determined upon considerations such as engineering, cost and minimum impact on environment during project design and environmental assessment phase. As a part of proposed four new activities preparation and evaluation, environmental impact assessment has already been conducted. As a part of environmental impact assessment, EMP is formulated on the basis of the findings of environment impact assessment, especially those adverse impacts identified in project construction and operation. EMP also puts forward corresponding mitigation measures which could lower the impacts to be in compliance with national and local environment standards and applicable safeguard policies of the World Bank. Environmental impact assessment documents, including the EMP, combine project design with protection plan for environmentally sensitive items. The implementation of EMP will minimize the potential impacts of the proposed new activities on environment. In order to implement EMP effectively and practically, in project preparation phase, expense budget for environmental measures will be incorporated into proposed four new activities budget, environmental mitigation measures into technical specification documents of engineering procurement, training and consultation cost for the implementation of EMP into the total investment estimate of the proposed four new activities. In the meantime, the PMO will employ qualified and experienced external monitoring consultant (EMC) for EMP to independently conduct external monitoring. EMC shall monitor whether construction entity carries out all environmental measures specified in bidding documents and whether all environmental measures put forward in project preparation phase are effective and reasonable, so as to submit better suggestions to PMO for strengthening environmental management in project construction and operation.

### 1.2 Brief Review on Implementation Status of Original ESMP

The approved and updated environmental and social management plans have been strictly implemented during the project construction period and the mitigation/prevention measures for various negative impacts were adopted. Before and during the construction stage, the EMC conducted two environmental trainings for the contractors. Signboards and fences are erected at construction site boundary. Since workers stay in rented

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<sup>1</sup> The proposed four new activities will not involve any involuntary resettlement, and are expected to mainly bring positive social impacts, therefore, here this plan is mainly to address potential environmental impacts.

houses nearby, domestic sewage and garbage are treated by existing living facilities. Scrap wood produced is collected and properly disposed daily to prevent fires. Construction waste is transported and disposed by local sanitation department designated by government. Mixed soil is stirred offsite then enters construction site for use to avoid dust. The contractors use machinery with low, no continuous noise, which causes minor impact on surrounding residents, park, museum and cultural relics. Tourists are prohibited from entering the construction area, and the entire construction process has little impact on the environment and staffs of those scenic spots. In order to protect the integrity of historical buildings and the safety of buildings, professional property companies hang safety warning signs around, designate security personnel to conduct regular inspections, and carry out regular house maintenance. The dredged sediment disposal yard is equipped with intercepting ditch, and culvert pipes are buried underneath and connected to each other. The collection wells on the site collect a small amount of sewage which is transported to local sewage treatment plant for treatment. Generally, the entire construction process has little impact on the environment. In addition, the implementing agencies have a variety of complaint channels which are disclosed at gate of each construction site, and complaint (if any) can be resolved in a timely manner. In December 2016, Hubei Academy of Environmental Sciences was commissioned by the PMO to be responsible for the external environmental monitoring of this project<sup>2</sup>. As of March 31, 2019, Hubei Academy of Environmental Sciences submitted four semi-annual reports on the implementation of the environmental management plan. The reports concluded that during the reporting periods, the on-site environmental test results basically met the requirements of national standards; there were no safety incidents incurred; and neither environmental complaint was received, nor significant environmental issues were identified. Overall, the implementation status of the environmental management plans is satisfactory.

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<sup>2</sup> Wuhan University was engaged concurrently for social impact and resettlement monitoring.

### 1.3 Introduction of the Newly Proposed New Activities at Mid-term Review

**Table 1- 1 Summary of Newly Proposed New Activities at Mid-term Review**

Subprojects	Brief of description of subproject (new, renovation, scale)	Characteristics of the area that are of particular interest* (including rationales, brief introduction of baseline, location, characteristics, scale, extension, surrounding sensitive receptors)
<p><b>New activity 1-</b> Upgrade of the Jingzhou Museum: with an estimated cost of USD 32.39 million (CNY 220.2 million)</p>	<p>Demolition of a three-story old office building with a floor area of 1,620 m<sup>2</sup> (covering a land area of 610 m<sup>2</sup>), on which site and the southern adjacent landscaping land to build a new three-story exhibition building (with 6,800 m<sup>2</sup> of floor space including one basement floor and two floors above ground, covering a land area of 2,130 m<sup>2</sup>) together with heritage display, rehabilitating the tourist service center and tradition culture creation center (total floor space of 4,000 m<sup>2</sup>), together with associated security and fire system improvements, landscaping and digital interpretation services on the Jingzhou Museum campus.</p>	<p><b>Nature of the proposed new activity:</b> This is the expansion or extension of the original component A - Cultural Heritage Conservation and Tourism Services Improvement including cultural relics display and upgrade of Jingzhou Museum’s Treasures House.</p> <p><b>Locationality, rationality and characteristics:</b> The exhibition building and supporting facilities will use the existing space to display the history and culture of the Jingzhou ancient city by demolishing the old office building. The proposed new activity is located in the Jingzhou Museum, adjacent to Kaiyunguan temple. It is located within the construction control zone of the city ancient wall. The height should not exceed four floors. The height of the building should be no more than 12 meters. The form should be designed based on the traditional local architecture and to protect the background environment of the city wall. Under the requirement of 12 meters of mouth height control, the architectural style of the exhibition building should be coordinated with the surrounding buildings. <b>Main concerned environmental issues include:</b> (i) when demolition of old office buildings and new construction of exhibition buildings in limited space in existing museum, the construction organization should be harmonized with daily activities of the museum to reduce interference and avoid negative impact on cultural relics and the environment. (ii) it is necessary to identify whether there is any asbestos risk existed in the demolition of the office building at 1,620 m<sup>2</sup> before starting construction. and (iii) coordination with the surrounding buildings and landscapes in the existing museum.</p> <p><b>Main environmental sensitive receptors:</b> buildings, cultural relics and landscapes in the museum, staff and visitors in the museum, and occupational health and safety of the construction workers. (State Administration of Cultural Heritage has principally approved in May 2019, see <b>Section H</b> for more details)</p>
<p><b>New activity 2-</b>Conservation and renovation of brick/stone pavement of the wall-top footpath: with an</p>	<p>● Wall-top linked up, including brick wall repairing 295m, wall top road repair of 2,702m<sup>2</sup>, one inscription brick repair and protection, plank road of 450m at key sections, plank road of</p>	<p><b>Nature of the proposed new activity:</b> This is the expansion or extension of the original component A - Cultural Heritage Conservation and Tourism Services Improvement including to</p>

Subprojects	Brief of description of subproject (new, renovation, scale)	Characteristics of the area that are of particular interest* (including rationales, brief introduction of baseline, location, characteristics, scale, extension, surrounding sensitive receptors)
<p>estimated cost of USD 4.88 million (CNY 33.2 million)</p>	<p>4,730m<sup>2</sup> at other sections, restoring 9 and build 9 staircases , renovation of 5 sets of management rooms, service facilities, and night lighting;</p> <ul style="list-style-type: none"> <li>● Exhibition, including the reconstruction of the ancient wall museum exhibition of 180m<sup>2</sup>, Gongji Gate and Chaozong Building exhibition of 188m<sup>2</sup>, guide navigation system at 12 places; and</li> <li>● Safety protection facilities, including the removal of 16 old and new constructions of 2 new partitions and closed facilities, two security equipment systems.</li> </ul>	<p>improve the west ancient city wall protection, rampart, retaining wall rehabilitation, and plantation protection and restoration.</p> <p><b>Locationality, rationality and characteristics:</b> It is at the top of the ancient city wall and is located within the protection zone of the ancient city. The total length of the Jingzhou city wall is 11,280m. However, the entire city wall top trail is not continuous, the damage is serious, and there are safety risks. The original project only included the western part of the ancient city wall. This new activity is planned to improve the connectivity, display and safety protection of the entire city wall top ring trail. <b>Main concerned environmental issues include</b> cultural relics of ancient city walls, coordination with surrounding cultural relics and landscapes, drainage design, and etc.</p> <p><b>Main environmental sensitive receptors:</b> buildings, cultural relics and landscapes around the ancient city walls. (State Administration of Cultural Heritage has principally approved in May 2019, see <b>Section H</b> for more details)</p>
<p><b>New activity 3</b>-Conservation and renovation of the outer walkway loop between the city wall and moat: with an estimated cost of USD 6.15 million (RMB 41.8 million)</p>	<ul style="list-style-type: none"> <li>● The current road pavement and subgrade removal at an area of 37,309 m<sup>2</sup>;</li> <li>● Subgrade treatment, lime soil cushion, paving bluestone (600mm×300mm×150mm) at an area of 38,454m<sup>2</sup>;</li> <li>● Landscaping, street lighting, railings and landscape works.</li> </ul>	<p><b>Nature of the proposed new activity:</b> This is the expansion or extension of the original component C—Transport Improvement including the extension of the inner ring trail of the city wall.</p> <p><b>Locationality, rationality and characteristics:</b> It is surrounded the outer wall of the ancient city wall and is located in the protected area of the ancient city. The outer ring road of Jingzhou ancient city is adjacent to the ancient city wall. The total length is about 10.45km and the road width is 3.5m. The surface layer of the road is mainly concrete and imitation stone pavement. The damage is serious. The part of the Dongmen to Mingyuelou section is blue brick pavement. The Xinnanmen section is partially paved with pebbles, granite or cement pavement, etc. Slow traffic, safety and comfort are difficult to ensue with, and it is inconsistent with the solemn temperament of ancient city wall. The outer ring trail is an important part of the ancient city and plays an important role in the protection of the ancient city wall. In order to improve the safety of the outer ring of the ancient city, it is proposed to renovate the outer ring road, retain the existing intact bluestone and blue brick roads, and replace the remaining bluestone slabs with the same style as the ancient city, and set up small venues at appropriate locations to provide viewing and resting spaces. <b>Main concerned environmental issues include</b> the impact to the ancient city wall cultural relics, and the surrounding</p>

Subprojects	Brief of description of subproject (new, renovation, scale)	Characteristics of the area that are of particular interest* (including rationales, brief introduction of baseline, location, characteristics, scale, extension, surrounding sensitive receptors)
<p><b>New activity 4-</b>Rehabilitation of the North Lake: with an estimated cost of USD 7.17 million (CNY 48.7 million)</p>	<ul style="list-style-type: none"> <li>● Sewer interception pipeline of 1.38 km (DN400-600mm);</li> <li>● Ecological embankment, including revetment of 4,671m, lakeshore plantation of 56,646m<sup>2</sup>, in-lake ecological island restoration; guardrail, scenery view platform.</li> <li>● Infrastructure renovation, including road reconstruction of 18,230 m<sup>2</sup>, buildings maintenance (including East Gate, West Gate, Qunxianzhai, Sanyou Pavilion), bridges maintenance (including Kongming Bridge, Double Curve Bridge, Yudai Bridge), stone arch bridge repair, signage, monitoring system, sanitation and small landscaping works.</li> </ul>	<p>cultural relics and landscape, and etc.</p> <p><b>Main environmental sensitive receptors:</b> buildings, cultural relics and landscapes around the ancient city wall. (State Administration of Cultural Heritage has principally approved in May 2019, see <b>Section H</b> for more details)</p> <hr/> <p><b>Nature of the proposed new activity:</b> This is the expansion or extension of the original component B—Water Environment Improvement including the expansion and extension of the North Lake wetland, water resources connectivity improvement and river and lake ecological rehabilitation.</p> <p><b>Locationality, rationality and characteristics:</b> It is located in the around the existing North Lake (28 hectares), in the northwest of the ancient city, with a water surface area of 18.49ha and a volume capacity of 110,900 m<sup>3</sup>. There is a current drainage outlet (section B×H=2×3m) connected with the moat. North Lake is the largest lake in the ancient city. Due to the lack of sewage interception pipelines, the sewage is discharged directly into the lake, which causes the water quality of the lake deteriorated. It is currently inferior to the V category. The proposed new activity belongs to the urban area, and there are a large number of residents living around.</p> <p><b>Main environmental sensitive receptors:</b>  Acoustic and atmospheric environment: Jingzhou Cultural Relics Protection Center has about 60 staff, located on the small island in the lake. Beimen Community has about 500 households/1,500 people, in the southeast side and the south side at a distance of 15m, where the Category 2 standard of Acoustic Environmental Quality Standard (GB3096-2008) and the Class II Standard of Ambient Air Quality Standard (GB3095-2012) are applicable.  Surface water environment: the current water quality of North Lake is poor; however, it applies to Category III of Environmental Quality Standards for Surface Water GB3838-2002 according to local water function zoning planning.</p>

\*(include the nature of the investment, the location, and any characteristics of the area that are of particular interest, e.g. near a protected area, area of cultural, historical, religious interest etc. Also, very briefly describe the general land use characteristics (farming, small industry etc.), and the location(s) of the nearest population centers.)

## B. Applicable Regulations

### 2.1 Laws and regulations

- (1) *Environmental Protection Law of the People's Republic of China*, revised on April 24, 2014, effective as of January 1, 2015;
- (2) *Environmental Impact Assessment Law of the People's Republic of China*, revised on December 29, 2018, effective as of January 1, 2019;
- (3) *Water Pollution Prevention and Control Law of the People's Republic of China*, revised on February 28, 2008, effective as of June 1, 2008;
- (4) *Law on Prevention and Control of Air Pollution of the People's Republic of China*, revised on October 26, 2018, effective as of October 26, 2018;
- (5) *Law of the People's Republic of China on Prevention and Control of Pollution From Environmental Noise*, promulgated on October 29, 1996, effective as of March 1, 1997;
- (6) *Law of the People's Republic of China on Prevention of Environmental Pollution Caused by Solid Waste*, revised on November 7, 2016;
- (7) *Water and Soil Conservation Law of the People's Republic of China*, effective as of March 1, 2011
- (8) *Catalogue for the Classified Administration of Environmental Impact Assessments for Construction Projects*, Order of Ministry of Environmental Protection (No.44), September 1, 2017; and its revision list, April 28, 2018;
- (9) *Provisional Measures on Public Participation in Environmental Impact Assessments*, issued by State Environmental Protection Administration, HF[2006] No.28; *The Measures for Public Participation in Environmental Protection* (approved by the Ministry of Environmental Protection Ministerial Meeting on July 2, 2015), September 1, 2015;
- (10) *Notice on Promulgating the List of the First Group of Alien Invasive Species of China*, issued by State Environmental Protection Administration, HF[2003] No.11; and *Notice on Promulgating the List of the Second Group of Alien Invasive Species of China*, issued by State Environmental Protection Administration, HF[2010] No.4;
- (11) *Adjustment Notice on the classifying approval authority levels for environmental impact assessment documents of construction projects*, Hubei Provincial People's Government Office (Ezhengbanfa [2019] No. 18)
- (12) *Functional Zoning of Surface Water Environment in Hubei Province*, Hubei Provincial People's Government Office (Ezhengbanfa [2000] No. 10);
- (13) *Guideline for Ecological and Environmental Protection*, November 26, 2000;
- (14) *Cultural Relics Protection Law of the People's Republic of China* adopted at the 3rd Meeting of the Standing Committee of the Twelfth National People's Congress on June 2013.

### 2.2 Technical standards

- (1) *Technical Guidelines for Environmental Impact Assessment - General Programme*(HJ2.1-2016);
- (2) *Technical Guidelines for Environmental Impact Assessment – Air Environment* (HJT2.2-2018);
- (3) *Technical Guidelines for Environmental Impact Assessment – Surface Water Environment* (HJ/T2.3-2018);
- (4) *Technical Guidelines for Environmental Impact Assessment – Noise Environment* (HJT2.4-2009);
- (5) *Technical Guidelines for Environmental Impact Assessment – Ecological Impacts* (HJ19—2011).

### 2.3 Policy planning

- (1) *Planning for the Protection of Jingzhou Famous Historical and Cultural Town* (2010-2030);
- (2) *Overall Planning for Protection of Culture Relics on Jingzhou Historic Town Wall* (2009);
- (3) *Jingzhou Ancient City National Ring Wetland Park Master Planning*, 2014
- (4) *Function Zoning of Jingzhou Water Environment*;

(5) *Planning for Comprehensive Treatment of Jingzhou Urban Water Environment (2010-2020).*

## 2.4 Project documents

- (1) *Consolidated FSR and individual FSRs for four new activities- upgrade of the Jingzhou Museum, renovation of brick and stone pavement of Jingzhou's Historic Town city wall-top footpath, renovation of the Jingzhou's Historic Town city outer walkway loop and Rehabilitation of the North Lake, June 2019;*
- (2) *Individual domestic EIA documents for four new activities, June 2019;*
- (3) *Opinions of the State Administration of Cultural Heritage on the construction of the Jingzhou City wall-top ring road and protection facilities within the scope of Jingzhou City Wall Protection (Wenhan [2019] No. 520), on 31 May 2019;*
- (4) *WB's MOU for this Project through 2018~2019.*

## 2.5 Applicable standards

According to the function zoning of Jingzhou environment, the applicable standards for environmental impact assessment of the four new activities are as follows:

**Table 2- 1 Schedule of Assessment Standards**

Category of standard	Standard No.	Standard name	Item evaluated	Level
Quality standard	GB3095-2012	Ambient Air Quality Standards	Assess ambient air quality	Classes I, II
	GB3838-2002	Environmental Quality Standards for Surface Water	Moat, North Lake, other connected water systems proposed	Category III
	GB3096-2008	Environmental Standards for Noise	Roads; residential areas (buildings of 3 floors and above) in the first row against road; adjacent areas where category I and II standards applicable;	Category 4a
			Quality areas (buildings of less than 3 floors) within 50m, 30m around road red line	Category 1
		Museum (beyond the scope of category 4a)	Category 1	
		Other areas (beyond the scope of category 4a)	Category 2	
Emission standard	GB12523-2011	Emission Standard of Environment Noise for Boundary of Construction Site	Noise for boundary of construction site	—
	GB8978-1996	Integrated Wastewater Discharge Standard	Wastewater in Construction phase Visitors' center, museum at operation	Level III

**Table 2- 2 Schedule of Ambient Air Quality Standards Unit: mg/Nm<sup>3</sup>**

Standard No.	Standard name	Evaluation factor	Hour (one time)	Daily average	Annually average	Item evaluated
GB3095-2012	Ambient Air Quality Standards	PM <sub>10</sub>	-	0.15	0.07	Assess ambient air quality Level II
		SO <sub>2</sub>	0.50	0.15	0.06	
		CO	10	4		
		NO <sub>2</sub>	0.20	0.08	0.04	

**Table 2- 3 Schedule of Surface Water Quality Standards Unit: mg/L, except for pH**

Standard No.	Standard name	Evaluation factor	Category III (mg/L)	Item evaluated
		pH	6~9	

GB3838-2002	Environmental Quality Standards for Surface Water	Water temperature	Average weekly maximum temperature rise $\leq 1$	Moat, North Lake, and other connected water systems proposed
			Average weekly temperature drop $\leq 2$	
		Dissolved oxygen	$\geq 5$	
		SS	$\leq 30$	
		COD	$\leq 20$	
		BOD <sub>5</sub>	$\leq 4$	
		Petroleum	$\leq 0.05$	
		Ammonia nitrogen	$\leq 1.0$	
		Total phosphorus	$\leq 0.2$ (lake, reservoir 0.05)	
		Total nitrogen	$\leq 1.0$	
Fluoride	$\leq 1.0$			
Fecal coliform	$\leq 10000$			

**Table 2- 4 Schedule of Environmental Noise Standard in Areas Unit: dB(A)**

Standard No.	Standard name	Evaluation factor	Day	Night	Item evaluated
GB3096-2008	Environmental Quality Standards for Noise	Equivalent sound level $L_{Aeq}$	70	55	Roads; residential areas (buildings of 3 floors and above) in the first row against road; adjacent areas where category I and II standards applicable; areas (buildings of less than 3 floors) within 50m, 30m around road red line
			60	50	Museum (beyond the scope of category 4a) Category 2
			55	45	Other areas (beyond the scope of category 4a) Category 1

**Table 2- 5 Standards of Wastewater Discharge**

Standard No.	Discharge standard	Pollution factor	Unit	Discharge value	Source of pollution
GB8978-1996 Integrated Wastewater Discharge Standard	Level III	pH	-	6~9	Construction wastewater and domestic wastewater
		SS	mg/L	400	
		BOD <sub>5</sub>	mg/L	300	
		COD	mg/L	500	
		Petroleum	mg/L	30	
		NH <sub>4</sub> -N	mg/L	45	

**Table 2- 6 Schedule of Noise Control Standard Value Unit: [dB(A)]**

Standard No.	Control standard	Item controlled	Day	Night	Control category
GB12523-2011	Emission Standard of Environment Noise Boundary of Construction Site	Noise for boundary of construction site	70	55	—

## 2.6 World Bank Safeguard Policies

As stipulated by World Bank, special attention shall be paid to public interests during project implementation, which is the purpose of conducting environmental impact assessment. Therefore, the PMO that carried out the environmental impact assessment checks the safeguard policies item by item as per the stipulations in environmental documents of the World Bank. See **Table 2-7** for details.

**Table 2- 7 Screening of Safeguard policies of the World Bank**

No.	World Bank Safeguard Policies	Y es	No	Remarks
1	OP4.01 Environmental assessment	X		OP 4.01 is triggered, and the environmental impact assessment, EMP (both Chinese and English versions) will be prepared according to the requirements of OP 4.01.
2	OP4.04 Natural Habitats		X	The proposed four new activities do not involve the definition of the natural habitats in the OP4.04.
3	OP4.09 Pest Management		X	The restricted insecticide and herbicide definite by OP4. 09 are not involved in both the construction and operation stage of the proposed four new activities.
4	OP4.10 Indigenous People		X	The proposed four new activities do not involve ethnic minority issues.
5	OP4.11 Physical Cultural Resources	X		The proposed four new activities involve protection and restoration of cultural relics. The cultural heritages involved in the proposed four new activities are confirmed and a special chapter is written to analyze the impact of the proposed four new activities on cultural relics. (see <b>Annex II</b> )
6	OP7.6 Projects in Disputed Areas		X	There is no controversial area in the proposed four new activities.
7	OP4.37 Safety of Dams		X	There is no dam in the project area.
8	OP7.50 Projects on International Waterways		X	There are no international waters in the project area.
9	OP4.36 Forest		X	There is no natural forest or artificial forest in the project area.
10	OP4.12 Involuntary resettlement		X	There is no resettlement in the proposed four new activities.

### C. Environmental Impacts/Risks and Mitigation Measures

General construction impacts and mitigation measures are included in **Annex I** applicable to all proposed new activities 1 to 4 which involve civil works.

Activity specific potential environmental issues and impacts during the design, pre-construction, construction and operation phases, as identified in the EIA, as well as corresponding mitigation measures designed to minimize the impacts are summarized in **Table 3-1**.

Mitigation or safeguard includes two types of environmental measures:

Those that will permanently become part of the infrastructure such as lake embankment ecosystem. These will need to be included in the design of the facility by the design institutes, otherwise they won't be built. The costs of building and maintaining these systems have already been included in the infrastructure construction and operating costs and therefore will not be double-counted as part of the EMP costs.

Those that are temporary measures particularly during the construction stage, such as dust suppression by watering and wheel washing, the use of quiet / low noise powered mechanical equipment, flocculants used to facilitate sedimentation of suspended solids in construction site runoff, etc. These will need to be included in the tender documents, otherwise, they are not budgeted by the contractor and they won't be done. The costs for implementing these measures are included in the EMP. This amount is made up of CNY4.35million for the implementation of soil erosion protection measures according to the SEPP (without double-counting the SEPP cost for vegetation/landscaping of permanent works areas, which have already been included in the civil works costs), and for other mitigation measures.

The mitigation measures defined in the EMP will be (i) checked and where necessary re-designed by the design institutes; (ii) incorporated into tender documents (where appropriate), construction contracts, and operational management plans; and (iii) implemented by contractors, IAs or PMO, as relevant. The effectiveness of these measures will be evaluated based on the daily site supervisions by the CSCs, the results of the environmental monitoring conducted, and through EMP compliance verification conducted by the PMO, the loan implementation consultant and the EMC.

**Table 3- 1 Summary of Activity-specific Potential Impacts and Mitigation Measures during Design and Pre-construction Stage**

Activity	Potential Impact and/or Issues	Mitigation Measures	Implementing Entity	Supervising Entity	Source of Funds
<b>Detailed Design Stage</b>					
New Activity 1: Upgrade of the Jingzhou Museum	Design to comply with relevant applicable health, safety and environmental codes and standards, including energy- efficient building codes and specifications.	Design buildings in compliance with relevant design standards and codes for energy-efficient, safe and green public buildings, including but not limited to: GB 50011-2010 (Building Seismic Design Code); GB 50016-2006 (Code of Design on Building Fire Protection and Prevention); GB 50189-2005 (Energy Conservation Design for Public Buildings); and other applicable design codes. Ensure no-use of VOC-emitting materials (including paints, coatings, adhesives, carpet and furniture's) to protect indoor air quality; Ensure no asbestos or asbestos- containing material is used in construction; Incorporate energy-efficiency measures defined the FSRs and EIA into building design. Design sewer, rainwater and garbage collection facilities appropriate to subproject scale and quality of influent. Universal accessible design will be applied according to national standards (Codes for accessibility design. GB 50763-2012).	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in design costs
	Landscape to combine compatibility, amenity with noise reduction and dust screening.	Landscape consistent with surrounding environment, and the existing museum features as possible. Include landscaping and vegetation planting in detailed design. Include dense foliage plantings (not less than 10m deep) along boundaries with roads or noise- producing areas. Plant trees and shrubs along building edges to screen windows from dust and particulates.	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in design costs
	Prepare emergency planning and procedures	Develop emergency response plan covering fire, earthquake, natural calamities, epidemic, air contamination, infestation, explosion, and food safety to ensure safe environment for all people, staff and visitors.	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in design costs
	Asbestos Risk Assessment.	Assess potential risks of asbestos and asbestos-containing materials (ACM) during rehabilitation or demolishing of the existing old office buildings; identify presence, absence and amount of asbestos and ACM, and define an action plan for all boilers, including labeling requirements, establishment of a register, control mechanism (from elimination, removal or isolation to safe working practices), health and safety requirements, and working procedures for disposal of the asbestos and ACM, based on the <i>World Bank EHS (April 2007)</i> and the <i>Good Practice Note —Asbestos: Occupational and Community Health Issues (May 2009)</i> . (for more details, see <b>Appendix 6 Asbestos-Containing Materials Management Plan</b> )	Qualified design Institutes	Jingzhou EPB, PMO, implementing agencies, WB, the loan implementation consultant	Included in design costs

Activity	Potential Impact and/or Issues	Mitigation Measures	Implementing Entity	Supervising Entity	Source of Funds
<b>New Activity 2:</b> Renovation of brick and stone pavement of Jingzhou's Historic Town city wall-top footpath	Impacts to CHs	According to the <i>Law on the Protection of Culture Relics of the P.R.C</i> and requirements of related management bureaus, the protection measures are as follows: reversible repairs and engineering on CH structures; reinforcing the supports of CHs; conduct monitoring and preventive measures against natural disasters. For more details see <b>Annex II ECOP of Preservation of CH.</b>	Design Institutes Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in design costs Included in design costs
<b>New Activity 3:</b> Renovation of the Jingzhou's Historic Town city outer walkway loop	Existing blue stone/brick	Compatible with surrounding environment, and the existing bluestone or blue brick pavement features as possible	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in design costs
<b>New Activity 3:</b> renovation of the Jingzhou's Historic Town city outer walkway loop	Existing blue stone/brick	Compatible with surrounding environment, and the existing bluestone or blue brick pavement features as possible	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in design costs
<b>New Activity 4:</b> Rehabilitation of the North Lake	Embankment	Technical design of embankment shall be adequate and stable enough to withstand the strong force of heavy storm water flow but at the same time maximize the adoption of eco- friendly embankment designs. Chose appropriate flowers and trees, which shall have landscaping effect and pose no risk on the stability of embankment.	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in design costs
	Invasion by foreign or exotic species	Technical design of the planting and other aquatic species must use local species with local provenance. Under no circumstance shall exotic or invading species be used.	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in design costs
	Auxiliary facilities demand	Consider adding auxiliary facilities to greenbelt construction to meet the leisure and exercise demand of citizens. For instance, open up an exercise square at appropriate place, build more toilets, trash can and stone bench. Provide adequate and functional systems for sanitary conditions, toilet facilities, waste management facilities; and appoint designated staff responsible for cleaning and disinfection; wastewater shall be discharged into the municipal sewer system. Close communication and cooperation among different departments is required, as necessary, for linked contents and items.	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in design costs
	Safety	Consider access control and separation vegetation belt Design safety warning signage along the lakeline and other appropriate places	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in design costs

Activity	Potential Impact and/or Issues		Mitigation Measures	Implementing Entity	Supervising Entity	Source of Funds
Design of sewer pipeline	Pipe burst		Technical design and construction method of the utilities pipelines must be adequate to prevent pipe burst.	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in design costs
	Water quality-effluent standard		Ensure the sewer pipelines should be properly connected with municipal network with enough capacity and diameter. Ensure Caoshi WWTP shall have adequate capacity to accept the collected sewer from this new activity, and achieve the desired treatment to meet Class 1A discharge standard and safety of plant operation, with dual power supply to avoid interruption to plant operation due to power failure.	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in the survey costs at design stage
	Sludge disposal		Ensure Caoshi WWTP shall include temporary sludge treatment to produce sludge with water content of lower than 60%.	Design Institutes	PMO, implementing agencies, the loan implementation consultant	Included in the survey costs at design stage

**Table 3- 2 Summary of Activity-specific Potential Impacts and Mitigation Measures during Construction Stage**

Activity	Potential Impact and/or Issues	Mitigation Measures	Implementing Entity	Supervising Entity	Source of Funds
<b>Specific Sector Related Impacts during Construction Stage</b>					
<b>New Activity 1:</b> Upgrade of the Jingzhou Museum	Disturbance to existing operation of the museum	Coordination with the museum operator to minimize impact to its normal operation, such as to optimize working schedule and haulage route, construction area fencing access control, and etc. Erect warning signboards and enhance noise and dust control. Provide training on construction workers.	Contractor, CSCs	PMO, implementing agencies, the loan implementation consultant, EMC	Included in construction costs
	Solid waste generated by demolishing old office building	Licensed demolition companies shall be contracted to carry out demolition of old office building; Maximize reuse/recycling of deconstruction wastes generated during the demolition (e.g. iron, bricks, windows, doors, steel bars etc.), sold to local waste recycling stations), dispose other demolition debris on special construction and demolition debris landfills, subject to approval by EPB; and Contractors shall ensure proper collection, storage, and disposal of demolishing wastes, and multi-compartment collection bins shall be provided to facilitate the reuse, recycling and composting of solid waste.	Contractors, IAs, CSCs	IA, PMO, the loan implementation consultant, EMC	Included in construction costs
	Asbestos impact during demolishing old office building	Identify, properly label and pack asbestos as well as demolishing debris contaminated with asbestos during demolishing old office building, and transport them in specific closed vehicles to the secured landfill of local hazardous waste disposal center in Jingzhou in accordance with the World Bank’s EHS Guideline. Proper protective clothing and specific equipment shall be provided by local hazardous waste disposal center to its trained team and demolishing contractors’ workers involving demolishing and disposal of asbestos during deconstruction of the authority old office building. Train workers on the hazards, danger and procedures of working in areas contaminated with asbestos. (for more details, see <b>Appendix 6 Asbestos-Containing Materials Management Plan</b> )	Demolition Contractor, CSCs, local hazardous waste disposal center approved by	IA, PMO, the loan implementation consultant, EPB, EMC	Included in the proposed project contingency cost
<b>New Activity 2:</b> Renovation of brick and stone pavement of Jingzhou’s Historic Town city wall-top footpath	Impacts to CHs	See <b>Annex II ECOP of Preservation of CH</b>			
<b>New Activity 3:</b> Renovation of the Jingzhou’s Historic Town city outer					

Activity	Potential Impact and/or Issues	Mitigation Measures	Implementing Entity	Supervising Entity	Source of Funds
walkway loop					
<b>New Activity 4:</b> Rehabilitation of the North Lake	Soil erosion, inadequate spoil storage, disposal and borrow site operation	<p>Implement soil erosion protection measures as defined in the Soil Erosion Protection Plan(SEPP) including but not limited to:</p> <ul style="list-style-type: none"> <li>- Confirm location of the borrow pit and temporary spoil storage and final disposal sites;</li> <li>- Develop borrow pit management and restoration plan, to be approved by responsible authority; obtain permit for the clearance of excavated earthworks;</li> <li>- Construct intercepting ditches and drains to prevent runoff entering construction sites, and diverting runoff from sites to existing drainage;</li> <li>- Construct hoardings and sedimentation ponds to contain soil loss and runoff from the construction sites</li> <li>- Limit construction and material handling during periods of rains and high winds;</li> <li>- Stabilize all cut slopes, embankments, and other erosion-prone working areas while works are going on;</li> <li>- Stockpiles shall be short-termed, placed in sheltered and guarded areas near the actual construction sites, covered with clean tarpaulins, and sprayed with water during dry and windy weather conditions;</li> <li>- All earthwork disturbance areas shall be stabilized with thatch cover within 30 days after earthworks have ceased at the sites;</li> <li>- Immediately restore, level and plant landscape on temporary occupied land upon completion of construction works;</li> <li>- Unauthorized extraction or disposal at other sites or deviating from established quota would be subject to withheld payments and penalties;</li> <li>- Restore pit following the completion of works in full compliance with all applicable standards and specifications.</li> </ul> <p>-Earth cut materials will be re-used on site.</p>	Contractor , CSCs	PMO, implementing agencies, the loan implementation consultant, EMC	Included in construction costs
	Pipeline trench excavation	<p>Excavation methods at different sections shall be optimized to avoid or minimize adverse environmental impacts (e.g., vibration, vegetation, underground water ) to adjacent institutions and residents.</p> <p>Local municipal network should be investigated in advance to avoid unintentional damage. If necessary, interruption of municipal services should be timely communicated and notified to relevant affected institutions and the public, and recovered timely.</p>	Contractor , CSCs	PMO, implementing agencies, the loan implementation consultant, EMC	Included in construction costs

**Table 3-3 Summary of Activity-specific Potential Impacts and Mitigation Measures during Operation Stage**

Activity	Potential Impact and/or Issues	Mitigation Measures	Implementing Entity	Supervising Entity	Source of Funds
New Activity 4: Rehabilitation of the North Lake	Positive impacts (Benefits)	The river slope will be repaired and improved by a combination of natural revetment and hard revetment. The visual landscape benefits will be greatly enhanced by garbage cleaning of river and regional greening.	O&M Unit	PMO, IA	O&M unit operation budget
	Maintenance of vegetation and landscape	Daily maintenance: manage vegetation including pruning, weeding and replacement of dead or dying trees and shrubs; By applying in-situ specific nitrogen management techniques to minimize the use of pesticides and fertilizers. Pesticides can only be used by workers who have been trained in storage, handling, use and disposal; The embankment will add 56,646 m <sup>2</sup> of plantation area, including riparian plants: 37,760 m <sup>2</sup> , and aquatic plants: 18,886 m <sup>2</sup> . All of them are common, pest-resistant endemic plants in Jingzhou, and the new activity is not expected to lead to an increase in the use of pesticides..	O&M Unit	PMO, IA	O&M unit operation budget
	Pollution from storm water and solid waste	Routinely collect and properly dispose litter and debris from sidewalks, driveways, and parking lots near the lake. Install litter traps along waterways (small floating mesh traps attached to one bank) and regularly empty these. Clean the roadside catch basins before rainy season to avoid surface water pollution by storm water runoff flushing debris and silt. Regularly empty garbage bins and containers placed along the river channels; Maintain storm-water retention facilities along the roads nearby the lake.	O&M unit	PMO, IA	O&M unit operation budget
	Embankment stability	Inspect all lake embankment stabilization works for physical integrity. If signs of failure are discovered, a repair program will be implemented immediately	O&M unit	PMO, IA	O&M unit operation budget

## D. Monitoring Plan

### External Monitoring

#### 4.1 Overview

The PMO have already engaged an external monitoring consultant (EMC), Hubei Academy of Environmental Sciences, for monitoring implementation of environment management plan (EMP). The EMC will periodically collect data from environmentally sensitive receptors (including water, air, noise, etc.). These indicator data will be provided to the PMO as basis for compliances of environment regulations. Formulation of a viable monitoring plan will be helpful for evaluating the overall performance of the project and the short-term effects of the construction activities. As an important component of the EMP, the environment monitoring plan consists of the following:

- Confirmation of negative impacts forecasted in EIA;
- Determining actual scopes of impacts;
- Assessing the effectiveness of mitigation measures at project site; and
- Identifying and adjusting additional mitigation measures for incidental impacts which may be necessary during project construction or operation.

Importantly, this monitoring plan is designated mainly for the four proposed new activities, as part of the overall WB financed project, therefore, will be incorporated into the whole WB financed project environmental monitoring plan.

#### 4.2 Impact monitoring

In order to monitor the impacts during the construction phase, the EMC will conduct periodical environmental monitoring, during the peak of construction works or by request of the PMO, the EMC will also utilize portable devices to monitor short-term impacts. In case activities that had violated environmental quality standards have been found, it is also necessary to conduct additional impact monitoring.

Sensitive receptors with potential for prominent pollution will be designated as the monitoring sites, based on forecast results from the project’s environmental impact assessment documents. The monitoring of pollution during the construction and operation stages will focus on aspects with relatively more significant impacts: noise, air, and surface water environment. The factors to be monitored will be determined based on the project’s characteristic pollution factors.

For analysis methods, the relevant methods defined in *Technical Specification for Environmental Monitoring* issued by the former Administration of Environmental Protection (now the Ministry of Ecology and Environment of PRC). The evaluation standards nominated in the environmental impact assessment documents will be used. According to the engineering characteristics of the proposed project, a monitoring plan for the construction and operation stages have been designed, as in **Table 4-1**.

**Table 4- 1 Environmental monitoring plan**

Stage	Impact factor	Location	Parameter	Frequency	Performed by
<b>Applicable to all four new activities</b>					
Construction	Air	Boundary of each construction site; TSP adjacent museum function area, adjacent moat, Jingzhou Cultural Relics Protection Center and Beimen community surrounding the North Lake		Once per season, (More during peak construction) 3~4 times per season	External monitoring consultant (EMC)
	Noise		$L_{Aeq}$	Once per season, 2 days Once during day, once at night	Same as above

Stage	Impact factor	Location	Parameter	Frequency	Performed by
	Water	North Lake	SS, TP, TN, DO	Once each in early, peak and late construction	Same as above

During the construction phase, the associated CHs shall be monitored and managed. For more details see **Annex II ECOP of Preservation of CH.**

**Specially applicable to New Activity 1: Upgrade of the Jingzhou Museum**

Construction and ACM	Asbestos and airborne asbestos in environment	Demolishing site of the existing old office buildings under New Activity 1: Upgrade of the Jingzhou Museum	Visual inspection and sampling of airborne asbestos	External monitoring: clearance sampling after completion of rehabilitation works following ISO/FDIS 16000-7: Indoor air – Part 7: Sampling strategy for determination of airborne asbestos fiber concentrations (for more details, see <b>Appendix 6 Asbestos-Containing Materials Management Plan</b> )	Qualified asbestos monitoring institute
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**Specially applicable to to New Activity 4: Rehabilitation of the North Lake**

Operation	Water environment.	Moat, North Lake	pH, NH <sub>4</sub> -N, COD, BOD <sub>5</sub> , petroleum, etc	Once per year	External monitoring consultant (EMC)
		Outgoing water	COD, BOD, ammonium & nitrogen	6 times per year at Feb, Apr, Jun, Aug, Oct & Dec	External monitoring consultant (EMC)

### Internal Monitoring

In addition, the contractors and construction supervision engineers will also perform environmental monitoring as stipulated in the contracts, including: monitoring noise levels at sensitive receptors using portable devices; during periods of heavy construction activities, such as digging, piling, power generation, material transportation and night constructions; at sensitive receptors surrounding construction areas.

Visual inspection will be used for determining the water quality at rivers and lakes under impacts of construction, including turbidity, smell, color, dead fish, etc.

The results will be compiled into formal written reports, submitted to EMC and PMO for review once per month. In case of any incidents, the contractors will report to EMC and PMO immediately.

### 4.3 Monitoring devices and records

The monitoring devices and methods used by contractors and construction supervision engineers should comply with relevant regulations and quality standards. The devices should be periodically calibrated before on-site measurements. All calibration records will be submitted to the EMC. The EMC will preserve all on-site records, reports and related approval documents.

If any necessary changes to devices or methods are to be made, the EMC's prior approval will be needed. During the on-site monitoring and inspection, data recording should be conducted at possible locations. **Table 4-2** has provided the records to be kept at each site's EMC office.

**Table 4- 2 Typical records to be kept on-site**

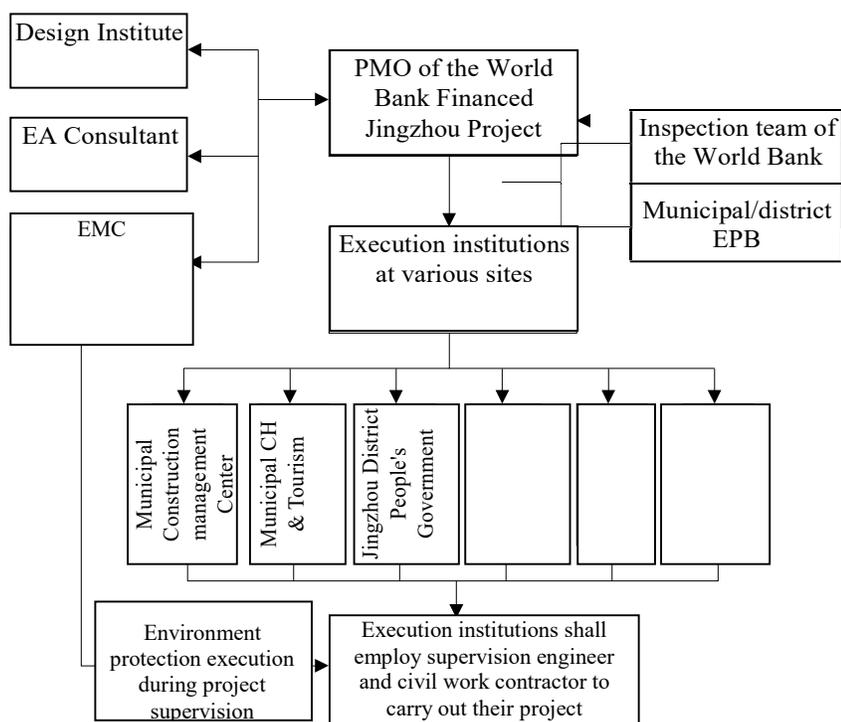
Type	Record
General	Environmental training record (e.g. attendance record for environmental awareness training meetings); On-site log and inspection record; Environmental work log, complaint work log, and environmental quality non-compliance notification form; Construction process and schedule; Equipment maintenance and repair record; Contacts of related parties and other parties; Meeting records.
Noise control	Updated list of current on-site mechanical and electrical equipment; If any sensitive receptor is affected, perform periodical checks and provide detailed results
Water pollution control	Water drainage plan for construction sites; Amounts of construction wastes, demolition wastes; Treatment of toilet wastewater (not connected into current main wastewater pipe); Final quality of outgoing wastewater and waste collection.
Management of solid wastes	Backup of valid certificates from waste delivery vehicles and waste collectors in the EMP; Amounts of recycled wastes; Amounts of inert wastes converted into active substances on-site (if any); Waste treatment record.
Air	Material transportation route plan; Mitigation measures for air impacts, such as sprinkling water; Monitoring results of air quality.
Emergency response	Incident emergency report

### **E. Institutional Arrangement**

The effective implementation of EMP requires the joint efforts of all concerned parties, including ecology and environment bureaus (formerly EPB) at each level, project initiator, i.e. the PMO/IAs, contractor, i.e. construction entity (CET), construction supervision engineer (CSE) hired by the PMO/IAs, and external monitoring consultant (EMC) for EMP, also employed by the PMO/IAs.

In order to realize the objectives of EMP, CSC entrusted by the the PMO/IAs will assign persons to monitor the environment during construction phase. In addition, the the PMO/IAs will employ fund of World Bank Loan to hire qualified and experienced EMC through competitive procurement. EMC will independently and externally monitor the implementation of EMP, and conduct regular and special checks on construction site and environmental monitoring. See **Figure 5-1** for the organization set-up, organization chart and working system for implementing EMP during construction.

Importantly, this institutional arrangement is designated mainly for the four proposed activities, as part of the overall WB financed project, therefore, will be incorporated into the whole WB financed project institutional arrangement.



**Figure 5- 1 Organization Chart of EMP during Construction**

**Table 5- 1 Institutional arrangement of the proposed four new activities**

Component	Proposed activity	Implementation agencies	O&M unit
Under Component A: Cultural Heritage Conservation and Tourism Services Improvement	<b>New activity 1-</b> Upgrade of the Jingzhou Museum	Jingzhou Cultural and Tourism Bureau	Jingzhou Cultural and Tourism Bureau
	<b>New activity 2-</b> Conservation and renovation of brick/stone pavement of the wall-top footpath	Jingzhou Cultural and Tourism Bureau	Jingzhou Cultural and Tourism Bureau
	<b>New activity 3-</b> Conservation and renovation of the outer walkway loop between the city wall and moat	Jingzhou Municipal Government Investment Engineering Construction Management Center	Jingzhou Landscaping Bureau
Under Component B: Water Environment Improvement	<b>New Activity 4:</b> Rehabilitation of the North Lake	Jingzhou District People's Government	Jingzhou Landscaping Bureau

See **Table 5-2** for the main responsibilities of mainly concerned parties and personnel arrangement in each project phase.

**Table 5- 2 Arrangement and Responsibilities of Project Environmental Management Organization**

<b>Phase</b>	<b>Concerned party</b>	<b>Environmental responsibility</b>
Project preparation phase	Jingzhou Ecology and Environment Bureau (JZEPB)	<p>JZEPB will review and approve EIA and instruct the PMO for the overall environmental management of the Project, and review asbestos risk management plan if there is an asbestos risk identified before the demolition of the old office building under the New Activity 1: Upgrade of the Jingzhou Museum. JZEPB will directly take charge of the supervision and enforcement of environmental protection regulations and standards.</p> <p>The roles and responsibilities of JZEPB are as follows: Supervise the implementation of EMP by construction entity and enforce applicable regulations and standards; completion and operation of environmental facilities within its power.</p>
	Set up project management office (PMO) under People’s Government of Jingzhou City and the implementation agencies	<p>Direct, supervise and coordinate; organize overall project</p> <p>Be responsible for the implementation of EMP; require DI to incorporate environmental mitigation measures into technical specifications when they are preparing bidding documents.</p>
Construction phase	Project Management Office (PMO), implementation agencies (Jingzhou Cultural and Tourism Bureau, Jingzhou Municipal Government Investment Engineering Construction Management Center and Jingzhou District People's Government)	<p>The PMO will take the ultimate responsibility for the environmental performance during project construction and operation. The PMO/IAs will be responsible for all works in project preparation and implementation. The PMO/IAs will also be fully responsible for works related to the safeguard policies of the World Bank during project preparation and implementation project, including but not limited to the following 5 aspects:</p> <p>First, organize qualified and experienced institutions to prepare EIA of the project in preparation phase, including providing support to and supervising the compilation of EIA report and EMP which shall meet the requirement of relevant domestic laws, regulations, standards, technical guides, and safeguard policies of the World Bank. Ensure the EIA and EMP approved by local ecology and environment departments and safeguard policy department of the World Bank.</p> <p>Second, guarantee the interaction among EIA Consultant, project feasibility study unit and project design unit, so as to incorporate programs and requirements into project design, and cost of environmental measures into total project investment by taking mitigation measures and other environmental considerations into account.</p> <p>Third, be the ultimate supervisor of environmental mitigation measures and other environmental measures in Construction phase, including incorporating environmental requirement into construction contract, providing training to contractor, construction supervisor and IAs, implementing other environmental management programs and conducting regular check on construction site.</p> <p>Fourth, implement and supervise environment monitoring procedures, review the log record of construction supervision engineer (CSE) and external monitoring report of EMC, inspect the environmental performance of contractor, and take necessary actions to timely respond to issues and suggestion provided in external monitoring report, including emergencies and accidents in construction.</p> <p>Last but not the least, consult local public, people affected by the project, concerned organizations, the World Bank and other parties of interest. Ensure that all the parties mentioned above have completely understood the whole project, potential environmental issues and mitigation measures. Listen to all the parties and respond to their questions and suggestions about environmental protection.</p> <p>Provided that there is an asbestos risk identified before the demolition of the old office building under the New Activity 1: Upgrade of the Jingzhou Museum, the PMO will hire a qualified institute to prepare asbestos risk management plan for the World Bank review, and conduct post-evaluation after the completion of the demolition.</p>
	Contractor (CET)	<p>During construction, contractor is a key node in environmental management, pollution control and impact mitigation. The Contractor shall be aware of its environmental protection obligations and take a range of measures to guarantee the performance of its obligations. The obligations of contractor and its environmental management personnel include but not limited to the following contents.</p> <p>(a) The Contractor shall incorporate the mitigation measure listed in EIA into the bidding documents of civil works,</p>

Phase	Concerned party	Environmental responsibility
		<p>attach them to the construction contract, and strictly implement the measures specified in the EMP; provided that there is an asbestos risk identified before the demolition of the old office building under the New Activity 1: Upgrade of the Jingzhou Museum, a qualified Hazardous Waste Disposal Center approved by the competent authority will be engaged to properly demolish, label, store, transport and dispose ACM in accordance with the approved asbestos risk management plan. The Contractor shall perform its environmental obligations initiatively and submit its environmental performance logs once a day or a week to construction supervisor. The PMO/IAs and construction supervision engineer shall review these logs and carry out certain rectifying activities;</p> <p>(b) The Contractor shall comply with the requirements of relevant environmental laws;</p> <p>(c) The Contractor shall carry out construction within the scope of contract and other bidding conditions;</p> <p>(d) One specially-assigned person of the Contractor shall be responsible for the implementation of environmental protection measures, and shall work together with EMC to carry out mitigation measures, on-site inspection and any corrective measures instructed by the PMO/IAs and/or EMC.</p> <p>(e) Upon receiving the instruction of the PMO/IAs or entrusted EMC, the Contractor shall stop construction activities which have adverse impacts; if necessary, the Contractor shall adopt another construction method to minimize the environmental impacts.</p> <p>(f) The Contractor shall allow public participation from communities around construction site, set up eye-catching signs &amp; boards at each road to describe main construction contents and construction phase at the site. There shall be contract name and name and telephone No. of contact on the boards, so that the public can express their concerns and complaints about construction activities.</p> <p>(h) Prior to the commencement of construction, the Contractor shall receive mandatory environmental training, including: national and local laws, regulations and standards; EIA; environmental mitigation measure; culture heritage evaluation and protection rules; emergency measures; environmental monitoring method and requirements specified in contract, and reporting procedure; long-term public consultation and response; environmental obligations of contractor.</p>
	Construction Supervision Engineer (CSE)	<p>CSE is responsible for supervising the project construction activities and environmental due diligence of the Contractor during construction, ensuring that the construction meets the requirements of relevant environmental laws, regulations, technical guides, standards, specifications and contract. The duties of CSE are to</p> <p>(a) Review construction organization design and make sure that it complies with the engineering design of project and EMP, so that corresponding environmental mitigation measure can be put forward. Construction cannot start until environmental measures obtain the approval of supervision engineer;</p> <p>(b) Provide assistance to the PMO/IAs or entrusted EMC in the course of environmental management and supervision;</p> <p>(c) Inspect the environmental management of the contractor regularly and ask the contractor to replace its environmental management personnel if in CSE's opinion the environmental management personnel fail to perform its obligations or fail to comply with contract requirements.</p> <p>(d) Require the contractor to take rectifying measures within specified time limits. If there is default and violent public complaints, CSE shall order the contractor to rectify, alter or stop its works and report the situation to concerned organization and the PMO/IAs.</p> <p>(e) Supervise the operations of the contractor and ensure that those operations meet the requirements specified in EMP and mitigation measures specified in contract;</p> <p>(f) Instruct the contractor to take actions to minimize the impacts and prevent default as per the requirements of EMP;</p> <p>(g) In case the contractor violates environmental requirements, the contractor cannot get paid until it solves the environmental issue and get approval from CSE within the same month.</p> <p>(h) In case the contractor discovers cultural relics during construction, CSE shall order the contractor to protect the site and inform concerned organizations and the PO/IAs;</p> <p>(i) Strictly follow the procedures to investigate complaint.</p> <p>(j) On-site supervision: through regular on-site inspections, CSE can supervise construction activities, identify potential</p>

Phase	Concerned party	Environmental responsibility
		<p>environmental problems, and timely provide mitigation (preventive) measures to the Contractor. Inspections cover construction area and areas outside construction site but directly or indirectly affected by construction. CSE organizes routine regular on-site inspections (e.g. every week or every month), and CET and PMO/IAs participate. CSE shall record environmental changes in project construction and environmental performance of the Contractor in its log book which could have an influence on breaches specified in EIA and suggestions given in EMP or contract. That log book shall be submitted to the Contractor, EMC and other concerned parties.</p> <p>(k) Punish system: as per the contract, if CSE finds operations against environmental regulations during on-site supervision, the Contractor shall rectify those within specified time limit (e.g. 2 weeks). If the Contractor completes those rectifications as required, there will be no punishment. If not, the Contractor shall at its own cost hire a third party to complete those rectifications.</p> <p>(l) Complaint system: CSE shall initiate complaint investigations if receiving environmental complaints during construction. Complaint investigation procedures are as follows:</p> <ol style="list-style-type: none"> <li>1) Record the received complaints and the dates into complaint database, and inform the Contractor;</li> <li>2) Investigate the complaints to determine their validity and evaluate that whether the issues complained are caused by construction activities;</li> <li>3) If complaints are valid and caused by construction activities, CSE shall lay down mitigation measures and provide them to the Contractor;</li> <li>4) If complaints are forwarded by Ecology and Environment Bureau, CSE shall submit interim report of complaint investigation to Ecology and Environment Bureau and take further actions within time limits specified by Ecology and Environment Bureau;</li> <li>5) Investigate to verify the situation and take measures to prevent same complaints.</li> <li>6) Report investigation results and actions taken as required by the person who launches the complaint. (if complaints are from Ecology and Environment Bureau, results shall be reported within the time limits required by it);</li> <li>7) Record complaint, investigation and follow-up actions, and monthly results of EMP.</li> </ol> <p>The CET and CSE shall work together to investigate complaints. The Contractor shall provide all the necessary information for investigation. If mitigation measures have been determined during investigation, the Contractor shall immediately carry out those measures. CSE shall ensure that the Contractor has carried out those measures.</p> <p>(m) CSE shall strictly supervise the various construction activities; in case of activities such as setting up temporary bridges to facilitate construction, CSE shall conduct stringent review and approval.</p>
	EMC for EMP	<p>EMC monitors on behalf of the PMO/IAs whether the Contractor completely conforms to the requirements of EMP, directly reports to the PMO/IAs and bears responsibilities to the PMO/IAs. The PMO/IAs shall employ qualified consultant through competitive procurement to conduct external monitoring of EMP. EMC shall have at least 5 years' experience in similar projects and consultation services, and be familiar with relevant environmental laws, regulations, technical standards, specifications and guides. The EMC hired shall get familiar with its job duties by reviewing relevant reports, including EMP approved by the World Bank. EMC shall also be responsible for environmental issues and protection needs during construction. The main responsibilities of EMC are as follows:</p> <ol style="list-style-type: none"> <li>(a) As entrusted by the PMO/IAs, EMC shall review whether construction organization complies with the requirements of approved EIA and EMP, especially requirements about on-site environmental management and impact mitigation.</li> <li>(b) Monitor and inspect the on-site environmental management system of the Contractor, and environmental performance, experience and capacity to handle on-site environmental problems of CSE; if necessary, EMC has the right to advise the PMO/IAs of replacing the environmental management personnel specially assigned by the Contractor and CSE;</li> <li>(c) Inspect regularly the implementation of EMP by the Contractor and CSE;</li> <li>(d) Review the effectiveness of environmental protection measures in EIA, check and determine the effectiveness of impact mitigation measures, and regularly submit consultation report to the PMO/IAs;</li> </ol>

<b>Phase</b>	<b>Concerned party</b>	<b>Environmental responsibility</b>
		<p>(e) In case of emergency, EMC shall play a part in coordination and handling;</p> <p>(f) Supervise the environmental protection actions of the Contractor; if necessary, order the Contractor to temporarily stop construction, and submit rectification measures or suggestions about punishment to the PMO/IAs, if EMC finds the Contractor violating the contract or EMP;</p> <p>(g) Timely submit half-year and annual consultation report to the PMO/IAs;</p> <p>(h) Participate into the environmental checks initiated by the World Bank Project Group or other authorities, if required by the PMO/IAs;</p> <p>(i) In case of environment pollution accidents during contract period, EMC shall conduct investigations and submit independent investigation report to the PMO/IAs as required the PMO/IAs.</p> <p>As per the requirement of the PMO/IAs, EMC shall assist the PMO/IAs and CSE in complaint investigation and evaluation.</p>
	Jingzhou Ecology and Environment Bureau (JZEPB)	Inspect environmental management during construction
Operation phase	PMO	Same as Construction phase
	The IAs (O&M unit) including Jingzhou Cultural and Tourism Bureau and Jingzhou Landscaping Bureau	1. Be responsible for the implementation of environmental protection measures and EMP; 2. Be responsible for the normal operation of environmental protection facilities.
	Jingzhou Ecology and Environment Bureau (JZEPB)	Organize the acceptance of environmental protection facilities under the standard of three-simultaneity (works designed, constructed and put-into-operation simultaneously); Check the environmental management during operation.
	Institution with monitoring qualification	Monitor operation and accident
	Jingzhou Urban & Rural Planning Bureau	Control the construction of sensitive items around project construction area

## F. Capacity building activities

The proper functioning of the management activities in this EMP relies on the knowledge and experience of environmental management officers/staffs. The new methods utilized in tasks such as upgrade of museum, are novel to local institutions, which necessitates training. The training plans will be provided to project stakeholders. Overseas trainings will be conducted in countries with rich experience in construction and operation management. Domestic trainings will be led by experts from universities, research institutes and professional consulting organizations.

Based on the experiences from previous projects, improving the environmental awareness of construction firms and supervisors is important, as well as reinforcing the monitoring on managing authorities. Training is necessary to achieve this purpose.

Training includes subjects of environment-related regulations, standards, responsibilities and management methods. The details are shown in **Table 6-1**.

**Table 6- 1 Training plan for technical staff**

Type	Area	Trainee	Content	No. of Trainee	Term	Date (Year)	Cost(CNY 10,000)
Overseas	Environment management	Management at relevant departments of project coordination office	Experience and best practices for environ. management during construction	To be determined at	10 days	2019-2021	To be determined at implementation
		Project management office, professionals at PMO/IAs	Technical methods for environ. management during construction	implementation	14 days	2019-2021	
Domestic	Environmental protection	Environmental protection personnel at construction firm	Fundamentals of environ. monitoring methods; monitoring records; occupational training; EMP, environ. monitoring and reporting, emergency plans		4 times, each per day	2019-2021	
		Environ. protection supervision engineer; construction firm environ. management personnel	Legislations, construction planning, environ. monitoring principles and planning, air and noise monitoring and control technologies		5 times, each per day	2019-2021	
		Asbestos handling and managing ACM asbestos containing material (ACM)	Relevant standards, development of asbestos management plan; procedures for monitoring asbestos; potential health effects related to asbestos exposure, employee personal protective equipment, work practices, personal hygiene, medical monitoring, respiratory protection programs and medical monitoring programs; additional safety hazards on asbestos abatement projects.		3 times, before, during and after completion of <b>demolishing of the existing old office buildings under New Activity 1: Upgrade of the Jingzhou Museum</b> , each per day	2020	
<b>Total</b>							<b>20</b>

Importantly, the training plan is designated mainly for the four proposed activities, as part of the overall WB financed project, therefore, will be incorporated into the whole WB financed project training plan.

## G. EMP Budget Estimate

The environmental management budget estimate includes costs of environmental facilities, monitoring, training and external monitoring consultation services, all of which are already incorporated in the proposed four new activities' overall budget estimate.

### 7.1 Environmental investment estimate

The total investment is estimated to be USD 50.6 million (CNY 344 million). Environmental investment includes costs for facilities, equipment, and environmental monitoring costs during construction, etc. Based on the proposed environmental protection measures planned in this report, the early estimate for the one-off environmental investment is 24.86 million CNY, accounting for 7.23% of total investment, consisting of 19.51 million CNY for engineering investment, and 5.35 million CNY as newly-added environmental investment.

**Table 7- 1 Environmental protection estimate**

Measures		Effect	Qnt.	Investment (CNY 10,000)	Remark		
<b>Part I: monitoring</b>							
Monitoring during construction		0.06 million/year	2 years	12	New		
Inspection and monitoring of asbestos during construction		0.01 million/year	1 year	1	New		
Conducting asbestos risk assessment and preparing asbestos management plan		To be covered by project contingency if asbestos containing material (ACM) are found for <b>demolishing of the existing old office buildings under New Activity 1: Upgrade of the Jingzhou Museum</b>					
Environ. acceptance and monitoring after completion			-	20	New		
<b>Part II: measures</b>							
Construction	Wastewater	Washing water	Recycled after sedimentation with oil removal	Discharging into the moat/North Lake is forbidden to prevent impacting water environ.	4 sites 5	8	New
	Emission	Dust	Small sprinklers for sprinkling at roads and sites	Reducing dusts	4 sites	10	New
	Noise	Noise	Noise reduction, e.g. temporary sound boarding near communities	Meeting requirements on construction site noise	4 sites	8	New
	Solid wastes	Construction and demolition waste	Recycled for construction	Prompt removal to ensure sanitation	4 sites	8	New
		Living wastes	Into existing sanitation system	Unmanaged piling is forbidden to prevent environmental impact	4 sites	8	New
	Ecological	Embankment vegetation				1951.39	Included in the project investment
	water conservation	Restoration of temporarily occupied and soil sites		Preventing soil erosion and restoring vegetation		435	New
	Society	Population notification signs	Publicized announcements;		4 sites	2	New
Disposal of asbestos containing material (ACM) generated, if any		To be covered by project contingency if asbestos containing material (ACM) are found for <b>demolishing of the existing old</b>					

Measures			Effect	Qnt.	Investment (CNY 10,000)	Remark
			<b>office buildings under New Activity 1: Upgrade of the Jingzhou Museum</b>			
Post-construction asbestos risk evaluation						
Operation	Solid wastes	Living waste s	Classified dustbins with prompt removal	Prompt removal to ensure sanitation	2/year	O&M budget, excluded from this estimate
		Normal waste s			2/year	
<b>Part III Environmental management</b>						
Training of environ. management personnel during construction including asbestos risk and management					6	New
EMP EMC cost					20	New
<b>Total Investment</b>					<b>2,486.39</b>	

## 7.2 Annual operation cost of environmental protection facilities

The operation cost of environmental protection facilities in the first 3 years in the operation phase is to be incorporated in the World Bank loan and the operation cost after the third year of operation will be incorporated in the cost of the operation company. The total cost for the first three years will be 0.84 million CNY as listed in **Table 7-2**.

**Table 7- 2 Annual operational cost for the environmental protection facilities**

No.	Item	Cost (10,000 CNY RMB)	Notes
1	Environmental monitoring	2	
2	Energy cost	2	
3	Maintenance	20	Domestic sewage treatment, solid waste collection, vegetation nursery etc.
4	Labor	4	
Subtotal		28	
Total in operation phase		84	3 years

## H. Consultation and Information Disclosure

### 8.1 Information Disclosure

When drafting EA document including this EMP, the information disclosure was made on official website of Jingzhou City Government on 15 August, 2019. In order to let the more affected people know the information of the project, the PMO disclosed the project EIA information on Jingzhou Daily on 28 August, 2019. This EMP is available on the local government website link and in the local communalities for the affected people to review. Since the websites are kept permanent, the public opinions can be solicited any time although no feedback have been received by the PMO, Jingzhou City Government (the EA), and the domestic EIA institute so far.

Furthermore, the English Version of the EMP will be disclosed on the World Bank's website (<https://www.worldbank.org/>).





**Figure 8- 2 EIA Information Disclosure on Jingzhou Daily**

(also available at [http://news.cnchu.com/jzrb/html/2019-08/28/node\\_41.htm](http://news.cnchu.com/jzrb/html/2019-08/28/node_41.htm))

## 8.2 Public Consultation

The content of the inquiry of public consultation mainly include:

- 1) Awareness of the four proposed new activities;
- 2) The public's recognition of the status of environmental quality.
- 3) Identify the adverse impact on the affected people during construction period and operation periods.
- 4) The public's attitude on the construction of the four proposed new activities from the perspective of environmental protection.
- 5) The opinion and suggestion of the public on the mitigation measures to be taken in the four proposed new activities.
- 6) Other opinions and suggestions of the public on the construction of the four proposed new activities.

The PMO and IAs distributed a total of 100 individual public opinion questionnaires in the potentially affected areas. In addition, the opinions from Jingzhou Culture and Tourism Bureau, Jingzhou Water Conservancy and Lake Bureau, Jingzhou Cultural Relics Protection Center, and Jingzhou Ancient City National Wetland Park Administration were solicited for the comments and suggestions on the environmental impact of the four proposed new activities. Both the individual public opinion questionnaire (individual) and the four relevant authorities' return rates are 100%.

In addition, the opinions from State Administration of Cultural Heritage and Jingzhou District EPB were also sought.

**Table 8- 2 Summary of public consultation undertaken at EIA preparation stage**

Time	Participants	Materials (EMP, design)	Questions and responses	How to address
17 to 26 April 2019	Jingzhou City Cultural and Tourism Bureau (contracts: Zheng Lei 15826649600)	EIA, EMP, design	Agreed and supported the proposed new activities and made the following recommendations: 1 The rehabilitation of North Lake must be thorough, especially including the sewer interception. 2 Try to shorten the construction period so as not to cause inconvenience to residents, visitors and institutions. 3 Upgrade the lakeside attractions and service facilities.	1 The PMO/IAs introduced that the rehabilitation of the North Lake will be implemented fully in accordance with the design standards to improve the water quality and landscape of the North Lake. After the completion of the sewage interception, the surrounding domestic sewer will be no longer directly discharged into the North Lake, instead, to discharge into municipal network so as to prevent pollution at source. 2 The PMO/IAs will promote the contractors to shorten the construction period as soon as possible, rationalize construction schedule for convenient passages, and minimize the impact on the travel of the majority of residents. 3 The lakeside scenic spots and service facilities will be upgraded according to the engineering design.
17 to 26 April 2019	Jingzhou Water Conservancy and Lake Bureau 0716-8132812	EIA, EMP, design	Suggest consistent with the city's flood control and drainage works to ensure that the city's flood control and drainage functions are not impaired.	The PMO/IAs promised to dock with the city's flood control and drainage works to ensure that the city's flood control and drainage functions are not degraded.
17 to 26 April 2019	Jingzhou Cultural Relics Protection Center 0716-8439354	EIA, EMP, design	1 It is recommended not to use heavy construction machinery to avoid damage to the ancient city wall. 2 The PMO/IAs shall urge the contractors to strengthen the awareness education of the earth haulage drivers, establish awareness of cultural relic protection, and avoid damage to the cultural relics such as the ancient city wall of Jingzhou during the transportation of earthwork or construction materials. 3 The PMO/IAs should pay attention to strengthen the protection of museum related facilities during construction.	1 The PMO/IAs will urge the contractors to avoid using heavy construction machinery to avoid damage to the ancient city wall. 2 The PMO/IAs will urge the contractors to strengthen the awareness education of the earth haulage drivers, establish an awareness of cultural relic protection, and avoid damage to the cultural relics such as the ancient city wall of Jingzhou during the transportation of earthwork or construction materials. 3 The PMO/IAs will urge the contractors to pay attention to strengthening the protection of related facilities of the museum during construction to avoid unintentional damage to the relevant facilities during the construction process.
17 to 26 April 2019	Jingzhou Ancient City National Wetland Park	EIA, EMP, design	1 The construction needs to consider the survival of the native species in the water and its impact on the micro-environment of biodiversity. The project design	1. During the rehabilitation works of North Lake, it will have a temporary and reversible effect on water quality, mainly due to the increase of suspended

Time	Participants	Materials (EMP, design)	Questions and responses	How to address
	Administration  0716-8447810		documents and the preparation of relevant EIA documents should include ecological (including biodiversity) impact assessment. 2 Under the premise of ensuring that the water quality of the moat is not affected, the dredging, interception and ecological revetment of North Lake should be carried out to improve the water quality of the North Lake, and only the water body that meets the standard can be connected with the moat.	solids in water. After the completion of the construction, the suspended solids gradually settled, and the new water plants will increase the self-purification capacity of the water body. From a long-term perspective, the ecological benefits are obvious, and the water quality of the project will be connected with the moat in the future. 2. North Lake is outside the scope of the Jingzhou Ancient City National Wetland Park, and it is located in the urban built-up area, and the human influence factors are obvious. According to the "Jingzhou Ring Ancient City National Wetland Park Master Plan", there is no national protected level of flora and fauna in the North Lake. North Lake is not an important ecological sensitive area, and the ecological benefits of the project construction are obvious. Biodiversity impact assessment has been further elaborated in the EIA, and the corresponding results indicate that no biodiversity impact will be brought by this proposed new activity.
17 April 2019	Jingzhou District EPB	EIA, EMP, design	Principally supported the proposed new activities. Please confirm whether North Lake is included in scope of the Jingzhou Ancient City National Wetland Park.	The PMO confirmed that North Lake is outside scope of the Jingzhou Ring Ancient City National Wetland Park. Upon the FSR is finalized, the domestic EIA documents will be formally submitted to Jingzhou District EPB for review and approval.
5 to 7 April 2019	A total of 100 residents in the affected areas	Individual public opinion questionnaire	The public expressed support for the construction of the project. They only hoped that construction can be carried out as soon as possible, to shorten the construction period as possible, to reduce the pollution caused by the construction activities and the inconvenience of travel. At the same time, the surrounding area of North Lake should prevent the restaurants sewage from being discharged into the lake water. The rest did not put forward relevant opinions from the perspective of environmental impact.	The PMO/IAs will promote the contractors to shorten the construction period as soon as possible, rationalize construction schedule for convenient passages, and minimize the impact on the travel of the majority of residents.  One part of the <b>New Activity 4</b> : Rehabilitation of the North Lake is sewage interception, which is to collect the domestic sewage of the residents around North Lake, and to build new sewage pipelines to discharge into the urban sewage pipe network, then to prevent direct discharge to the North Lake.
31 May 2019	State Administration	Design	<i>Opinions of the State Administration of Cultural</i>	The design has been modified and improved. All

Time	Participants	Materials (EMP, design)	Questions and responses	How to address
	of Cultural Heritage		<p><i>Heritage on the construction of the Jingzhou City wall-top ring road and protection facilities within the scope of Jingzhou City Wall Protection (Wenhan [2019] No. 520)</i></p> <p>In principle, it is agreed to rehabilitate plank roads, renovate management houses and build navigation system within the scope of Jingzhou city wall protection scope. The design still needs to be modified and improved as follows: (1) Supplementing cultural relics impact assessment on the key sections of the walking path and the boardwalks on the slopes of earth wall, and clarifying the impacts on the cultural relics and the landscape environment. It is recommended to reduce the number of boardwalks, use lightweight materials, and use existing ramps to renovate without changing the original shape of the cultural relics. Concrete cushions should not be used. (2) Strictly controlling the quantity and scale of facilities such as navigation, paying attention to the coordination of scale and color, and supplementing the buried structural design, and shall not cause damage to the cultural relics. Further demonstrating the necessity and feasibility of implementing night lighting systems. And it is not appropriate to arrange urban furniture on the city walls. (3) Reconstruction of existing management houses should be coordinated with the style of the city wall in terms of architectural shape and color.</p>	those opinions have been strictly followed and incorporated into the project design.

### 8.3 Communication and sustainable public participation

In the construction phase of the four new activities, the public communication and consultation is an ongoing work. The measures are shown below:

- (1) The signs should be set up in somewhere visible of construction sites, and the engineering information should be listed, including a brief description of the project, construction phase, main construction activities, the project manager's name and phone number, the chief engineer's name and phone number. And the public people are invited to provide their own management personnel in the area of interest.
- (2) The contractors are required to hold public meetings in the communities where the construction sites locate, at least once a year. At the meeting, the on-site management personnel explain the construction activities, and respond to the issues the public concern.
- (3) The project office should assign a full-time security staff to receive complaint of construction and operation from the public. The staff's names and contact numbers in project office should be notified to local public through pamphlets and public meeting.
- (4) The staff in the PMO/IAs and the contractor may visit the key environmental sensitive receptors occasionally, such as residential areas, to understand their concerns, and the feeling about the impact of the construction and operation.
- (5) In preparing of special construction activities with big influences, such as unavoidable construction at night, the contractors are required to visit the potentially impacted communities to explain their activities and the resulting impacts (such as security risk, high noise etc.), and listen to the public concerns. The appropriate and responsible measures should be taken to solve the public issues.

#### I. GRM

A grievance redress mechanism (GRM) has been established as part of the project EMP to receive and manage any public environmental and/or social issues which may arise due to the four new activities. The PMO will ensure that potentially affected communities are informed about the GRM at an early stage of the four new activities. During the project preparation phase, the IAs, PMO and EPB have received training on the GRM.

The PMO is the lead agency responsible for overall management, implementation, and reporting of the GRM. The PMO coordinates the GRM and (i) instructs the IAs and contractors on their responsibilities in the GRM (ii) establishes a simple registry system, to document and track grievances received (including forms to record complaints and how they have been resolved); and (iii) reports on progress of the GRM in the semi-annual environmental monitoring reports (EMR) to WB. Each IA will assign a member of staff, who is responsible for implementation of the GRM and other relevant aspects of the EMP. Tasks include keeping a record of complaints. At least two months before construction commences, these contacts will be disclosed to the public at each construction site and forwarded to local residents to ensure that entry points to the GRM are well known.

The procedure and timeframe for the GRM is shown in **Figure 9-1**, and is summarized as follows.

- (i) **Stage 1** (maximum 10 working days): Affected persons can submit a written or oral complaint to the contractors, CSCs or IAs. Complaints received by any other institutions will be referred back to the IAs for action. The IAs will notify the PMO for the complaint within two days. The PMO will enter the complaint in the Complaint Register. The contractor, in consultation with the IAs, attempts to resolve the issue directly with the affected person. Within five working days of receiving the complaint, the agency will provide clear advice to the affected person on the proposed corrective action and by when it will be taken. The corrective action will be implemented not later than 10 working days from receipt of the complaint. The PMO will enter the resolution in the Complaints Register. If quick corrective action is not possible, or the IAs is unsure how to proceed, or the complainant is not satisfied by the initial corrective action, then the complaint will be referred to the PMO for Stage 2.

(ii) **Stage 2** (maximum 5 working days): For complaints not resolved in Stage 1, Stage 2 is initiated. The PMO-ES, contractor, CSC and IA will meet with the affected person and together discuss the issue and identify possible solutions. At the meeting, a possible solution will be agreed upon. The contractor or IA, as appropriate, will implement the agreed solution and report the outcome to the PMO-ES.

(iii) **Stage 3** (maximum 10 working days): If Stage 2 is unsuccessful (i.e. no solution can be identified or the affected person is not satisfied with the proposed solution) the PMO-ES will convene a multi-stakeholder meeting and involve the project leading group to ensure that any needed inputs from other agencies are coordinated. The workshop will identify on the outcome provide to the PMO and WB.

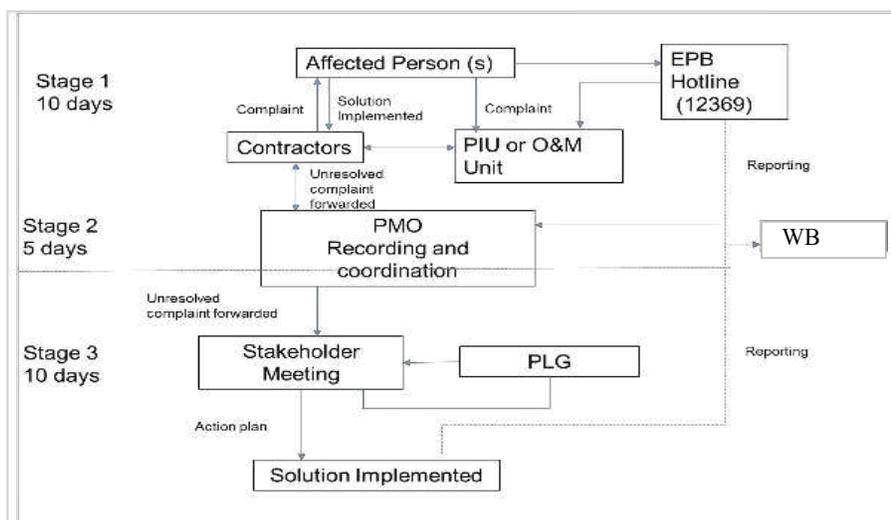


Figure 9- 1 The Project Grievance Redress Mechanism

Note: AP = affected person, EPB = ecology and environment protection bureau, O&M = operation and maintenance, PMO =project management office; IA=project implementation unit; PLG=project leading group.

## J. Reporting

### 10.1 Reporting Submitting contractor project documents

According to the tender documents, the contractor should compile an Environmental Management Plan (EMP) prior to the commencement of construction. EMP should be submitted to the Construction Supervision Engineer (CSE) for review to ensure compliance with legislations and the already approved EIA and EMP. All changes to submitted files will be reviewed and approved by CSE representatives. Upon CSE's approval, the EMP will also be submitted to EMC for review. Any additional suggestions by EMC will be passed to the contractor via CSE. The relevant documents will be regularly updated.

### 10.2 EMP

All EMP inspection results and suggestions will be recorded in the regular (semiannual; annual) environmental management report prepared by the EMC. If necessary, the EMC will also prepare a simple monthly report, particularly when violation of contract occurs. The EMP progress reports will be submitted within two weeks after each report date. The first progress report will be submitted in the first month after construction starts.

The regular (semiannual; annual) EMP progress reports should include at least the following:

- (a) Implementation overview (one or two pages)
  - 1) Non-compliances of regulations;
  - 2) Complaint records;

- 3) Report of changes;
  - 4) Key issues in the future.
- (b) Basic project information
- 1) Project organization, including names and telephone numbers of key personnel;
  - 2) Construction process;
  - 3) Management structure;
  - 4) Tasks to be done this season.
- (c) Environmental status
- 1) Illustrated explanation of tasks of the season (e.g. work locations and activities);
  - 2) Illustration of locations of project area, sensitive spots and monitoring stations
- (d) Summary as required by EMP
- 1) All monitored parameters;
  - 2) Suitability of the environment;
  - 3) Environment evaluation report, and implementation status of mitigation measures recommended by the EMP;
  - 4) Requirements of the environment provided by the contract.
- (e) Implementation status

Protection and pollution prevention; suggestions of mitigation measures as recommended by evaluation report and EMP are provided in the summary.

- (f) Monitoring results

Results and the following information

- 1) Methods;
  - 2) Laboratory name, devices and calibration details;
  - 3) Monitored parameters;
  - 4) Monitored location (and depth);
  - 5) Date, time, frequency and terms;
  - 6) Weather condition during monitoring;
  - 7) Other factors that may influence the results;
  - 8) Quality assurance, quality control results, and limitations.
- (g) Reporting violations, complaints, notifications, etc.
- 1) All records of non-compliance in environmental quality performance;
  - 2) All received complaints (oral or written), including location of receiving complaint, type, methods of survey or consultation, actions and follow-up, results and conclusion;
  - 3) All activities in violation of local environmental protection legislations.
- (h) Others
- 1) Explanation on reviewing future key factors from work plans and work method declarations.
  - 2) Suggestions on management of noise, air, water and solid wastes.

Importantly, the reporting plan is designated mainly for the four proposed activities, as part of the overall WB financed project, therefore, will be incorporated into the whole WB financed project reporting plan.

### 10.3 Data preservation

It is not required to incorporate on-site documentation, such as monitoring records, laboratory analysis reports, videos and images in the EMP progress reports submitted. However, such files should be kept by the

PMO/IAs and CSE, and should be ready for submission at any time. All relevant information should be clearly and systematically recorded in the documentation.

Electronic copies are required for monitoring data. All documents will be preserved during Construction phase, and be available to the PMO/IAs at any time within the year after project completion.

### **Annexes and Appendices**

Annex I ECOP for General Construction of Contractors

Annex II ECOP of Preservation of CH

Appendix 1 Summary of Environmental Supervision and Management

Appendix 2 Checklist for Environmental Protection Inspection during Construction Phase

Appendix 3 Notice on Rectification of Environmental Protection issued by Environmental Supervisor to Contractor

Appendix 4 Checklist before Acceptance of Environmental Protection

Appendix 5 Notification Form of Possible CH Sites

Appendix 6: Asbestos-Containing Materials Management Plan

## **Annex I ECOP for General Construction of Contractors**

### **A1.1 General**

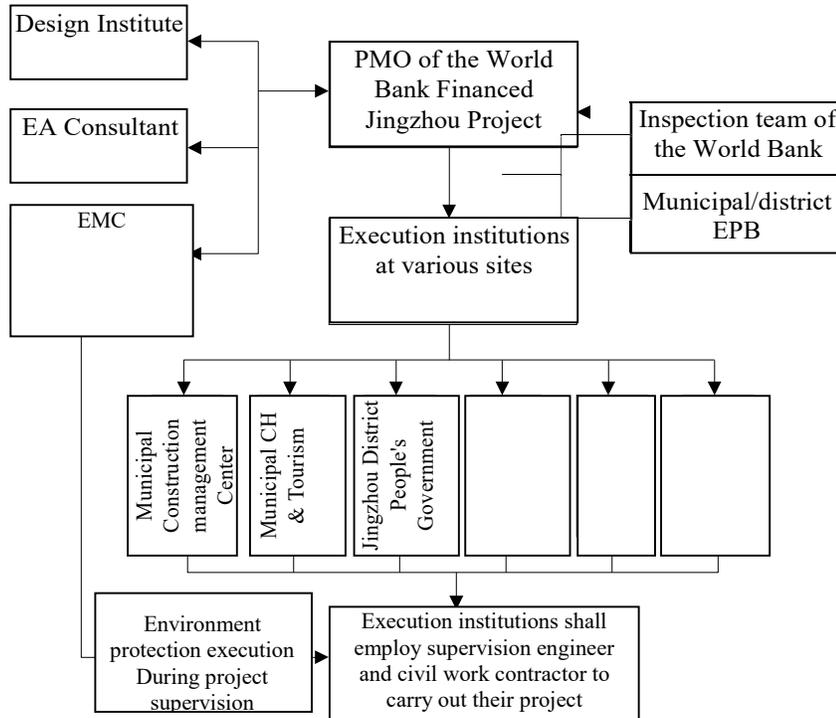
As a guideline, the ECOP lays the rules of environmental management for the project construction of contractor, and shall be read with national and local regulations. Contractors and their employees shall follow the measures specified in the ECOP in a strict manner, so as to minimize the adverse effect of construction on environment.

Following measures shall be faithfully implemented upon the completion but before the acceptance of the project.

- 1) Landscaping and land restoration shall be carried out at affected areas. In land restoration, waste shall be cleaned out, and vegetation restored to original level.
- 2) Rivers, roads, drainage pipelines and channels in affected area shall be cleaned to check whether sewage and traffic run smoothly in drainage ditches and on roads respectively.
- 3) All construction sites shall be cleaned, remaining materials properly handled.
- 4) Land temporarily occupied for construction shall be restored.

### **Institutional arrangements and responsibilities**

According to the relevant policies of the World Bank on loan and actual needs, a management institution devoted for the project is established to implement the ECOP and take charge of environmental management and supervision. It is proposed to establish an internal environmental management framework consisting of the PMO, the Project Component Office, the outsourced Design Institute, EIA Consultant, EMC, and the supervision department of the proposed four new activities. This institutional framework shall be obliged to carry out environmental management and supervision. See **Figure A1-1** and **Table A1-1** for institutional arrangements and respective responsibilities.



**Figure A1- 1 Environment Management Framework**

**Table A1- 1 Institutions in Environment Management System and their Main Responsibilities**

Name of institution	Task	Main Responsibilities
PMO	In charge of overall project coordination and management	<ul style="list-style-type: none"> <li>① Take charge of project planning and design; guarantee that environmental protection meets the procedure requirements of the State and the World Bank.</li> <li>② Carry out coordination, supervision and overall tracking &amp; report, and solve major environmental problems.</li> <li>③ Be responsible for employing EIA consultant and EMC.</li> </ul>
Execution institution	In charge of the implementation and management of various project components	<ul style="list-style-type: none"> <li>① Take charge of the environment protection &amp; management during project design and preparation.</li> <li>② Handle the fund for environmental protection.</li> <li>③ Be responsible for liaison and coordination with PMO for environmental management.</li> <li>④ Appoint environment management personnel; implement ECOP and tracking &amp; reporting; timely coordinate Contractor and CSE to carry out environment management; receive and handle environment complaints.</li> </ul>
Provincial/municipal EPB	In charge of reviewing and approving the EIA of proposed project as a governmental supervision & regulatory institution	In charge of reviewing and approving the EIA of proposed project as a governmental supervision & regulatory institution
Contractor	Implementation institution, in charge of implementing relevant environmental protection measures not fall due to project construction. specified in ECOP	Inspect construction site and review the ECOP/EIA before commencement; implement ECOP; protect environment; guarantee that the environment quality will
Engineering supervisor & environmental supervisor	In charge of supervising and inspecting the emission of pollutants and ecological destruction events during construction, and dealing with such events.	<ul style="list-style-type: none"> <li>① Conduct on-site environmental inspection weekly; fill in checklist of environmental inspection during construction and keep document archived.</li> <li>② Put forward rectification plan for items not in compliance with ECOP and supervise its implementation.</li> </ul>
EIA Consultant	Carry out independent environment	Formulate ECOP and prepare domestic EIA documents.

Name of institution	Task	Main Responsibilities
	impact assessment of the project; provide technical support for the environment protection and formulate ECOP	
Consultant	In charge of preparing feasibility study, preliminary design, shop drawing and bidding documents of the project	① Ensure that engineering proposal has the minimum impact on environment. ② Incorporate various environmental measures in feasibility study report, preliminary design, and EIA into design proposal and budget and also into the bidding documents.
EMC	Provide assistance to PMO in preparing EIA, and supervise the implementation of environmental protection during project implementation	① Submit an interim report to the World Bank and environmental management implementing institutions prior to June 30 in each year and keep the document archived. ② Submit an annual report to the World Bank and PIA prior to December 31 in each year and keep the document archived. ③ Submit a comprehensive evaluation report of environmental management half year after the completion of all environmental management works and keep the document archived.

### Environmental management personnel arrangement and main responsibilities

In the environmental management system, there are some internal project institutions, some outsourced consultants, some external institutions. For better performance of the main responsibilities of environmental management institutions, environmental management institutions are recommended to arrange environmental management personnel as per **Table A1-2**.

Table A1- 2 Arrangement of Environmental Management Personnel

Environmental management institutions	Personnel arrangement	Main responsibilities	Qualification
PMO	1 manager	① Inspect and coordinate the works of personnel in PMO. ② Organize environmentalists of the World Bank to conduct visits, submit report to the World Bank and implement the environmental management requirements of the World Bank. ③ Summarize environmental management report and submit it to the World Bank, coordinate with other relevant departments, solve major environmental problems. ④ Conduct at least 1 on-site environmental inspection in each year, fill in checklist of environmental inspection during construction and keep document archived.	Environmental management personnel shall be equipped with expertise in environment and management.
	Outsourced independent EMC	① Provide technical assistance and training. ② Provide assistance in preparing restoration plan for ecological environment damaged in construction. ③ Carry out supervision and survey on environmental management according to ECOP requirements. ④ Evaluate the living conditions of affected population and check whether their lives have been restored. ⑤ Prepare external monitoring and evaluation report and submit it to PMO and the World Bank.	
Various execution institutions	1 manager	① Carry out at least 1 on-site environmental inspection in each month, fill in checklist of environmental inspection during construction and keep document archived. ② Organize environmental management training. ③ Supervise the implementation of environmental measures specified in the ECOP.	

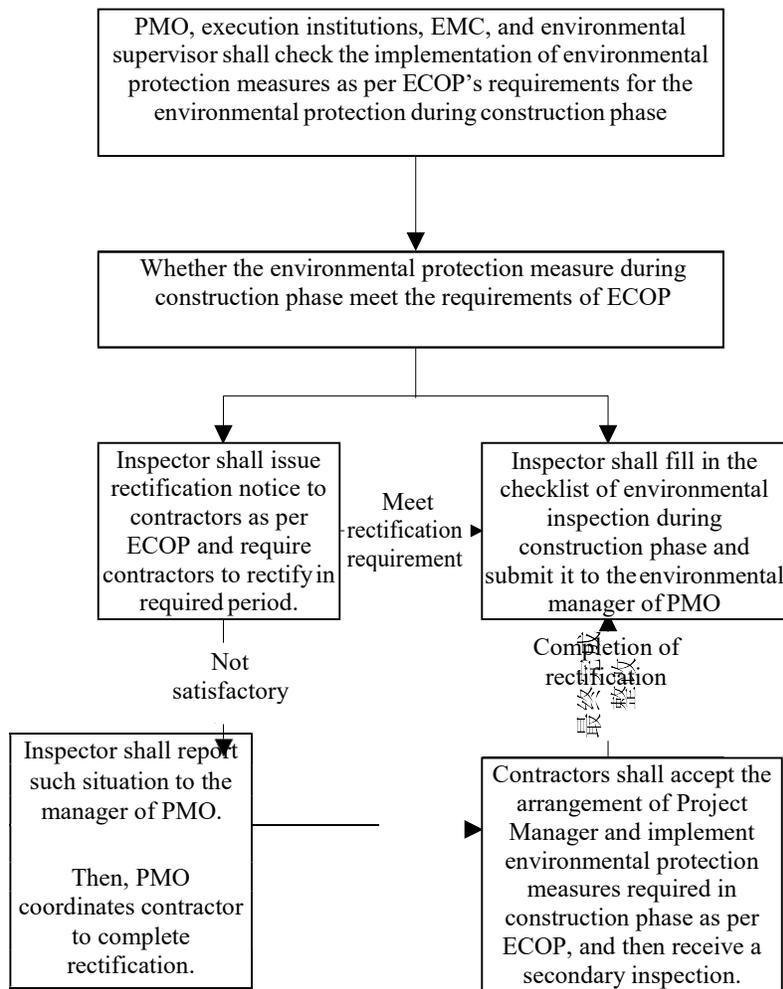
Environmental management institutions	Personnel arrangement	Main responsibilities	Qualification
	1 complaint receptionist	① Take charge of recording, filing and reporting complaints to managers during construction and operation; handle the complaints from public. ② Cooperate with managers to carry out environmental protection.	
Various Project Component Office	1 manager	Take charge of matters in relation to the implementation of project components; cooperate with PIA to carry out environmental protection.	
Institutions for EIA	3 persons	① Conduct field survey to each project and carry out EIA. ② Prepare ECOP	
Contractor	1 Environmental manager	① Take charge of implementing environmental protection measures specified in ECOP during construction. ② Report accidental environmental problems in project area to environmental management director in institutional framework; formulate various environmental protection measures during construction. ③ Accept the supervision and inspection of engineering supervisor, the World Bank and various EPB on environmental protection. ④ Establish a feedback system and complete rectification within 3 working days after receipt of rectification notice (for items requiring coordination of management institution, rectification period can extend to 10 working days). ⑤ Complete checklist at construction site together with engineering supervisor and report it to the local management institution. ⑥ Contractor shall report the progress of works to engineering supervisor on monthly basis.	
Environmental supervisor	1 environmental supervisor, assumed by engineering supervisor	① Conduct environmental inspection on site on weekly basis, fill in checklist of environmental inspection during construction and keep document archived. ② Put forward rectification plan for items not in compliance with ECOP and supervise its implementation.	

## Construction preparation and environmental supervision

PMO shall provide all the EIA documents of each project component, including EIA, ECOP, future EMP, and copies of approvals of local EPB, to contractors after contract award but before construction. Contractors are required to carry out environment survey on construction site to verify the description of construction site in EIA documents and identify the environmental restrictive factors in project area. Environmental mitigation measures shall be put forward regarding the newly found sensitive receptors in environmental survey. Construction cannot be carried out until such measures are approved by environmental supervisor. See Appendix 1 for environmental supervision & management.

During construction, environmental supervisor is obliged to check whether the environmental protection and mitigation measures meet the requirements put forward in ECOP. He shall inspect construction site at least 1 time per week, fill in checklist for environmental protection inspection during construction phase (Appendix 2) and keep document archived, issue rectification notice (Appendix 3) to contractors regarding the environmental issues in construction, supervise contractors implementing relevant rectification measures, and submit report to the environmental manager of execution institutions and the experts of the World Bank. Upon the completion of construction, it is proposed to conduct an environmental inspection at construction site before acceptance of environment, fill in the checklist before acceptance of environmental protection (Appendix 4) and keep document archived.

See **Figure A1-2** for workflow of environmental supervision during construction.



**Figure A1- 2 Workflow of Environmental Supervision**

**Document management**

During implementation of ECOP, relevant documents shall be managed by PMO, execution institutions, EMC, EA Consultant, engineering supervisor and contractors shall manage. See table 1.1-3 for details.

**Table A1- 3 Requirements for Document Management**

Name of institutions	Document management
PMO	① Prepare ECOP and domestic EIA documents and supervise their implementation and archiving. ② Record the briefing of PLG and submit report to the World Bank; Keep documents archived. ③ Coordinate with other departments to solve major environmental problems and make record of the measure implemented, as well as keep documents archived.

Name of institutions	Document management
Various execution institutions	① Prepare and implement environmental rules and regulations for the project components and keep documents archived. ② Prepare and implement environmental management & training plan and keep documents archived. ③ Organize special study or research; keep documents related to seminar and research archived. ④ Keep a good record of complaints during construction and operation and keep them archived. ⑤ Keep a record of the briefing of engineering supervisor on quarterly basis, keep them archived; submit report to PMO. ⑥ Place signature on checklist submitted by contractors and engineering supervisor; verify environmental sensitive receptors; and keep such documents archived. ⑦ Administer the rectification notices submitted and keep them archived.
EMC	① Submit an interim report to the World Bank and environmental management implementing institutions prior to June 30 in each year and keep the document archived. ② Submit an annual report to the World Bank and PIA prior to December 31 in each year and keep the document archived. ③ Submit a comprehensive evaluation report of environmental management half year after the completion of all environmental management works and keep the document archived.
Contractor	① Keep a weekly record of detailed construction and keep them archived; submit them to engineering supervisor. ② Complete checklist at construction site together with engineering supervisor, keep the checklist archived, and submit it to IA. ③ Keep a record of detailed construction in case of emergency situations, keep the records archived and submit them to engineering supervisor. ④ Complete rectification within 3 working days after receipt of rectification notice (for items requiring coordination of management institution, rectification period can extend to 10 working days); Keep documents archived.
Engineering supervisor	① Keep a weekly record of the briefing of contractors, and keep the record archived and submit it to PMO. ② Complete checklist at construction site together with contractor, keep the checklist archived and submit it to execution institution. ③ Keep a record of detailed construction in case of emergency situations, keep the records archived and submit them to local management institutions. ④ Put forward rectification plan for environmental problems encountered in construction by contractor and supervise the implementation of such plan, including issuing rectification notice and checklist, review the documents and keep them archived.
Institutions with Class A qualification for EIA	① Prepare ECOP and domestic EIA documents and keep draft, draft for approval and approved draft archived.
The World Bank	① Keep a record of the briefing of PIA every half year and keep the record archived.

## A1.2 ECOP of construction site and site construction ECOP of construction site

Construction site includes construction camps, concrete mixing stations, asphalt mixing stations, etc. In terms of function, construction camps fall into three categories, i.e. life camps, production camps, life & production camps. Life camps can only accommodate the living of construction personnel; production camps accommodate building material storage, concrete mixing station, asphalt mixing station, etc; life & production camps accommodate both the living and production of construction personnel. Asphalt mixing station is mainly used for mixing asphalt applied in pavement.

See **Table A1-4** for the ECOP of construction site.

**Table A1- 4 ECOP of Construction Site**

Environmental elements	Protection measures	Responsible institution
	Existing public toilets within project area shall be employed as far as possible.	

Water environment	Domestic sewage (construction personnel discharged in toilet) shall be treated by existing municipal facilities. Production sewage shall be recycled after sedimentation without discharge.	Contractor
Ambient air	Electricity or other clean energy will be employed for daily life and heating.	Contractor
Acoustic environment	Low-noise equipment shall be selected to control sound source.	Contractor
Solid waste	Domestic garbage collection spot or garbage can shall be provided. Building waste in construction camp shall be recycled as far as possible. Those that cannot be recycled shall be transported to designated spot regularly. A temporary solid waste storage & disposal or recycle spot shall be established.	Contractor
Social environment	Construction personnel shall follow local rules and civil laws, carry out works in a civilized manner and establish good relationship with local residents. Contractor shall provide sufficient and clean drinking water, soaps, toilet papers, and separate male and female bathrooms. In addition, contractor shall ensure that site offices, warehouses and workshops are in locations which are proper in the opinion of environment engineer or supervisor of PMO. 2m high or higher safety fence of proper material shall be established around camps.	Contractor
Ecological environment	Barren slope, brush land, poor land, road with small traffic volume in scenic area shall be preferred for production camp construction. No building phenomenon under CH protection shall be occupied. In case it is necessary to occupy farmland for production camp construction, no basic farmland shall be occupied. In addition, before construction, cultivatable surface soil on the farmland shall be removed and stored at a leveled area in the site temporarily and fenced with bagged soil. The area shall be provided with temporary drainage ditch and grit sedimentation and covered with dust-proof screen. Upon completion of construction, the surface soil will be employed for restoring cultivation or landscaping.	Contractor
Environmental management	Only resident employees, staff in construction camp and personnel visiting construction site for business reasons shall have access to the construction site. Visits to construction camp shall be approved by construction camp manager as required. Sufficient lighting at day and night shall be provided at construction site. A strict code of conduct in construction phase shall be formulated to restrain the behavior of construction personnel.	Contractor

### ECOP of site construction

See Table A1-5 for ECOP of site construction.

**Table A1- 5 ECOP of Site Construction**

Environmental elements	Protection measures	Organization in charge
Water environment	<p>A review conclusion of preliminary drainage design of construction site. – A detailed implementation plan of proposed drainage system.</p> <p>-- As a part of the drainage system of the site, surface runoff at construction site shall be drained to avoid soil carry-away. Water shall be subject to the treatment of sediment trap before discharge. – Domestic sewage from toilets at site offices shall be collected by licensed waste collector or treated by relevant facilities. Wastewater after treatment shall not be discharged until it meet the requirements of national law.</p> <p>- Wastewater treatment facilities and sedimentation tank shall be provided near each construction area that may produce wastewater. In addition, sedimentation tanks shall be capable of processing excess suspended solids (SS) before they are discharged. Wastewater from washing concrete, cofferdam and vehicles shall not be discharged.</p> <p>- Retaining wall and bagged sand shall be provided near drilling and piling machine to prevent expansive soil and wastewater from flowing into piling area. Collected expansive soil or wastewater shall be released after treatment. – Prior to wet season’s arrival, all exposed surface shall be properly covered or provided with landscaping to reduce sand in runoff.</p>	Contractor

Environmental elements	Protection measures	Organization in charge
Ambient air	<p>In any case, the dust and granular material produced should be minimized, to avoid the impact on the surrounding communities, especially on vulnerable groups (Children, the old);</p> <ul style="list-style-type: none"> <li>- Prevent the soil from being exposed to wind by large area due to seasonal vegetation loss.</li> <li>- Build dustproof enclosure around the construction site, to reduce the diffusion of dust as far as possible, especially avoid impact on the surrounding communities;</li> </ul> <p>Carry on watering if necessary on muddy roads or passages and in soil or filling material storage area. On dry and windy days, watering should be carried on for twice every day at least (forenoon and afternoon). The frequency of watering near the surrounding communities shall be added properly depending on demands;</p> <ul style="list-style-type: none"> <li>- In tunnels, the supporting ventilating system and other facilities should be equipped, to control the concentration of air pollution;</li> <li>- The vehicles and roads used for transporting the materials of the project should be designed properly. For example, the roads can be paved with concrete/pitch or stones. There may be large amount of construction materials to be transported before the construction of large earth works;</li> <li>- Ensure the maintenance and repair of all vehicles, prohibit the vehicles that are not properly maintained and may cause server pollution to enter the construction site;</li> <li>- In transportation of chemical products or materials such as cement, yellow sand, and lime, clean and impermeable material shall be used for covering them completely, to avoid leakage or overflow in the transportation;</li> <li>- The exhaust gas of construction vehicles and machines are unavoidable, but the engines of them shall be examined and adjusted when necessary, to reduce the pollution to air.</li> </ul>	Contractor
Acoustic environment	<p>Limit travel speed at accesses of all roads related to the project;</p> <ul style="list-style-type: none"> <li>-All the vehicles entering the field should be with speed less than 30 kilometers per hour, except specially specified;</li> <li>-Keep the noise when all the machines and equipment are in operation less than 90 dB if possible;</li> <li>-In sensitive areas (including residential area, etc.), noise reduction measures should be taken more strictly to prevent the noise from disturbing residents;</li> <li>- Proper measures should be taken to avoid the vibration or noise caused by construction activities;</li> <li>- Formulate a construction material transportation plan, to reduce the adverse impact on the life of surrounding residents and the traffic outside the construction site; the vehicles must slow down and be prohibited to whistle when go across the sensitive areas. In rush hours, the transportation should be reduced as far as possible. Contractor must provide transportation routes to Project Manager in advance;</li> <li>-The construction equipment should keep the optimum operation condition and the lowest level of noise.</li> <li>- Use temporary noise barrier, to reduce the noise produced by construction equipment as far as possible;</li> <li>- Hearing protection must be provided for the workers who operate the equipment with high noise, such as piling, exploding, mixing and stirring, etc, and the noise shall be controlled;</li> <li>- In the area used for storing fuel or lubricant, fences shall be installed, and compacted/impermeable ground or other surfaces should be paved, to prevent unexpected leakage or overflow of fuel and/or lubricant. The drainage of the surface water within the enclosure should be through oil skimmer or other devices, to eliminate the discharge of hydrocarbon. Empty buckets of fuel /lubricant shall not be placed in the field, but be labeled with MSDS, and treatment method of them should be trained for workers;</li> <li>- Project supervision team should be equipped with portable noise detecting instruments, to exam the noise level in sensitive areas;</li> </ul> <p>-The time for construction materials to be transported away from the field should be during non-peak period, so as to control the increase of traffic volume and noise.</p> <ul style="list-style-type: none"> <li>- Use properly designed silencer, sound insulation board or protective cover, etc. All the noise control equipment should be repaired regularly, and replaced when dysfunctional.</li> <li>- Use electrical equipment to replace diesel-powered equipment or gas-powered equipment;</li> <li>-In case that an equipment with high level of noise send out noise in one direction, it should be far away from the sensitive receptor nearby as far as possible.</li> <li>-The construction machine and equipment shall be used intermittently, and be closed or slowed down to the minimum speed in downtime.</li> </ul> <p>Noise mitigation at night:  In case of construction near local communities at night, which will cause heavy impact on local residents and other sensitive receptors, the following special measures should be taken:</p> <ul style="list-style-type: none"> <li>-Notify the residents of the affected area in advance, with content including the specific time of construction at night and the lasting time, the necessity of construction at night, and the mitigation measures the project will provide, so as to obtain their understanding. The affected residents can put forward their ideas, difficulties, and suggestions, which should be taken into account before construction at night.</li> <li>- Concrete mixer, generator, and other fixed equipment with high noise should be as far from the residential areas as possible. In construction at night, use the municipal power supply the replace diesel generator, to mitigate the impact of the noise.</li> </ul>	Contractor

Environmental elements	Protection measures	Organization in charge
Solid waste	<ul style="list-style-type: none"> <li>- Establish and execute compulsorily daily clearing procedure, including repair and maintenance of construction waste disposal facilities;</li> <li>- The remains produced by demolition of structures should be reused as far as possible (For example, use as filling material in other projects of Jingzhou). The disposal of the remains must be conducted after the identification of the disposal site, and upon approval of supervision engineer of the project. Contractor shall ensure that the disposal sites meet the following conditions: (1) it can't be located in forest area (2) without impact on natural drainage (3) without impact on threatened/ rare plant. In any case, Contractor shall not dispose the materials in environmental sensitive areas;</li> <li>-In case that fragments or sludge are deposited in the adjacent area of the construction site, Contractor shall clear them away immediately, and recover the affected area to the original state upon confirmation of the supervision engineer;</li> <li>- All the traffic arrangement of supply, maintenance, demolition, remain clearance, etc. during construction period, will be regarded as part of Contractor, and be defaulted to have been approved to be planned and implemented by Contractor, and arranged by supervision engineer;</li> <li>- For design and construction of all waste soil yard, the most safe and stable technical terms must be applied;</li> <li>- Conduct risk assessment to potential impact caused by permeation of waste material to surface water;</li> <li>-Ensure that the location selection of waste soil yard won't have impact on surface drainage through proper analysis;</li> <li>-Build safe and stable waste soil yard according to requirements of landscape and vegetation recovery plan, avoiding erosion.</li> </ul>	Contractor
Social environment	<p>The construction at important traffic nodes should avoid rush hours (07:00~08:30 and 17:00~18:30); set vehicle in and out signboards, and the drivers shall drive in a civilized way, ensuring the safety of transportation;</p> <p>Formulate comprehensive health management plan for construction staffs, including disease control, vaccination, pest management, food safety, etc.</p> <ul style="list-style-type: none"> <li>- Set safe sight distance in construction site and construction camp;</li> <li>-Set up signs around the construction area, to provide convenience for traffic operation, guidance for all works, as well as suggestion and warnings of safety. – All the signs should use Chinese, and made as per specification of China;</li> <li>-Upon the consent of environmental officer of the project, use selected routes to go to the field of the project. The Contractor vehicles shall be of dimension that is suitable to the level of roads in the area, and control the load strictly to prevent to damage the local roads and bridges. For damages to the local roads and bridges due to overload transportation, Contractor shall bear all the responsibility and be requires to repair the damaged;</li> <li>-Appropriate traffic control should be kept during the whole contract period; -Be careful to mark the safe passage for pedestrians; - If there are Children from schools nearby, it's necessary for traffic security officer to direct the traffic at the time when school is over.- Ensure to supply traffic signs (including paint, easels, materials for signs, etc.), road marking, guardrail, to maintain the safety of passengers during construction period.</li> </ul>	Contractor
Ecological environment	<p>All the earthworks shall be controlled appropriately, especially in rainy season;</p> <ul style="list-style-type: none"> <li>- Contractor shall keep the stability of the earthworks in the whole process of excavation, and disturb the area outside the project area as rarely as possible.</li> <li>-It's better for Contractor to operate continuously in excavation and filling of the last section, avoiding local construction of earthworks, especially in rainy season;</li> <li>- To avoid erosion to soil slope caused by excavation and filling, cut-off curtain and toe drainage equipment should be installed and grass or other vegetation should be planted at the top and bottom of the earthworks. The cut-off curtain Contractor should be installed at higher place, to reduce surface run off and slope erosion.</li> <li>- The excavation of earthworks and unstable materials, should be conducted in specified disposal area upon approval of the supervision engineer of the project;</li> <li>- The disposal area shall not be arranged in the areas with the possibility of landslide, or may affect the farm land or land of other use, or areas which may cause surface run off with impact on water source. Canal may need to be excavated within and around waste landfill yard, of which the specific construction form will be decided by supervision engineer.</li> </ul>	
Environment and safety management	<p>Reserve, specify and limit a storage and disposal area for construction waste, and/or install a safety mobile run of waste moving from higher place to lower place;</p> <ul style="list-style-type: none"> <li>-Proper protective and fixing measures need to be taken in the process of sawing, cutting, grinding, polishing, fragmentation or excavation (if applicable);</li> <li>-Achieve clean transportation, avoiding vehicles and other equipment from dropping waste in the process of transportation;</li> <li>- Set temporary protective facilities for falling in the periphery of scaffolds and operation zones high above the ground, such as hand rail, skirt board, etc. to prevent construction materials and staffs from falling.;</li> <li>- Provide safety glasses, side protective cover, mask, safety helmet, safety boots or shoes to all relevant workers.</li> </ul>	Contractor

## Annex II ECOP of Preservation of CH

### A2.1 ECOP of protection of the Historic Town wall

The new activities will focus on repair of sensitive receptors, especially **renovation of brick and stone pavement of Jingzhou's Historic Town city wall-top footpath, renovation of the Jingzhou's Historic Town city outer walkway loop**. It has no negative impact on the historic city wall and its vegetation. Contractor shall compile detailed construction regulations under guidance of this ECOP, and submit it to CH experts and supervision engineer for approval before construction.

**Table A2- 1 Protective measures in the process of city wall repair**

Name	Status	Restoration measures	ECOP	Organization in charge
The road on top of the city wall, the outer walkway loop	Been repaired	Clearing and unchoking	Hire supervision company with a professional background to supervise	Contractor
	Partial loose	Crack pouring and repair		
	Severe sinking and damage of brick paving	Bed mortar and brick paving	Hire supervision company with a professional background to supervise	
	Sinking and Damage of basement layer of brick paving	Backfill with loess	Use original building materials as much as possible	

### A2.2 ECOP of Jingzhou Museum

Jingzhou Museum itself does not belong to CH, but relics on display are sensitive receptor, so during construction of the **upgrade of the Jingzhou Museum**, as long as the relics on display are well kept, this project has no impact on CH protection agencies of Jingzhou Museum. ECOP of upgrade project of Jingzhou Museum is shown in Table A2-2.

Table A2- 2 Protective measures of Jingzhou Museum Project

Project name	Project content	ECOP	Organization in charge
New construction of three-story exhibition building	Interior furnishing works		Contractor
	Making of reproductions, handicrafts and props		
	Professional showcase and lighting	Proper arrangements for temporary storage of CH which meets the standard, and invite professionals to check and transport artifacts	
	Project of exhibition displays for official documents and letters		
Equipment installation works	Multimedia equipment and software engineering works		Contractor
	Modification of monitoring system	——	
	Modification of fire alarm and sprinkler system (supplementary gaseous fire suppression)	——	
	Central air conditioning system	——	
	Elevator	——	

### A2.3 General ECOP of CH protection

During the construction period, if any CH is found, the Contractor shall immediately preserve the site and report to the local Cultural Relics Bureau according to Cultural Relic Protection Law of People's Republic of China (2007.12.29). Construction can only be resumed after treatment of Cultural Relics Bureau. Reporting procedures for cultural heritage are shown below. Notification table for CH point is shown in Appendix 5.

If any CH is found during the construction, builders should:

- (1) Immediately cease the construction, and strengthen the protection of the site;
- (2) The contractor should report to the police and competent authorities of CH for identification in a timely manner;
- (3) Once it is defined by the expert as CH, delimit immediately the scope of protection;
- (4) If construction period is pressing or there is danger of nature destruction, excavation of CH needs to be undertaken;
- (5) The excavation of CH must be carried out by professionals using specialized equipment and no unauthorized excavation shall be taken by the contractor;
- (6) Once it is defined as significant cultural heritage discovery, that project shall undertake demonstration as to whether or not it should be built in another place.

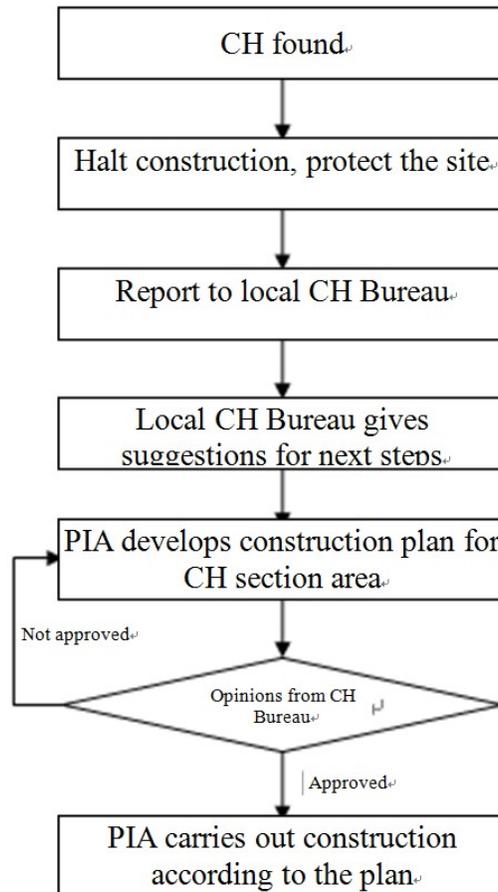


Figure A2- 1 Flow chart for discovered CH during construction

## Appendix 1 Summary of Environmental Supervision and Management

No.	Content	Mitigation measures	Implementing agency	Supervision agency
Design phase				
1	Soil and water loss	Design scientific construction processes and methods. Rationally select materials and location of stockyard and dump area to prevent soil erosion;	DI	Implementing agencies and project supervision agencies
2	Greening	Green design for areas surrounding the building;		
3	Land expropriation	Compensation for acquired land shall be complemented in accordance with the relevant provisions, and the compensation funds shall be distributed to each family;		
4	Air pollution	Stockyard and mixing stations should be at least 20m away from sensitive areas;		
5	Water environment	Reuse construction waste as far as possible, and rely on existing sewage treatment facilities for treatment of sanitary sewage.		
Construction phase				
1	Countermeasures for impact of ecological environment	<p>(1) In the pre-construction, Contractor must map out protection wires, clarifying protected target and the scope of protection; coordinate issues related with construction sites, and minimize the occupation and destruction of the riverside land or other vegetation.</p> <p>(2) Contractor should rationally design general layout of the construction in the construction organization plan, and make full use of the existing street road of the historic town, and minimize the area of temporarily occupied land.</p> <p>(3) For temporarily occupied land that has to be taken, after the construction is finished, waste in that area should be cleared in a timely manner and vegetation should be restored. For permanently occupied land of the project, except for permanent buildings and water surface, vegetation in that area should be restored in a timely manner as far as possible.</p>	Contractor	Implementing agency, environmental supervision agency, and external environmental supervision agency
2	Soil and water loss	<p>(1) To prevent soil erosion caused by interception pipeline, according to related requirements of Report of Soil and Water Conservation Plan, intercepting drain and drainage ditch shall be build, to prevent runoff from entering into moat; build hoards and sedimentation tank to reduce soil loss and runoff; during the rainfall and gale period, construction and material processing shall be limited; stabilize the full-cut slope, dike, and other work areas susceptible to erosion; temporary storage yard for sludge shall be covered with clean waterproof tarps, and shall be sprayed with water in dry weather; all water spray; all interference area of earth-work should be stabilized; after construction is completed, immediately restore the landscape in the temporarily occupied land.</p> <p>(2) Residue prevention and slope protection works for provisional storage yard should be determined in accordance with the position of waste soil, its properties, its expected height and other factors.</p> <p>(3) Drainage systems of dump yard should be set on the basis of topography, geological and hydrological conditions, combining the condition of ditches, agricultural irrigation and other facilities, so as to avoid water erosion of farmlands and sloping fields. When there is convergence around the dump area, interception and drainage measures can be taken to distribute water;</p> <p>In addition, after the project is finished, the plant for revegetation in the main protection area, protection area of pioneer road, protection area of concrete mixing station, and provisional dump (residue) area shall use native species and avoid exotic species.</p>	Contractor	Implementing agency, environmental supervision agency, and external environmental supervision agency

No.	Content	Mitigation measures	Implementing agency	Supervision agency
3	Surface water pollution	<p>(1) In the construction site, the waste for vehicle cleaning, concrete curing, aggregate washing should be collected through the gutter channel. After the waste water is mixed and diluted, it will run into provisional sedimentation tank for treatment. The size of sedimentation tank should be set so that the residence time of waste water in this tank could be 12h above. Waste water after its treatment will be used for cleaning of construction site , building materials, concrete curing, and aggregate washing;</p> <p>(2) Rely on existing facilities for treatment of domestic wastewater as far as possible;</p> <p>(3) Strengthen construction management, and strictly control the running, emitting, dripping, and leaking of oils in construction machinery ; build provisional drainage system and take water conservation measures, so as to prevent water environment impact caused by soil and water loss of the dump area;</p> <p>(4) All Contractors must implement measures for treatment of waste water of construction and domestic sewage to ensure proper handling and disposal of waste water;</p> <p>(5) Enhance the education on environmental protection of construction, and enhance the environmental awareness of construction workers; construction workers must not litter, or dump waste and sewage improperly.</p>	Contractor	<p>Implementing agency, environmental supervision agency, and external environmental supervision agency</p>

No.	Content	Mitigation measures	Implementing agency	Supervision agency
4	Noise	<p>(1) Site arrangement: Arrange the construction site properly: Do not place several power or machinery devices at one place to avoid too much noise at the place. Machinery devices fixed to a position should be operated inside an operation shed if any.</p> <p>(2) Use low-noise equipment and technology, so as to reduce noise at the source. By using transport vehicles with low noise, the noise in driving can be 10~15dB (A) less than that of other vehicles of the same level; the difference of noise level can be up to 5dB (A) between different types of excavators and blenders.</p> <p>Reduce operation vibration noise through strengthening inspection and maintenance of mechanical equipment, maintaining regular lubrication, and tightening all components. The whole equipment shall be firmly installed, keeping full contact with the ground. Shockproof base shall be used if possible, so as to reduce noise.</p> <p>(3) Arrange construction time properly, avoid construction operation with noise pollution during 22:00 p.m.~6:00a.m. as well as lunch break as far as possible; if urgent construction at nighttime is unavoidable, it should be reported to local environmental protection administration, and construction can only be conducted at specified day upon approval.</p> <p>Reduce noise of construction transportation: as the transportation during construction period has great impact on environment, the amount of transportation at night shall be reduced as far as possible, and the speed of heavy-duty trucks shall be limited, especially when entering residential area. Regular maintenance of transport vehicles shall be done, whistling shall be reduced or banned, and transport route shall be arranged in a reasonable manner.</p> <p>(4) The PIA shall instruct construction contractor to post and publish complaints hotline at construction site. When receives complaints, PIA shall contact with local environmental protection administration immediately, so as to handle all disputes timely.</p> <p>In case that there are sensitive sites (Newly-built houses or houses haven't been demolished) within 50m from construction site, temporary noise barrier or baffle plates shall be erected. Strengthen management, advocate civilized construction, and enhance consciousness of all construction personnel to avoid noise disturbing surrounding residents so as to control human noise as far as possible. Meanwhile, in the process of project construction, continuous communication with existing and planned communities surrounding the project area is required, so as to obtain understanding and support from surrounding residents.</p>	Contractor	Execution organization, Environmental supervisor, EMC
5	Air pollution	<p>Main sources of fugitive dust are earthwork excavation, mixing of ash and earth during construction of visitors' center, wetland, river-way revetment work, demolition of buildings within the boundary of land expropriation, temporary storage, transportation and other processes of powder materials,. To mitigate the impact of fugitive dust on the environment, following measures shall be taken:</p> <p>(1) Maintain a certain humidity at construction site, watering and cleaning system must be established for storage area of powder materials, dedicated person shall be arranged for the work, and the frequency shall be adjusted according to the degree of drying of the</p>	Contractor	Execution institution, Environmental supervisor, EMC

No.	Content	Mitigation measures	Implementing agency	Supervision agency
		<p>weather.</p> <p>(2) Effective and clean construction enclosure shall be set around construction site.</p> <p>(3) Construction material shall be stored indoors as far as possible; in case of storing outdoors, they shall be covered with tarpaulin; powder materials like cement and lime shall be transported as bulk materials by tank car; storage site of powder material shall be kept as far from residential community as possible.</p> <p>(4) Materials such as earth, gravel and the like shall be covered with tarpaulin during transportation; overloaded transport is prohibited for fear of secondary pollution as a result of spillage, leakage and overflow along the way.</p> <p>(5) Wheel cleaning equipment shall be installed at the exit of construction site; dedicated cleaner shall be assigned for cleaning wheels and sweeping entry/exit at site; vehicles with mud-carrying wheels are banned for travelling.</p> <p>(6) Under weather condition of strong wind, construction operation producing dust is banned within 200m from sensitive sites such as residential area, school, kindergarten, hospital and the like.</p> <p>(7) For protecting operator's health, dustproof respirator shall be provided.</p> <p>(8) Standard fuel shall be used for transport vehicles and fuel-fired construction machinery, low-grade fuel is prohibited for use; in addition, driving route of transport vehicles shall be arranged reasonably to ensure driving at a safe speed and reduce idle time, so as to reduce emission of exhaust gas by motor vehicle.</p> <p>(9) Strengthen maintenance of fuel-fired mechanical equipment, and maintain equipment operation under normal and good condition; furthermore, fuel-fired machinery shall be installed with exhaust gas emission purifier to ensure emission of standard exhaust gas.</p>		
6	Safety and health during construction	<p>Select capable workers in annual recruitment</p> <p>Implement a comprehensive vaccination program in accordance with the local regulations;</p> <p>Prevent malaria in existing conditions in the camp, and build facilities for early diagnosis and treatment of patients;</p> <p>Reserve sufficient drugs to treat malaria;</p> <p>Collect and assay saliva of persons who are possible to have tuberculosis (TB) infection;</p> <p>Reserve antibiotics to treat respiratory tract infection;</p> <p>Reserve drugs and infusions to treat food poisoning and diarrhea;</p> <p>Provide solutions against mass outbreaks of food poisoning; Monitor the shared kitchen in the camp regularly;</p> <p>Reserve and provide insect repellent to the workers;</p> <p>Take measures for disease control and pest control when building the construction camp;</p> <p>Provide condoms to the workers in the camp for free.</p>	Contractor	Execution institution, Environmental supervisor, EMC

## Appendix 2 Checklist for Environmental Protection Inspection during Construction Phase

Inspection element	Implementation status		N/A	Remark
	Implemented	Not implemented		Suggested rectification and preventive measures for the problems and non-compliance found in the inspection
<b>1. Control of air pollution</b>				
1.1 Watering the construction site to reduce dusts produced in the construction				
1.2 Powdery materials storage yard is covered or watered to reduce dusts.				
1.3 Vehicles carrying powdery materials are covered or watered before leaving.				
1.4 Spray water to control dusts in the demolition works				
1.5 Construction wastes are transported in enclosed containers.				
1.6 Road-block fence is used in the environmentally sensitive receptors (areas) where road construction is being carried out				
1.7 Earth in the construction site is stacked together and covered.				
1.8 The dirt on the surface of the lorries is cleaned before they leave the construction site				
1.9 The storage yard for materials and large formwork at the construction site is leveled and hardened				
1.10 In consideration of the prevailing wind direction and the surrounding sensitive receptors, the main dust source the storage yard for particle and granular materials is set 30m away from the surrounding sensitive receptors down the wind.				
1.11 Dusty roads are hardened, paved with sand particles and are watered regularly				
1.12 Speed is limited at construction road and speed limitation signs are provided.				
1.13 Fuel consuming construction machines and vehicles are used in good condition and no black smoke is produced when running				
1.14 Any waste is incinerated.				
1.15 Other (Please specify)				
<b>2. Water pollution control</b>				
2.1 Waste water treatment system (such as the temporary settling pond) at the construction site is used and maintained properly				
2.2 Waste water from construction is disposed of and utilized effectively				
2.3 Waste water from construction is drained to the stormwater channel.				
2.4 Facilities collecting waste water from construction into the settling pond (such as earth ditch or U-shape groove) are provided.				
2.5 Mud in the U-shape groove is cleaned off				
2.6 Mud in the settling pond is cleaned off				
2.7 Vehicles and equipment are cleaned before going in or out of the construction site.				
2.8 Washing facilities are maintained properly, sediment is prevented from overflowing.				
2.9 Mud at the washing facilities is settled down and discharged regularly				

Inspection element	Implementation status			Remark Suggested rectification and preventive measures for the problems and non-compliance found in the inspection
	Implemented	Not implemented	N/A	
2.10 The public roads/places surrounding the construction site, entrance to the site and the temporary fence are kept clean and away from mud				
2.11 Sanitary sewage is disposed of properly				
2.12 Existing living facilities are relied on				
2.13 Storage of construction materials such as pitch, oil, and chemicals are forbidden around waters				
2.14 Other (Please specify)				
<b>3. Noise control</b>				
3.1 Construction noise permit is obtained for construction in noise control period.				
3.2 Construction noise permit is posted at the entrance of construction site.				
3.3 Idle equipment in construction site is shut down or in a state of throttling and vibration reduction.				
3.4 Effective noise reduction measures (vibration reduction, noise reduction, sound barrier, etc.) are taken.				
3.5 Low-noise equipment is selected.				
3.6 Construction time is reasonably arranged.				
3.7 Machineries producing high noise are set at location away from residential area.				
3.8 Machinery equipment are regularly serviced.				
3.9 Construction intensity, machinery & vehicle operator and COP are managed in a strict manner.				
3.10 Other (Please specify)				
<b>4. Solid waste pollution control</b>				
4.1 Construction site is clean and tidy.				
4.2 Some building waste is employed in small civil works carried out at the same time.				
4.3 Remaining building waste are stacked at designated place in construction site in a centralized manner and transported to landfill for disposal.				
4.4 Mellow soil in spoil is employed for reclamation and forestation on barren land in project area.				
4.5 Water is sprayed before transportation of building waste.				
4.6 Domestic garbage is collected via trash bag and transported to incineration plant for disposal.				
4.7 No toxic or hazardous substance is burned at construction site.				
4.8 No oil is leaked. Contaminated soil is immediately cleaned.				
<b>5. Protection of animals, plants and cultural relics</b>				
5.1 Disturbance to terrestrial plants is minimized. Plants are protected.				
5.2 Rare animal is found				
5.3 Cultural heritage is found in construction. Protection measures are taken if found.				
5.4 Other (Please specify)				
<b>6. Resource conservation</b>				
6.1 Precautions for water pipe break-down and water waste are made.				

Inspection element	Implementation status			Remark
	Implemented	Not implemented	N/A	
6.2 Diesel-powered equipment are shut-down in case of standby to reduce oil consumption.				Suggested rectification and preventive measures for the problems and non-compliance found in the inspection
6.3 Energy saving measures are taken.				
6.4 Metal or consumption. Other materials are employed to reduce.				
6.5 Materials are well stored to prevent degradation or waste.				
6.6 Other (Please specify)				
<b>7. Construction safety and emergency response</b>				
7.1 The integrity of buildings in construction site is guaranteed.				
7.2 First-aid tools are provided at construction site.				
7.3 Signs are hung at dangerous areas and apparatus, hazardous materials, places provided with safety measures, emergency exits, etc.				
7.4 Personal protective devices are provided to construction personnel by contractor				
7.5 Contractor establishes procedures and system for report and record of occupational accident and diseases, and dangerous accidents.				
7.6 Health education is provided to construction personnel.				
7.7 Accidents are reported and investigated. Rectification and prevention measures are put forward and recorded.				
7.8 Other (Please specify)				
.....				
Construction stage for inspection: _____		Inspection date: _____		Inspection time: _____
Signature of site inspector: _____		Signature of environmental supervisor _____		
Note:				
① Problems observed, description of non-conforming items, rectification and prevention measures can be stated in "Remarks" column.				
② In case of discovery of non-conforming measures or items requiring rectification, environmental supervisor immediately issues Rectification Notice of Environmental Protection or not. In "Remarks" column, the number of "Rectification Notice of Environmental Protection" shall be stated. Detailed rectification actions of contractor shall be recorded separately.				
③ This table is a general environmental checklist of proposed project. Proper adjustment to the table can be made according to specific project component and environmental problems as well as local environmental conditions and construction items. Proper				
Weather: _____				

### Appendix 3 Notice on Rectification of Environmental Protection issued by Environmental Supervisor to Contractor

Project name:	Name of the construction site
Contract No. and location of subproject:	Current construction phrase:
Problems found in on-site inspection:	

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The Contractor makes an analysis and propose improvement measures:

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Rectification opinions of EPB (if necessary):

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Environmental supervision:

Date of prescribed period rectification order:	Complete within	Days Recipient:	MM	DD	YY
			MM	DD	YY

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Conclusion for Recheck:

Re-checker:                      Year      Month      Day

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### Appendix 4 Checklist before Acceptance of Environmental Protection (as sample)

Project name:		Weather on check day:	
Name of the construction site		Environmental inspector:	
Current construction phrase:		Contract No. and location of project:	
Inspection date	of Environmental protection:	Specific time:	
Inspection items	Implementation		Note
	Implemented	Not been implemented	Put forward recommendations for rectification and prevention measures for problems and irregularities having been detected
1 Whether construction waste in construction site has been cleaned up to local dump area			
2 Whether measures has been taken to sensitive receptors of acoustic environment along the road			
3 Whether acoustic environment of the sensitive receptors along the road meet requirements of relevant standards			
4 Whether temporary dump (slag) area has taken recovery measures			
5 Whether road condition in existing road turns bad and whether traffic is smooth			
6 Whether ossified concrete mixer has been demolished			
7 Whether provisionally occupied land for concrete mixing has taken the measure to land consolidation, re-cultivation or greening			
8 Whether provisional sedimentation tanks and grit chambers have been removed			
9 Whether provisionally occupied land for sedimentation tanks and grit chambers has taken the measure to land consolidation, re-cultivation or greening			
10 Whether water retaining barrier, torrent gutter, and drain ditch have been removed and ecological restoration measures have been taken			
11 Whether mature soil on the surface having been stripped have been used for ecological restoration			
12 Whether trees are planted on both sides of the road			
13 Whether tree species belong to the region			
14 Whether roadbed slope has undergone greening			
15 Whether drainage system of road is adequate			
16 Whether there is visual pollution along the road			
17 Whether related training and education in municipalities and counties have been carried out			
18 Whether local residents are satisfied with the construction of road project			
Note for table filling: This table is a general checklist for environmental inspections in the construction phrase specified for subprojects, local condition of the environment and related environmental protection measures, so if necessary, it may be added or adjusted.			
* When any record of "not been implemented" is found, this suggests that there may be irregularities or situation in need of improvement. At this time, the environmental supervision shall promptly issue a rectification notice of "environmental protection" to the contractor and record in the remarks column the serial number of "rectification notice on environmental protection ". Detailed information of rectification actions by the Contractor should be recorded separately.			
Signature of site inspector:		Time:	
Signature of environmental supervision:		Time:	

## Appendix 5 Notification Form of Possible CH Sites

<b>Part 1 - Site confirmation</b>
Confirmed date of the site
Description of site location (including the name of construction area)
Site type
General description of the site
Site confirmer
Time and date of ceasing operation
- Time and date for informing the construction contractors and environmental coordinators
Time and date for informing environmental management agency and environmental supervisor
Completed by
Verified by
<b>Part 2: Guidance from environmental management agency</b>
Receive date of requirement from environmental management agency
Summary of requirements from environmental management agency ( refer to appendix if necessary)
Date of worker training
Verification for implementation of requests from environmental management agency (signature and date)

## **Appendix 6: Asbestos-Containing Materials Management Plan (sample if applicable)**

The Asbestos-Containing Materials Management Plan (ACMMP) describes and evaluates the risk of contractors (and others) encountering asbestos-containing material (ACM) at the construction site **during demolishing of the existing old office buildings under New Activity 1: Upgrade of the Jingzhou Museum**; and it provides a procedure for dealing quickly and safely with any ACM that may be found.

The WB safeguard policies requires that WB-funded projects apply pollution prevention and control technologies and health and safety measures that are consistent with international good practice, as reflected in international standards such as the IFC/World Bank *Environmental, Health and Safety General Guidelines* (2007). If national legislation differs from these standards, the borrower is required to achieve whichever is more stringent. However, the national procedure does provide clear description of handling ACM, therefore, the ACMMP follows the World Bank Guidelines.

The main principles of the ACMMP are as follows:

- A. Prompt recognition of ACM;
- B. Prompt and effective action to contain and deal appropriately with the ACM (including safe management and disposal); and
- C. Maintaining the safety of site personnel and the general public at all times.

The ACMMP is designed for use by the PMO and the IA (**Jingzhou Cultural and Tourism Bureau**) to manage the ACM risk over the **New Activity 1: Upgrade of the Jingzhou Museum** as a whole, and by contractors to deal efficiently with any ACM they or their workers encounter. The procedural element of the ACMMP is therefore designed to provide straightforward instructions that can be easily and quickly understood without the need for specialist knowledge and without referring to other sources.

### **Protocol for Handling and Disposal of ACM at Demolishing Sites of the Existing Old Office Buildings under New Activity 1: Upgrade of the Jingzhou Museum**

#### **Applicability**

The ACMMP applies to all construction sites and any related areas for **demolishing of the existing old office buildings under New Activity 1: Upgrade of the Jingzhou Museum**. Contractors employed by **New Activity 1** are legally responsible for their construction sites and related areas and must follow the provisions of the ACMMP within those locations. Specifically this protocol must be used to ensure the safe handling, removal and disposal of any and all ACM from those areas.

#### **Immediate Action**

On discovering ACM on a construction site the contractor must:

- a) Stop all work within a 5 m radius of the ACM and evacuate all personnel from this area;
- b) Delimit the 5 m radius with secure fencing posts, warning tape and easily visible signs warning of the presence of asbestos;
- c) If the site is in an inhabited area, place a security guard at the edge of the site with instructions to keep the general public away;
- d) Notify the Construction Supervisors and arrange an immediate site inspection; also notify the IA (Jingzhou Cultural and Tourism Bureau).

The IA must:

- e) Notify the local EPB and Health Bureau.

**Important Note: The following will be ONLY applicable if any ACM is identified through the above procedures.**

## **Equipment**

To remove asbestos from a construction site, contractors must provide the following equipment:

- a) Warning tape, sturdy fence posts and warning notices;
- b) Shovels;
- c) Water supply and hose, fitted with a garden-type spray attachment;
- d) Bucket of water and rags;
- e) Sacks of clear, strong polythene that can be tied to close;
- f) Asbestos waste containers (empty, clean, sealable metal drums, clearly labelled as containing asbestos).

## **Personal Protective Equipment (PPE)**

All personnel involved in handling ACM must wear the following equipment, provided by the contractor:

- a) Disposable overalls fitted with a hood;
- b) Boots without laces;
- c) New, strong rubber gloves;
- d) A respirator is not normally required if there are only a few pieces of ACM in a small area, and if the ACM is damp;
- e) In large or heavily contaminated areas, a disposable respirator is needed (not a dust mask) with an Assigned Protection Factor of 20 or more (e.g. a respirator with a P3 filter);
- f) There must be no smoking, eating or drinking on a site containing ACM.

## **Decontamination Procedure 1: Removing small pieces of ACM**

- a) Identify the location of all visible ACM and spray each lightly but thoroughly with water;
- b) Once the ACM is damp, pick up all visible ACM with shovels and place in a clear plastic bag;
- c) If ACM debris is partially buried in soil, remove it from the soil using a shovel and place it in the plastic bag;
- d) Insert a large label inside each plastic bag stating clearly that the contents contain asbestos and are dangerous to human health and must not be handled;
- e) Tie the plastic bags securely and place them into labelled asbestos waste containers (clean metal drums) and seal each drum;
- f) **Soil that contained ACM debris must not be used for backfill** and must instead be shoveled by hand into asbestos waste containers;
- g) At the end of the operation, clean all shovels and any other equipment with wet rags and place the rags into plastic disposal bags inside asbestos waste containers.

## **Decontamination Procedure 2: Removing ACM-contaminated backfill**

- a) If soil containing ACM debris has inadvertently been used for backfill this must be sprayed lightly with water and shoveled out by hand to a depth of 300 mm and placed directly into asbestos waste containers (i.e. not stored temporarily beside the trench);
- b) Any ACM uncovered during the hand shoveling must be placed in a clear plastic bag;

- c) Once the trench has been re-excavated to 300 mm, if there is no visible ACM remaining, the trench may be refilled by excavator using imported clean topsoil.

### **Decontamination Procedure 3: Removing Asbestos-Containing (AC) pipes or large pieces of ACM**

If AC pipes or other large pieces of ACM are uncovered during excavation in an undamaged condition and they can be re-covered by soil and left in place in the ground undisturbed, this should be done. If AC pipes or other large pieces of ACM need to be removed from site:

- a) Inform **local hazardous waste disposal center approved by authority** of the nature and size of the large ACM and arrange for them to handle, receive and bury the material;
- b) Sprinkle the ACM thoroughly with water, ensuring that any broken or damaged areas in particular are thoroughly wetted;
- c) Inform excavator and truck drivers of the dangers associated with ACM and instruct them to remain inside their cabs with the windows closed throughout the operation.
- d) Lift the material by excavator into a dump truck, without causing additional breakage and with as little disturbance as possible;
- e) Cover the bed of the truck with a secure tarpaulin and transport the ACM to the disposal site with as little disturbance of the carried material as possible;
- f) Manual assistance should be limited to securing the tarpaulin if possible, and personnel providing such assistance should wear PPE as indicated in Section E;
- g) At the disposal site, tip the ACM directly into the prepared cavity and arrange for it to be covered with soil immediately.

### **Disposal**

ACM should be disposed of safely at a local hazardous-waste disposal site by **local hazardous waste disposal center approved by authority**.

- The Contractor must arrange for the **local hazardous waste disposal center approved by authority** to collect the sealed asbestos waste containers as soon as possible and store them undisturbed at the disposal site.
- At the end of construction contractors must arrange for the **local hazardous waste disposal center approved by authority** to bury all ACM containers in a separate, suitably-sized pit, covered with a layer of clay that is at least 250 mm deep.

### **Personal Decontamination**

At the end of each day, all personnel involved in handling ACM must comply with the following decontamination procedure:

- At the end of the decontamination operation, clean the boots thoroughly with damp rags;
- Peel off the disposable overalls and plastic gloves so that they are inside-out and place them in a plastic sack with the rags used to clean the boots;
- If a disposable respirator has been used, place that in the plastic sack, seal the sack and place it in an asbestos waste container;
- All personnel should wash thoroughly before leaving the site, and the washing area must be cleaned with damp rags afterwards, which are placed in plastic sacks as above.

### **Clearance and Checking-Off**

- The decontamination exercise must be supervised by site supervisors (engineering or environmental).

- After successful completion of the decontamination and disposal, the Construction Supervisors should visually inspect the area and sign-off the operation if the site has been cleaned satisfactorily.
- The contractor should send a copy of the completion notice to the IA, with photographs of the operation in progress and the site on completion.

### **Training**

IA's Environmental Specialist will conduct training on ACCMP implementation for Contractors staff and IA. The training will include a session focusing on ACM, which covered:

- a. Risks of contact with ACM (in general and the risk assessment);
- b. Responsibilities for dealing with ACM on construction sites;
- c. The ACMMP and the Protocol for site clean-up;
- d. Awareness-raising for the contractors' workforce.

### **Cost Estimate**

Costs incurred by contractors in implementing the ACMMP are included in their budget in EMP budget.