Pilot Demonstration of GEF City Cluster Eco-Transport Pr

Environmental Management Plan

For

Lituo Terminal Project

Changsha Environmental Research Institute of

Environmental Sciences

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I. BACKGROUND

A. Project Background

China's transportation is facing significant challenges in energy saving and CO2 emission reduction. With rapid economy growth, transportation has become a major consumer of energy and a major source of CO2 emissions in China. According to the International Energy Agency (IEA), the transport sector accounted for more than 38% of total crude oil consumption in China in 2007. According to the Ministry of Transport (MOT), the amount of CO2 emissions generated from transport—roughly 290 million tons in 2004—is estimated to double by the end of 2015 and reach 1.1 billion tons in 2030.

To achieve energy saving and CO2 emission reduction amid the anticipated continuing rapid growth in transport demand, the transport sector must seize all opportunities in a strategic way to promote eco-transport—a way of sustainable transport development that is resources saving and environmentally friendly. Multi-modal integrated transport development in the rapidly growing city clusters is such an opportunity.

The Southern Changsha High Speed Rail Line Station cum Bus and Urban Rail Terminal Complex located at Lituo (also called in a short form Lituo Terminal) is selected for pilot demonstration of design. The Lituo Terminal is an annex to the Southern Changsha High Speed Rail Station which has been functioning since built two years ago. The underground level of the entire complex (i.e. HSR Station cum bus terminal) has been constructed. Part of the underground floor will be used as garage of the bus terminal. Connection with the future urban rail line is also included in the underground section of the terminal. A three-floor building will be built above the garage to serve for passenger and terminal management purpose. The terminal is designed with function as the hub for long-distance bus, urban public bus transport and urban rail in the future.

The project is classified as Category B as per OP4.01 due to its limited scale of civil works and anticipated environmental and social impacts associated with the Lituo Terminal. Based on the environmental screening and assessment, the following safeguards policies are triggered: 1) OP4.01 Environmental Assessment; and 2) OP4.12 Involuntary Resettlement.

Accordingly, an EIA report was prepared by Changsha Research Institute of Environmental Sciences. The EIA team conducted site survey to understand the surrounding environment of the project site, collect environmental baseline information. Environmental quality was monitored and analyzed. Based on the feasibility report provided by the IA, the draft EIA report was prepared.

B. Objective of the EMP

The objective of the EMP is to map out a plan for managing the environment during project construction and operation so that the potential adverse environmental impacts can be avoided, mitigated, or otherwise minimized to acceptable levels. More specifically, the objectives of the EMP are to:

- ⌘ Develop mitigation measures, to be incorporated into the project design, construction and operation stages;
- ⌘ Provide the framework for the environmental management and supervision;
- ⌘ Establish and strengthen an institutional framework for environmental management including clearly defined roles and responsibilities of the relevant agencies; and

⌘ Propose the environmental monitoring plan for the construction and operation periods.

C. Basis of the EMP

This environmental management plan has been developed based on the regulatory requirements of China, safeguard policies of the World Bank, technical guidelines for environmental management, results and recommendations of the project environmental impact assessment report, feasibility study reports and other project documentation for each of the project cities. More specifically, the key basis of the EMP includes:

PRC National Laws

(1) *Environmental Protection Law of the PRC*, Dec. 26th, 1989
(2) *Environmental Impact Assessment of the PRC*, Sep., 2003
(3) *Water and Soil Conservation Law of the PRC*, June 29th, 1991
(4) *Land Administration Law of the PRC*, Aug. 28th, 2004
(5) *Law of the PRC on the Prevention and Control of Air Pollution*, April 29th
(6) *Law of the PRC on the Prevention and Control of Water Pollution*, June 1st, 2008
(7) *Law of the PRC on the Prevention and Control of Pollution from Environmental Noise*, Oct. 29
(8) *Law of the PRC on the Prevention and Control of Environmental Pollution by Solid Waste*, Dec. 29th, 2004
(9) *Agriculture Law of the People's Republic of China*, Dec. 28th, 2002
(10) *Law of the PRC on the Urban and Rural Planning*, Oct. 28th, 2007
(11) *Rules of Environmental Protection Management for Construction Projects, issued by the State Council of PRC,* November 29, 1998;
(12) *Classification Inventory for Environment Protection of Engineering Project* issued by the MEP, January 1, 2003;
(13) *Measures Concerning Environmental Protection and Management for Transportation Construction Projects,* issued by MOC, May 22, 1990;
(14) *Notice to Strengthen the Environmental Impact Assessment and Management of Construction Projects Financed by Loan from International Financial Organizations*, jointly issued by MEP, the State Planning Commission, the Ministry of Finance and the People's Bank of China, June 21, 1993.
(15) *Public Consultation Method during Environmental Impact Assessment,* MEP, 2006

Hunan Provincial Environmental Regulations

(1) *Environmental Protection Regulations of Hunan Province*, May 2002
(2) *Surface Water Function Zoning in Yunnan Province*, DB43/023-2005
(3) *Regulation on Construction Waste Transportation*, Changsha Municipal Government
(4) *Notice on Implementation of Air Pollution Control Measures*, Changsha Municipal Government, 2001
(5) *Management Method for Dust Control in Urban Area of Changsha City*, Changsha Municipal Government, 2005
(6) *Air Quality Zoning of Changsha City, Changsha* Municipal Government, 2005
(7) *Notice on Implementation of Second Phase Dust Control Measures*, Changsha City, 2004

(8) *Environmental Noise Functional Application Zoning in Urban Areas in Changsha City*, Changsha Municipal Government, 1994
(9) *EIA Technical Guideline for Controlling Dust from Construction Sites in Changsha*, Changsha EPB, 2008

Technical EIA Specification and Guidelines

(1) *General-EIA Technical Guideline*, HJ/T2.1-93;
(2) *Ambient Air- EIA Technical Guideline*, HJ/T2.2-2008;
(3) *Surface Water- EIA Technical Guideline*, HJ/T2.3-93;
(4) *Acoustic Environment- EIA Technical Guideline*, HJ/T2.4-2009
(5) *Technical guidelines for environmental impact assessment - Ecological environmental of nature resource development*, HJ/T19-1997, 1998.06
(6) *Technical Specifications of Soil and Water Conservation for Development and Construction Project*, SL204-98
(7) *Ambient Air Zoning Principal and Technical Method*, HJ14-1996
(8) *Environmental Noise Functional Application Zoning Principal and Technical Method*, GB/T15190-94
(9) *Technical Method for Dust Control in Urban Area,* HJ/T 393-207
(10) *Notice on the Noise Issue in the EIA for Road and Railway projects,* Huanfa [2003] 94

D. Applicable Standards

Air

Air quality standard implement Class II of *National Ambient Air Quality Standard (GB3095-96).*

Construction machines implement Class II of *Air Pollutant Emission Standard (GB16297-1996)* (Table 1-1).

Table 1-1 Air Pollutant Emission Standard (GB16297-1996) unit: mg/m^3

Pollutant	SO2	NOx	TSP
Class II Limit	550	240	120

Oil smoke from restaurant implements *Catering Industry Oil Smoke Emission Standard (GB18483-2001)*. The limit value is shown in table 1-2.

Table 1-2 Catering Industry Oil Smoke Emission Standard (GB18483-2001)

Item	Small	Medium	Large
Maximum emission permit□mg/m^3□	2.0		
Minimum smoke purification rate (%)	60	75	85

Water

The wastewater will be finally discharged into Liuyang River. Water standards for the section at upstream is Class IV of *Surface Water Quality Standard (GB3838-2002)*.

Before discharging into the urban sewer network, domestic sewage should be pretreated to meet Class III of *Integrated Waste Water Discharge Standard. (GB89078-1996)* (Table 1-3).

Table 1-3 Integrated Waste Water Discharge Standard unit: mg/L

Pollutants	pH	NH3-N	COD_{Cr}	BOD_5	oil
Class III	6～9	/	500	300	100

Noise

For noise during the construction, Noise Limits for Construction Sites (GB12523-90) will be applied, see Table 1-4 for detail.

Table 1-4 Noise Level Limits on Construction Site, LAeq, (dB)

Construction Stage	**Major Noise Sources**	**Noise Level Limits**	
		Day	Night
Earthwork	Bulldozers, excavators and loaders	75	55
Pile driving	All sorts of pile drivers	85	Construction prohibited
Structuring	Concrete mixers, vibrators, electric saws, etc.	70	55
Fitting up	Cranes, lifters, etc.	65	55

Note: 1. Noises listed in the table are the limits on construction sites which correspond to those in sensitive areas. 2. If several construction phases are being undertaken simultaneously, the limit on the highest noise will serve as the standard.

For vehicle noise during construction, applicable standard is Allowed Noise Level for Vehicle (GB1495-79).

For noise during the operation, Ambient Noise Standard (GB3096-1993) Class II for residential area and class IV for road side area will be applied.

Solid Waste

Control Standards for Urban Wastes for Agricultural Use (GB8172-87)

Standard for pollution control on the landfill site for domestic Waste (GB16889-1997)

II. ENVIRONENTAL IMPACTS AND MITIGATION MEASURS

During the project development of the project, the principle of "people first" has been followed so as to the best extent to meet the demand of the public. It is anticipated that this project will improve the transport conditions for the general public, thereby increasing the living standard and beautifying the urban landscape. However, a certain number of negative impacts will take place during the construction and operation phases, which are described as follows:

Table 2-1: Summary of Potential Impacts and Mitigation Measures of Lituo Terminal project

Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
A. Pre-construction					
Environmental Clauses and Specifications for Contractor Prequalification, Technical Specifications, Environmental Clauses for Contracts, and Loan Covenants	To ensure environmental credibility among contractors, prepare environmental prequalification clauses and specifications to be included in the prequalification package to contractors. Prepare environment section in the terms of reference for bidders. Prepare environmental contract clauses for contractors, namely special conditions (e.g. reference EMP and monitoring table).		Before tenders for contractors	IA	Longxiang Company
Environmental Operation and Supervision Manual	Preparation of an environmental operation and supervision manual by the contractors for approval by the IA.		Before construction	Contractors, IA	CMTB
Complaint and Information Office	Establish a Complaint and Information Office; ensure staff at Complaint and Information Office is well trained to handle complaints, crisis or conflicts with residents due to distress from environmental impacts		Before construction	IA together local committee	CMTB
Environmental protection training	Invite environmental specialists and/or HEPB officials to provide training on implementing environmental mitigation measures and supervision		Before construction	IA together with environmental experts engaged	CMTB
Information disclosure and consultation	Information boards, construction timetable, feedback and complaint hotlines should be installed at the construction sites. The construction unit should contact the relevant departments to set up a pipeline connection scheme and organize temporary	Entire project areas	Before construction	IA	CMTB

Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
	pipelines. Water supply and electrical lines should be installed in case there are temporary cutoffs. Illumination lamps should be fixed and directed. Detailed measures will be explained in the public hearing.				
B. Construction Phase					
1. Solid waste					
Refuse generated on construction sites,	Refuse will be collected and stored on site. The contractors will be demanded to separate construction waste from municipal waste Periodically, the municipal waste will be transported off site for disposal, by environmental sanitary authority if possible.	Construction sites	During construction	Contractors	IA
Construction waste	Construction waste transported to Liuyang River Bank project.	Construction sites	During construction	Contractors	IA, Changsha Construction Waste Management Department
2. Water Quality					
Wastewater from construction workers, canteens	Domestic waste water will be treated at oil separation tank, sedimentation tank and septic tanks. The treated catering sewage is used for construction site watering, and greening as possible. Surplus waste water discharged into urban sewer network.	Worker camps	During construction	Contractors, in cooperation with local communities	IA, HEPB
Car Washing	Waste water from car washing will be treated with oil filter tanks.	Car washing site	During Construction	Contractors	IA
3. Air Quality					
Transportation of construction materials and	Avoid truck overloading; vehicles delivering fine materials to the sites must be covered; clear the fugitive materials dropped on the road in a timely	Transportation route	During Construction	Contractors	IA

Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
waste	manner.				
Construction site cleaning to reduce dust	Fence the construction site with wall that not less than 2.5 meter high. For construction site should be watered at least twice a day. When air pollution index higher than 100 or wind force scale more than 4 classes during dry season, site or road cleaning should be frequently conducted after water spring, and no earth work is allowed. When air pollution index is less than 50, site cleaning frequency can be reduced accordingly.	Construction site	During Construction	Contractors	IA
Construction material storage	Material storage sites should be selected downwind of residential area and covered with canvas or sprayed with water.	Construction site	During Construction	Contractors	IA
Construction vehicles emission	All the construction vehicles should meet the standard of Limit on Vehicle Emission (GB3847-2005), issued by Ministry of Environment in 2005	Construction site	During Construction	Contractors	IA
Emissions from vehicles and equipment	Select appropriate machinery and transportation vehicles. Machinery and equipment will be fitted with pollution control devices in working order.	Construction site	During Construction	Contractors	IA
4. Noise					
Noise from construction equipments	The construction site should be fenced. The construction equipment will be well maintained to keep it best operating conditions and lowest noise levels possible. Temporary noise barrier should be provided for high noise equipment operation. Equipment used in construction, including the aggregate-crushing plants, will strictly conform to PRC and local noise standards by applying good housekeeping and maintenance practices at all times.	Construction site	During Construction	Contractors	IA

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Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
	Noisy construction work will be stopped between 10:00 p.m. and 7:00 a.m. and 12 a.m. to 2:00 p.m.				
Transportation vehicles	Construction material transportation schedule should be carefully designed to minimize the adverse impact on residents and students, as well as the traffic on the existing road. The transportation vehicle will be required to slow down and banned from horning when passing residential areas and schools. In the event that night transport is necessary, restrict vehicle speeds to less than 30 km per hour with no honking allowed	Construction site	During Construction	Contractors	IA
Construction workers protection	For workers who must work with highly noisy machines such as piling, mixing, etc., ear phones will be provided for noise control and workers protection.	Construction site	During Construction	Contractors	IA
Noise monitoring during construction	Constriction team should be equipped with potable detecting device to monitor the noise level at the sensitive receptors	Construction site	During Construction	Contractors and supervision company	IA
Nighttime noise	Although in general night time construction will be banned for this project, it might happened some time. Residents living within the potentially impacted areas will be noticed ahead of time for the length and noise intensity of the proposed night time construction. Information on why the night construction is necessary and mitigation measures to be taken will be provided to these residents to obtain their understanding. These residents will be consulted for their concerns, difficulties, and suggestions for noise control prior to the commencement of night time construction. These concerns will be responded and suggestions adopted where appropriate.	Construction site	During Construction	Contractors	IA

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Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
	Night time construction will be arranged in such a way to avoid school exam time (about one week in the summer) in the urban area and harvest time (about half month each in the summer and fall) in the rural area. These are particularly sensitive time when students need the good night sleep in preparation for exams and farmers for the heavy farming activities in the field. Power generated and other stationary equipment will be carefully placed to be far away from residential areas to ensure no noise impacts from these machines. Where possible, municipal power supply will be utilized in construction including night time construction as diesel generators are extremely noise and avoiding using them is the best mitigation. Equipment with lower noise levels will be used for concrete pouring operations, which may require 24 hours non-stop operation.				
Construction worker protection	Temporary noise barriers at the appropriate places should be erected to reduce the noise impacts. These areas should include noisy stationery construction machines and/or areas with sensitive receptors, based on the on-site noise level monitoring results.	Construction site	During Construction	Contractors	IA
5. Health					

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Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
Health and Well-being of Communities	☒ Provide disease prevention and control training to construction workers, particular epidemic diseases such as HIV, H1N1 and hepatitis B prior to start of the construction. Leaflets, education seminars will be organized, in association with the local government and communities, to increase the awareness and knowledge on the HIV/AIDS. ☒ Posters will be placed in and around the construction sites for disease control, for not only construction workers but also villagers and others in the areas. ☒ Adequate protective gear such as condoms will be provided to workers at the construction camps; ☒ Periodical health check will be provided to construction workers to ensure their health and well being. ☒ At and near construction site, traffic signs will be set. Traffic safety education will be given to the contractors' staffs as well as nearby local people. Maintenance will be provided to the existing local roads. ☒ Timely actions will be taken to kill mosquitoes and vectors and create a clean environment on site ☒ pay attention to the treatment of sewage and wastewater in the living areas on site	Throughout the project areas	During construction	IA in cooperation with local health authorities	IA, External supervisors, , Hunan health authorities

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Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
	☒ First-aid medicines for infectious diseases and pesticides should be prepared by each contract section and timely inspections should be conducted to make sure mosquito nets and other mosquito prevention facilities are available on site, with adequate care taken in soaking of mosquito nets ☒ adequate supply of medicine for epidemic prevention and vector destruction should be assured.				
8. Safety					
Construction site and traffic safety	Measures on construction staff and public ☒ The contractor will provide safe and convenient passages for the public ☒ Provide construction workers sufficient personal protection equipment such as hard hats, safety shoes, and others ☒ Seminar on safety issues will be provided to local public, particularly school students; ☒ Where the potential dangers are present, warning signed will be installed; ☒ There will be construction staff on duty on or near heavy movement of construction vehicles, or heavy construction vehicle traffic through the villages to ensure safety.	All the construction sites	During construction	Contractors with assistance from the local traffic police	IA, External supervisors, CCE, Hunan Safety Management Department
10. Social					
Public disturbance	Further public consultations with local residents should be conducted to inform them about project activities and obtain comments. Consult the local government and traffic police regarding construction materials transportation on the existing roads to avoid traffic jam, especially reduce the transportation though the residential	Residential areas	Before construction starts	contractors	IA

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Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
	areas. Construction notice should be posted on the bulletin board of townships along the alignment, introducing the project activities, resettlement policies to the local people. Erect billboard at each construction site, listing contractor and Construction Supervision Engineer contract names and telephone numbers, construction period and other brief construction information for public notice. Also list the local EPB hotline or contract number for public complaints.				
11. Environmental Supervision					
Environmental supervision and monitoring	The IA will designate an environmental management person for internal supervision and a contract with a professional construction environmental supervision company for external supervision. Local EPBs will also be involved. The EMP will be implemented and the inspection report will be sent to the IA and HEPB and World Bank.	Construction site	During construction	Engaged supervision company and environmental monitoring station	IA,HEPB
C. Operation Phases					
1. Environmental Acceptance Audit	The IA will hire a licensed environmental consulting or monitoring institute to conduct an environmental survey and monitoring report for project acceptance within the first 3 months of operation or no later than 1 year with permission from HEPB.	Project Area	Within first 3 months of operation or no later than 1 year, with permission from HEPB	Licensed institutes contracted by Longxiang Company	HEPB
2. Air Quality	Vehicles properly maintained and passing annual inspection tests supervised by Changsha EPB. All the construction vehicles should meet the standard of Limit on Vehicle Emission (GB3847-2005) Restaurants smoke should be exhausted at top of the tall building where has better diversion. After pre-treatment by the smoke exhaust ventilator, the	Project Areas	Operation phase	Longxiang Company	HEPB

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Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
	smoke will be further purified through deposition process in the vertical shaft. The smoke concentration will meet oil smoke emission standard (GB18483-2001). Introduce an annual air quality monitoring program.				
3. Noise	No horn when transport vehicles passing the sensitive points Noise muff will be installed for wind engine. Low noise level equipment will be selected to reduce noise from the source. At power transformer substation and pump station room, wall-facing will use noise-absorbing material All of the vehicles will be checked properly maintained to meet noise standard.	Project area	Operation period	Longxiang Company	HEPB
4. Water					
Water pollution from sewage and garbage	Wastewater pre-treatment will be installed. The effluent should be in accordance with the Class I of the Integrated Discharge for Wastewater Standard (GB8978—1996). Oil traps will be maintained and monitored regularly. The pre-treated water will be discharged into Changsha sewer network at Laodong East Road, and finally treated at Huaqiao Wastewater Treatment Plant. Rain water will be collected separately and discharge into Liuyang River.	All service areas and toll gates	Throughout operation phase	Longxiang Company	HEPB
5. Ecology	Maintenance of the planted vegetation and trees should be contracted to special people to ensure the plants survive.	Project area	Operation period	Longxiang Company	Hunan forestry bureau, HEPB
6. Solid Waste	Strengthen supervision over the pollution	All service areas and	Throughout	Longxiang	HEPB

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Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
	management of solid wastes and make sure that garbage bins are provided and the solid wastes are periodically removed and transported to the local solid wastes treatment facilities for centralized treatment.	toll gates	operation phase	Company	

CCE = chief construction engineer, CMRG = Changsha Municipal Rail Group, CMTB = Hunan Municipal Transport Bureau, EIA = environmental impact assessment, EMP = environmental management plan, EPB = environmental protection bureau, HEPB = Hunan Environmental Protection Bureau IA = implementing agency, Changsha Municipal Rail Group is the project IA, m = meter,
Source: Environmental impact assessment report and technical assistance consultant.

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III. INSTITUTIONAL ARRANGEMENT

A successful EMP will need active involvement from all parties such as the environmental protection bureau (EPB) of various levels of governments, the project proponent (project owner), the Contractors and Environmental Team (CET), the Chief Construction Engineer (CCE), and the Construction Environmental Supervision Engineer (CESE). An organization structure of the above agencies/parties and line of communication on environmental issues are presented in the Figure 1. The roles and responsibilities of the major parties are also presented in the section following the schematic.

The EMP organization structure for project construction is shown below :

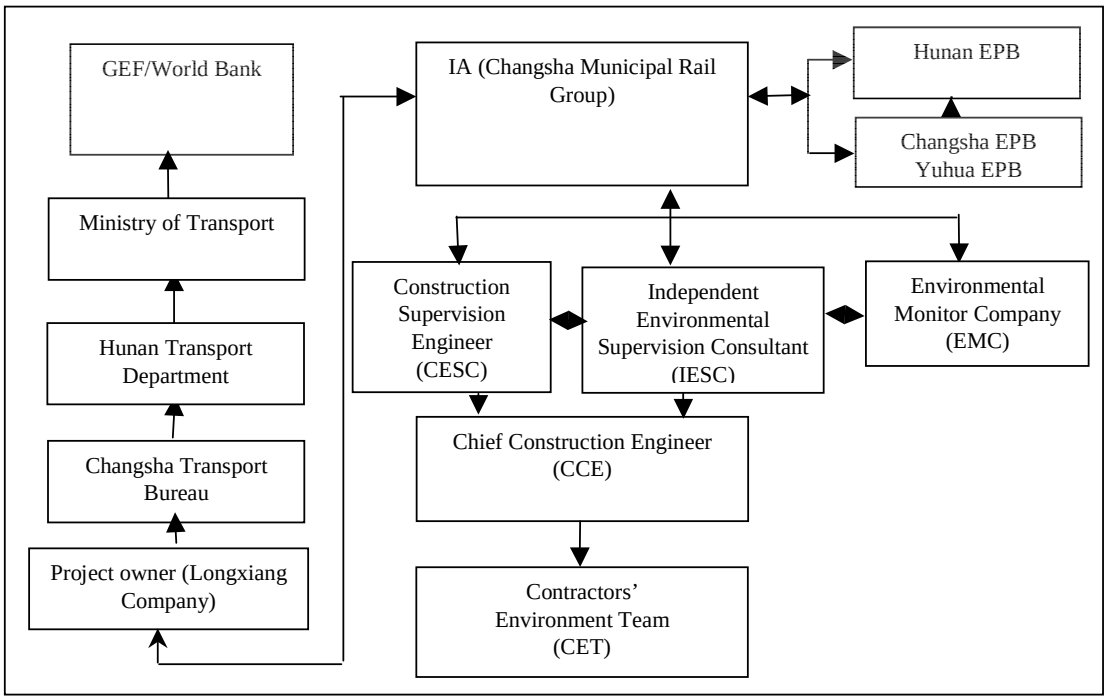

Figure 3-1 EMP Organization Chart for Construciton Phase

In order to achieve a satisfactory outcome of the Projects EMP, the project owner will appoint a Construction Environmental Supervision Engineer (CESE) to supervise and monitor the implementation of the EMP throughout the construction phase of the Project. The CESE reports to the project owner directly. Involvement of the CESE can ensure that the Project's EMP is adequately implemented. The CESE will check, review, verify and validate the overall environmental performance of the Project through supervises and inspections. This will provide confidence that the reported results are valid and the relevant monitoring program or codes of practice as provided in the Project EMP are fully complied with. In addition, the project owner will also engage an Environmental Monitor Station (EMS), responsible for regular and focused environmental monitoring of the construction sites.

The main environmental responsibilities of respective parties are described below :

A. Environmental Protection Agency

As the regulatory agency, the various levels of EPBs will make the environmental regulations and the policies, and the guideline to the project construction and operation activities, as well as be responsible for enforcement the laws, regulations, standards and environmental practices of all organizations within their respective jurisdictions.

More specifically, Hunan EPB is the provincial project environmental supervision and administration and their roles and responsibilities are:

a) supervise the implementation of EMP;
b) enforce applicable laws, regulations and standards;
c) coordinate the environmental protection effort between departments concerned;
d) check and supervise the construction, completion and operation of environment facilities;
e) guide the city and county EPBs to carry out environmental management.

The roles and responsibilities of the project region city and county level EPBs are as following:

a) supervise the construction unit to implement EMP and enforce applicable regulations and standard;
b) coordinate the environmental protection effort between departments concerned;
c) check and supervise the construction, completion and operation of environment facilities thin their jurisdiction scope.

B. Project Proponent

Longxiang Company will be the Client or projectr and the Changsha Municipal Rail Group (CMRG) will be the Implementation Agency. Thus the CMRG will be responsible for environmental performance of the project during construction and the Longxiang Company will be responsible for environmental performance during operation period. This is a day to day management organization for management of all aspects of project preparation and construction , as such, the Longxiang Company will be responsible for environmental management with, but not limited to, the following specific responsibilities:

a) Prepare EIA for project development and appraisal including, supporting and supervising environmental assessment (EIA) team to complete EIA and EMP to meet the regulatory

and Worldbank safeguard requirements and receive approval from the regulatory agency for the project and clearance of the safeguard documents from the GEF.

b) Ensure the interactions between the EIA team and project planners and engineers for integrating mitigation measures and other environmental considerations and programs and requirements into project design with the necessary budgetary support as may be needed.

c) Ultimate supervisor for mitigation and other environmental protection measures during project construction, including incorporation of environmental requirements into construction contracts, organizing training for the contractors, enforcing other environmental management programs and conducting periodical inspection of the construction sites.

d) Engage and supervise environmental monitoring programs, receive and review monitoring reports from the monitoring teams as well as from contractors on their regular reports for environmental performance and timely initiate necessary remedial actions as may be needed in response to the monitoring report findings and/or recommendations, including any emergency, accidental situations and chance finds during construction.

e) Consult and/or communicate to the local communities, project affected people, regulatory agencies, the GEF and other stakeholders during the project preparation and construction to ensure them the full knowledge of the project progress, potential issues and mitigation actions, as well as to listen and respond to their concerns, suggestions and demands for environmental and community protection.

The IA will have full time professional and other safeguard (e.g., resettlement) staff on board to directly lead the supervision and management effort from the IA for environmental management of the project preparation and construction.

C. The Contractors and Their Environment Team (CET)

The duties of the Contractor(s) and CET include but not limiting to:

a) strictly implement the listed measures in EMP;

b) undertake self-check and self-rectify activities;

c) strengthen the coordination with the CSC and CESE;

d) compliance with relevant environmental legislative requirements;

e) work within the scope of contractual requirements and other tender conditions;

f) each contractor will have 1 full time environmental personnel, working with the CESE for mitigation implementation, site inspection and any corrective actions instructed by the client and / or CESE,

g) provide and update information to the CESE regarding works activities which may contribute, or be continuing to the generation of adverse environmental conditions;

h) in case of non-compliances / discrepancies, carry out investigation and submit proposals on mitigation measures, and implement remedial measures to reduce environmental impact;

i) stop construction activities which generate adverse impacts upon receiving instructions from the client / CESE. Propose and carry out corrective actions and implement alternative construction method, if required, in order to minimize the environmental impacts;

j) adhere to the procedures for carrying out complaint investigation; and

k) take responsibility and strictly adhere to the guidelines of the EMP program and complementary protocols developed by their project staff.

D. Chief Construction Engineer (CCE)

A Chief Construction Engineer (CCE) is generally included in the Project team and is responsible for overseeing the construction works of the project and monitor other works and activities undertaken by the Contractor(s) for ensuring compliance with the specification and contractual requirements. The responsibilities of the CCE include:

a) Review construction organization design to ensure compliance with project engineering design and the EMP with regard to environmental protection and impact mitigation. The construction may only be ordered to start after the review is completed and CCE is satisfied with the environmental arrangement;

b) Provide assistance to the CESE and EMS as necessary in the implementation of the environmental monitoring and superviseing program;

c) Regularly monitor the performance of the Contractor's environment staff, verifying monitoring methodologies and results. In case the CCE considers that the Contractor's environment staff fails to discharge duties or fails to comply with the contractual requirements, instruct the Contractor(s) to replace the Contractor's environment staff;

d) Instruct the contractors to take corrective actions within the CCE determined timeframe. If there is breach of contract or strong public complaints on contractor environmental performance, the CCE will order contractor to correct, change or stop the work, reporting to relevant agencies and the Client at the same time;

e) Supervise the Contractor's activities and ensure that the requirements in the EMP and contract specifications are fully complied with;

f) Instruct the Contractor(s) to take actions to reduce impacts and follow the required EMP procedures in case of non-compliance / discrepancies identified;

g) If the contractor discovered cultural relics by chance, the CCE will order site protection and report to the relevant authorities and the Client;

h) Request and monitor contractors to cut trees strictly in accordance with the pre-determined area, numbers, species, etc. in the permits. Also monitor contractor activities for wildlife and plant protection during construction.; and

i) Adhere to the procedures for carrying out complaint investigation.

E. Constructin Environmental Supervision Enginneer (CESE)

Each Supervision Engineer Company will be required by contract to assign one Construction Environmental Supervision Engineer (CESE). The CESE must have at least five year experience in construction environmental management, impact mitigation, training, and monitoring, and fully familiar with the environment laws, regulations and relevant standards. The CESE will familiarize himself with the project works through review of the reports, including the project EMP. In particular, the CESE is expected to perform the following duties:

a) Review on behalf of the Project Office if the construction design meets the requirements of EIA and EMP particularly with regard to the site environmental management and impact mitigation measures required;

b) Supervise site environmental management system of the contractors including their performance, experience and handling of site environmental issues, and provide corrective instructions. CESE has the right to recommend to the Client to change contractor or their environmental personnel if they feel necessary;

c) Inspect and determine the effectiveness of impact mitigation measures and report to the Client periodically of the observations;

d) Investigate public complaints occurred and potential environment problems as well as make necessary assessment; Order the contractor to make corrective actions and respond to the public on the corrections conducted. Once environment emergency occurs, the CESE must involve in the coordination and treatment process.

e) Review the EMP implementation by the contractors, verify and confirm environmental supervision procedures, parameters, monitoring locations, equipment and results;

f) Report EMP implementation status to Project Office

g) As integral part of Supervision Engineer, approve invoices or payments with consideration of EMP performance.

h) Participate in environmental inspection, monitoring, review and other relevant activities organized or called for by the GEF task team, the Client and the relevant government agencies; and participate in the soil conservation acceptance upon the construction completion.

E. Environmental Monitor Station (EMS)

Environmental Monitor Station (EMS) will be engaged and reports to the Client directly. EMS shall have the appropriate environmental monitoring credential issued by the Ministry of Environmental Protection (MEP), be familiar with the highway project environmental issues and protection need and experience conducting highway project environmental monitoring. The main responsibilities of the EMS are:

a) Engaged by the Client to monitor regularly noise, air and surface water quality of the construction sites and provide the Client the monitoring reports；The monitoring time will be consistent with the construction activities, i.e.,monitoring will be conducted during active construction；

b) Upon request by the Client, conduct monitoring during environmental pollution accident investigation and provide the Client the monitoring reports and

c) Upon request by the Client, assist CESE conduct public complaint investigation and assessment.

F. Independent Environmental Supervision Consultant (IESC)

The Project Office of the IA will recruit an Independent Environmental Supervision Consultant (IESC) to conduct independent supervision on implementation of EMP. The lead IESC shall be a person who can independently and professionally examine records, procedures and processes. He / she may require a small team to assist him / her with checking the site (i.e. the IESC team). The IESC shall have extensive knowledge and experience in environmental monitoring and auditing to provide

independent, objective and professional advice on the environmental performance of the project (at least 5 years experience is required). The IESC shall familiarize himself with the project works through review of the reports, including the project EMP. In particular, the IESC is expected to perform the following duties:

a) Review and audit in an independent, objective and professional manner in all aspects of the EMP;

b) Validate and confirm the accuracy of monitoring results, monitoring equipment, monitoring locations, monitoring procedures and locations of sensitive receivers;

c) Carry out random sample check and audit on monitoring data and sampling procedures, etc;

d) Conduct random site inspection;

e) Audit the EIA recommendations and requirement against the status of implementation of environmental protection measures;

f) Review the effectiveness of environmental mitigation measures and project environmental performance;

g) On a need basis, verify and certify the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions. Where necessary, the IESC shall seek the least impact alternative in consultation with the designer, the Contractor(s), and Project Office;

h) Verify the investigation results of any non-compliance of the environmental

i) Quality performance and the effectiveness of corrective measures; and

j) Feedback audit results to Project Office and ESE team according to EMP procedures of non-compliance in the EMP, and provide Supervision Engineer suggests on actions of penalty, suspension or other punishment;

k) Provide environmental training to the Contractors, CESE and the Project Office staff prior to and during construction;

l) Prepare quarterly report to the Project Office of IA, CMTB and semiannual report to the World Bank/GEF.

IV. ENVIRONMENTAL MONITORING PLAN

The objective of the environmental monitoring plan is to verify the prediction of environmental impacts assessment and determine environmental performance and impacts to surrounding area. The monitoring plan will also provide a basis for project executing agency to prepare environmental policies, take additional actions for mitigation as may be necessary and minimize adverse impacts.

A two tier monitoring program has been developed for this project: daily and regular monitoring, to be carried out by contractors and construction supervision companies and periodical compliance monitoring by professional monitoring stations. Environmental staff will be trained prior to the start of construction for the monitoring which will include mostly visual monitoring of air borne dust, surface runoff, storage and disposal of construction waste, traffic impacts, and construction safety issues. Hand-hold noise meters will be used to monitor the noise levels at sensitive receptors during construction. The objective of this daily monitoring program is to identify environmental issues at the same time as the construction activities on these sites to that appropriate mitigation actions, if needed, can be initiated and implemented timely to minimize the impacts. This monitoring while not perfect, is important as it does provide a daily monitoring of environmental performance and allow prompt corrective actions should any of the construction activities cause significant impacts beyond the prediction of the EIA or ineffective mitigation measures currently proposed.

A. Environmental Compliance Monitoring

The environmental comliance monitoring program is listed below.

Table 4-1: Environmental Compliance Monitoring Program

Environmental Issues		Mitigation Measure	Implementation Agency	Supervision Agency
A	Preconstruction			
1	EIA and public consultation	Confirm public consultation has been conducted after draft EIA and before the final approval	IA	Longxiang Company, HEPB
2	Environmental clauses contract	Confirm the clauses and specifications have been drawn and reviewed by environmental specialists	IA with assistance from Design Institute, environmental specialists	Longxiang Company

3	Environmental Operation and Supervision Manual	Manual is prepared and reviewed	Environmental specialists on behalf of IA	Longxiang Company
4	Complaint and Information Office	Confirm that Complaint and Information Office has been established with qualified staff	IA	Longxiang Company
5	Environmental Protection Training Program	Confirm that training has been provided to staff members as designated	Environmental specialists or institutes on behalf of IA	Longxiang Company
	Utility Relocation	See resettlement plan	IA	Longxiang Company
B	Construction			
1	Ecological resources protection	Engineering spoil is used for filling, take appropriate measures to minimize soil erosion, which does not affect the landscape	IA	Longxiang Company /HEPB
2	Water pollution	Discharged into the Huaqiao Wastewater Treatment Plant	IA	Longxiang Company /HEPB
3	Solid waste pollution	Develop solid waste collection management system, responsible by specially-assigned person	IA	Longxiang Company /HEPB
4	Air Pollution	Spray water to reduce air pollution during construction, cover transport materials, and goods vehicles with canvas	IA	Longxiang Company /HEPB
5	Noise	Construction at night is forbidden	IA	Longxiang Company /HEPB
C	Operation			
1	Water Pollution	Discharged into the Huaqiao Wastewater Treatment Plant	Longxiang Company	HEPB
2	Noise	No horn when transport vehicles passing the sensitive point	Longxiang Company	HEPB
3	Solid waste pollution	Set the waste container, collected by specially-assigned person in a timely manner	Longxiang Company	HEPB

B. Environmental Quality monitoring

In additional to the daily monitoring by contractors a formal environmental monitoring program will also be carried out during the construction, as well as operation phase. This program will be conducted by professional environmental monitoring program with main objective to provide official records on environmental and regulatory compliance status. The formal environmental monitoring plan for the project, to be carried by Hunan Environmental Monitoring Station in both the construction and operation stages, is presented below.

Construction Phase

Environment monitoring during construction is mainly for dust and noise pollution in order to timely identify problems and timely correct actions to ensure that the construction does not adversely affect the environment.

Monitoring Project: Ambient air quality monitoring TSP, PM10, NO2, Noise monitoring of the field noise boundary Leq (A).

Monitoring frequency: once every three months during construction.

Monitoring Location: ambient air monitoring stations, noise monitoring points are located in nearby residential area

V. ENVIRNMENTAL SUPERVISION

A. Compliance with Legal and Contractual Requirements

There are contractual environmental protection and pollution control requirements as well as environmental protection and pollution control laws in PRC which the construction activities are required to comply with.

All the works method statements submitted by the Contractor(s) to the CCE for approval will also be sent to the CESE for vetting to see whether sufficient environmental protection and pollution control measures have been included.

The CESE will review the progress and program of the works to check that relevant environmental laws have not been violated, and that any foreseeable potential for violating the laws can be prevented.

The Contractor(s) will regularly copy relevant documents to the CESE so that the checking work can be carried out. The document will at least include the updated Work Progress Reports, the updated Works Program, and the application letters for different license/permits under the environmental protection laws, and all the valid license/permit. The site diary will also be available for the CESE's inspection upon his/her request.

After reviewing the document, the CESE will advise the CCE and the Contractor(s) of any non-compliance with the contractual and legislative requirements on environmental protection and pollution control for them to take follow-up actions. If the CESE's review concludes that the current status on license/permit application and any environmental protection and pollution control preparation works may not cope with the works program or may result in potential violation of environmental protection and pollution control requirements by the works in due course, he/she will advise the Contractor(s) and the CCE accordingly.

Upon receipt of the advice, the Contractor(s) will undertake immediate action to remedy the situation. The CCE will follow up to ensure that appropriate action has been taken by the Contractor(s) in order that the environmental protection and pollution control requirements are fulfilled.

B. Environmental Supervision Plan

The Construction Environmental Supervision Engineer (CESE) shall prepare the project environmental supervision plan prior to environmental supervision according to the codes and standards for environmental protection, design documents, construction contracts and supervision contracts and EMP, etc. The supervision plan shall mainly include the following content:

a) Scope, stage and time limit of environmental supervision

- Scope of environmental supervision: the area of the project and the area impacted by the project.
- Scope of work: construction site, living camps, attached facilities, as well as the area with environmental pollution and ecological damage resulted from construction within the above scope.
- Stage of work: environmental supervision of construction preparation, construction, project maintenance.
- Time limit of supervision: from the stage of project construction preparation till expiration of the maintenance period of the project. The maintenance period lasts 1 year since completion of construction. Environmental supervision of the project is divided into the three stages, construction preparation, construction and defects liability period.

b) Targets of the work

Targets of environmental supervision are to fulfill the obligation of environmental supervision, serve the project independently, fairly, scientifically and effectively, and carry out overall environmental supervision in order to make the project measure up to the requirement of environmental protection in terms of design, construction and operation according to the laws, regulations and policy specified and released by the state and the relevant responsible department, the regulations, specifications and

technical standard of the GEF, as well as the approved design documents, tender documents and the supervision and construction contracts signed legally.

c) Working procedures

The working procedures include working recording system, staff training, report system, letter communication, environmental regular meeting. There shall be one environmental protection supervision meeting each month. During the meeting, the contractor will give a review to sum up the recent environmental protection work. The Environmental Supervision Engineer gives overall assessment about environmental protection of each bidding object of the current month. The achievement of the work will be approved, and the current problems will be put forward and the remedial requirement will be proposed. A meeting minute will be taken for each meeting.

d) Preparation for work commencement

CESE shall prepare the environmental supervision work plan and submit to CMRG prior to entering the field. The plan shall include the composition of the environmental supervision organization and the environmental supervision staff list. CESE shall get familiar with the contract condition and the relevant technical specification, and carry out field investigation, and get an overall knowledge on the field landform, surface features, hydrogeology and profile of the environment.

2. The work plan for environmental supervision and the provisions of environmental supervision shall be approved by the CMCB.

e) Quality control

CESE shall: carry out overall inspection, supervision and management for the construction, pay attention to control beforehand, timely prevent and control the unfavorable factors which might cause environmental impact, and take preventive measures before the accident happens; eliminate each hidden danger which might cause environmental impact; improve control afterward, ensure that the project submitted by the contractor satisfies the drawings and technical specifications and measures up to each environmental protection requirement.

f) Coordination, information collection and management

Coordination among various parties will be mainly achieved through coordination meetings.

As for information summarization, filing and management, sorting, classification, division into books and filing will be done according to the requirement of the Owner, referring to the regulations of the GEF, the state and the relevant local departments and in combination with the engineering features of the project. The theme meetings will be convened regularly. Inspect and supervise the contractor to sort out the document and technical file in time in order to ensure that the engineering

information and file classification are clear and complete, and the technical file and the drawings are simultaneous with the real object.

C. Content of Environmental Supervision

1) Environmental Supervision Before Construction

Review of pollution prevention proposal: according to the process design of a specific project, “three waste” (waste water, waste gas, and solid waste) discharge link during the construction workmanship shall be reviewed. The advancement of treatment technology and feasibility of the treatment measures, which are adopted during the discharge of major pollutant and design, shall also be reviewed. Before the project, the final method of disposal and place of the pollutant shall be planned and implemented specifically after reporting the responsible department of the environmental protection as per the regulations and treatment requirements of the related document.

Review of environmental protection clause in the Construction Contract: construction contractor must abide by related requirements of environmental protection which shall be reflected in the construction contract in the way of specific clause. During the process of construction, strengthen supervision, inspection, and monitoring to reduce the pollution effect on the environment during the construction period, and carry out review on the level of civilized construction quality of the construction unit as well as construction environmental management.

2) Environmental Supervision during Construction

CESE will conduct daily on-site supervision, e.g. whether the construction is carried out as per clauses of the environmental protection, and whether the clauses are changed without approval; whether the environmental protection requirement is satisfied during the construction process by monitoring, whether construction work is in line with the environmental protection standard, and whether it is carried out as per the design requirements of the environmental protection; whether each environmental protection measure (which can guarantee the environmental protection requirements) is implemented during the construction process. The main contents are:

a) Supervise water and soil loss caused by the major works and the temporary works. Inspect whether the facilities of water and soil conservation measure up to the requirement of design and whether soil is obtained and dumped as per the procedure and location; temporary sedimentation tank will be built during construction; protect the ground with broke soil or other places which are likely to be impacted by water and soil loss by grass mat and plastic film before the rainstorm; ensure that the rivers, channels and

sewage system are smooth and in favorable working condition.

b) Environmental supervision of industrial and domestic wastewater disposal: Supervise the source of the industrial and domestic wastewater, discharge amount and water quality index, construction progress of the disposal facilities, as well as the disposal result. Inspect and supervise whether it measures up to the approved requirement of discharge.

c) Environmental supervision of atmospheric pollution: atmospheric pollution in the work area mainly comes from the exhaust gas and dust produced during the construction and production process. For the source of pollution, discharge is required to be done when it measures up to the standard. The specified environmental quality standard shall be met in the work area and the area under its impact measure up to relevant standard.

d) Environmental supervision of noise control: In order to prevent the damage of the noise, for the sources of strong noise or vibration, it shall be prevented as per the design requirements.

e) Environmental supervision of solid waste disposal: solid waste disposal include industrial, domestic trash disposal and industrial slag disposal. It is required to ensure that the site is clean and tidy.

f) Environmental supervision of people's health: Ensure safety and reliability of the domestic drinking water, prevent infectious disease, and provide necessary welfare and sanitation.

g) Supervision of construction and installation of the environmental protection facilities: supervise construction of the facilities of sewage treatment, acoustic protective screen and green work.

3) Supervision at Completion Inspection

Supervise and manage the environment restoration monitoring, the implementation of the environment restoration, and the operation of the environmental protection treatment facilities.

a) Supervise the preparation of the as-built document.
b) Organize the initial inspection.
c) Assist the Owner in the organization of final acceptance of construction.
d) Prepare the final report for the environment supervision of the project.
e) Sort out the as-built data of the environment supervision.

D. Management of Contractors

During the construction period, the contractor, who shall always station in the construction site, shall be mainly responsible for effective controlling and reducing the impact on the environment. Most of the environmental protection measures shall be implemented by the contractor. In order to ensure the environmental protection measures and Environmental Management Plan to become the duty of the contractor, the following measures shall be taken:

a) During pre-qualification, the environmental management shall be included in the authentication clause when the contractor's qualification is reviewed. Under the same condition, priority shall be given to the bidders who have passed the ISO9000 and ISO14000 authentication;

b) At least one full-time and dedicated person shall be assigned in each construction phase to carry out environmental supervision and environmental monitoring as well as the implementation of the specific environmental protection measures;

c) In the process of preparation the Bidding Document, the project proponent shall make each environmental protection measure into the related clause, so that the details of environmental protection can be understood. And the corresponding budgetary estimate shall be prepared in the bidding document. Therefore, the implementation of the environmental protection measures will become the obligation and responsibility of the successful bidder;

d) Prior to the commencement of construction, the Contractor shall receive relevant environmental training. In each section, at least 1 senior manager and 1 environmental protection professional shall participate the training convened by the experienced experts of environmental protection and local regulatory authorities. Such training shall be carried out 2-3 days prior to signing the contract, and the details include:

- Relevant national and local laws and regulations and discharge standards;
- Technical guidelines for environmental protection;
- Environmental Impact Report and Environmental Management Plan of the Project;
- Specific requirements and monitoring methods of the monitoring point;
- Specific requirements on the monitoring reports and feedback of the monitoring information;
- Applicable mitigation measures;
- Emergency measures for the emergency and leakage of the hazardous materials;
- Public participation during construction and resolution of public complaint;
- The responsibility of the contractor for environmental protection;

E. Penalty System

If non-compliance with environmental regulations are discovered by CESE during the site supervision, contractors will be given a grace period to repair the violation, for example two weeks. If the contractor performs the repairs within the grace period, no penalty is incurred. However, if the contractor fails to successfully make the necessary repairs within the grace period, they will pay the cost for a third party to repair the damages.

a) review the Contractor□s response on the identified mitigation measures, and the updated situation;
b) if the complaint is transferred from EPB, submit interim report to EPB on status of the complaint investigation and follow-up action within the time frame assigned by EPB;
c) undertake additional monitoring and verify the situation if necessary as well as review that any valid reason for complaint does not recur;
d) report the investigation results and the subsequent actions to the source of complaint for responding to complainant (If the source of complaint is EPB, the results will be reported within the time frame assigned by EPB); and
e) Recording the complaint, investigation, the subsequent actions and the results in the monthly EMP reports.

During the complaint investigation work, the Contractor(s) and CCE will cooperate with the CESE in providing all the necessary information and assistance for completion of the investigation. If mitigation measures are identified in the investigation, the Contractor(s) will promptly carry out the mitigation. The CCE will ensure that the measures have been carried out by the Contractor(s).

VI. INSTITUTIONAL STRENGTHENING AND TRAINING

Personnel training will be provided in different stages of project implementation. At the construction stage, heads and environmental staff from winning contractors and construction supervision companies will be requested to participate in a mandatory environmental training program. This request will be included the construction tendering documents to be issued to the pre-qualified bidders who will be invited to bid. This training program will include, but not limited to, the following contents:

⌘ Relevant environmental regulations, policies, standards and programs;
⌘ The main findings and recommendations of environmental impacts assessment;
⌘ Relevant environmental control technologies, processes and procedures;
⌘ Key contents of environmental management plan, particularly various mitigation measures for the construction stage and the implementation;
⌘ Daily environmental monitoring requirements, methodology and procedures;
⌘ Environmental reporting requirements; and
⌘ Environmental emergency response and cleanup.

For operation stage, environmental staff from IA and relevant government organizations which oversee and supervise the road operations will be provided the training. The training programs will be primarily provided by professional environmental staff or in local universities.

Table 6-1 Institutional Strengthening and Training

Strengthening activities	**Agencies**	**Strengthening plans**	**Timing**			
Capacity building	The IA	Institutional organization, development of responsibilities for each position.	During project preparation and implementation			
Monitoring	Contractors, IA	Procurement of related monitoring instruments and equipment	During project preparation and implementation			
Training	Attendees	Contents	Times	Period (days)	Number of persons	Total costs (CNY 1,000)
Environmental laws, regulations and policies	The IA, Contractors	(i) Environmental laws and regulations, (ii) Environmental policies and plans, (iii) Basic Environmental management, (iv) Environmental emergence response	1	1	5/each time	10
EMP implementation	Contractors, IA	(i)Responsibility and duties for the project construction, management and environmental protection. (ii) Task of environmental protection in the project construction. (iii)Key environmental protection contents etc. in project construction, (iv)Various environmental reporting (v)EMP improvement and corrective actions (vi)Environmental monitoring and report (vii) Biodiversity protection (viii) Cultural property protection (ix) Site supervision methodology, procedures etc.	1	2	5	30
Crisis handling	Contractors, IA	(i)setting up crisis handling unit, (ii)crisis handling methods	1	1	3	10
Environmental technologies and equipment	Contractors, IA	Engineering technologies, pollution control equipment selection and procurement,	1	1	3	10
Environmental facility operation and	IA	(i)Operation and maintenance of environmental installations, (ii)Safety operation regulations, (iii)Equipment management and	1	1	2	10

Strengthening activities	Agencies	Strengthening plans	Timing			
maintenance		emergency response procedures				
Environmental monitoring and inspection	Contractors, IA	Monitoring and inspection methods, data collection and processing, interpretation of data, reporting system	1	1	5	30
Total						100

NOTE: EMP = environmental management plan, IA = implementing agency

Table 6-2: Public Consultation Plan

Organizer	Approach	Times	Subject	Attendees
A. Project Preparation				
IA, EIA Institute	Public meeting	Once	Environmental quality status; project information; major impacts and benefits; mitigation measures; public attitudes, comments, and recommendations	Residents, enterprises, NGOs and other stakeholders within construction and service area; specialists from various sectors
	Questionnaire	Once		
IA, EIA Institute	Social survey	Once		
IA, RAP specialist	Survey on resettlement	As required by relevant resettlement plan	Comments on resettlement, improvement of living conditions, livelihoods, and poverty reduction; comments and suggestions	Persons affected by resettlement and relocation
B. Construction Phase				
IA	Public consultation and site visits	At least once	Adjusting of mitigation measures, if necessary; construction impact; comments and suggestions	Residents adjacent to components, representatives of social sectors
IA	Expert workshop or press conference	As needed, based on public consultation	Comments and suggestions on mitigation measures, public opinions	Experts of various sectors, media
IA	Survey on resettlement	As required by relevant resettlement plan	Comments on resettlement, improvement of living conditions, livelihoods, and poverty reduction; comments and suggestions	Persons affected by resettlement and relocation
C. Operation Phase				
IA	Public consultation and site visits	Once in the first 2 years	Effects of mitigation measures, impacts of operation, comments and suggestions	Residents adjacent to the project roads and other component sites, representatives of residents and representatives of social sectors
IA	Expert	As needed,	Comments and	Experts of various

	workshop or press conference	based on public consultation	suggestions on operational impacts, public opinions	sectors, media

Note: EIA = environmental impact assessment, IA = implementing agency, NGO = non-government organization

Table 6-3 Reporting Plan

Report		From	To	Frequency of Reporting
Construction				
Internal supervision, contracted by IA	Weekly internal supervision reports by contractors	Environmental responsible person pointed by contractors	Chief of contractors	Weekly
	Monthly supervision reports by environmental supervisors to be contracted by IA	Environmental supervisor on behalf of IA	IA	Monthly
	Quarterly environmental inspection reports based on monthly reports	Environmental supervisor on behalf of IA	IA, CMTB	Quarterly
Environmental quality monitoring and inspection	Spot-check monitoring and inspection report	Local county or municipal environmental monitoring center	Local county or municipal environmental protection bureau, IA	Randomly
	Quarterly external environmental monitoring and inspection reports	Local county or municipal environmental monitoring center	municipal environmental protection bureau, IA, project management office, CMTB	Quarterly
Independent supervision monitoring	Prepare semi-annual environmental report for the GEF on behalf of IA based on construction compliance monitoring reports and environmental quality monitoring reports	Independent environmental supervisor	CMTB	Semi-annually
Reports to GEF through MOT	Semi-annual progress reports based on internal and external reports	IA	GEF, HEPB	Semi-annually
Test Operation				
Project acceptance	Environmental acceptance reports after project completion	A certified monitoring institute contracted by IA	IA, HEPB, GEF	Within 3 months after project completion, or no later than 1 year with permission
Operation				
Internal monitoring	Routine environmental monitoring reports	IA	Local county or municipal environmental protection bureau, project management office, CMTB	Quarterly during first 2 years
External monitoring and inspection	Environmental compliance reports	Yuelu district/Changshan EPB environmental	Yuelu EPB project management office, IA	Twice yearly during the first 2 years

Report		From	To	Frequency of Reporting
		monitoring center		
Reports to GEF	Semiannual reports based on internal and external monitoring inspection reports during operation	IA	HEPB, GEF	Twice yearly during the first 2 years

GEF = Asian Development Bank, EMC=environmental monitoring center, IA = implementing agency, HEPB = Hunan Provincial Environmental Protection Bureau, CMTB = Hunan Provincial Department of Transportation
Sources: Project preparatory technical assistance consultants based on EIA report

VII. COST ESTIMATE

The Environmental Registration Table did not provide environmental cost. Considering the average environmental cost taking 2-2.5% of the total project estimated cost, the project environmental cost is about 25 million RMB.