

Pilot Demonstration of GEF City Cluster Eco-Transport

# **Environmental Management Plan**

For

**Western Changsha Terminal Project**

**Environmental Impact Assessment Center of**

**Hunan University**

**February 16, 2011**

## **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 Western Changsha Terminal is selected for pilot demonstration of design. It is an existing bus terminal located in the Wangchengpo Economic Zone of Changsha. The terminal is designed to be dismantled and reconstructed in order to 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 Western Changsha 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 Environmental Impact Assessment Center of Changsha University in December 2010. The Hunan University 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 and Applicable Standards for 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 Prevention and Control of Water Pollution for Catchment of the Xiangjiang River*
- (4) *Regulation on Construction Waste Transportation*, Changsha Municipal Government
- (5) *Notice on Implementation of Air Pollution Control Measures*, Changsha Municipal Government, 2001
- (6) *Management Method for Dust Control in Urban Area of Changsha City*, Changsha Municipal Government, 2005
- (7) *Air Quality Zoning of Changsha City*, Changsha Municipal Government, 2005
- (8) *Notice on Implementation of Second Phase Dust Control Measures*, Changsha City, 2004
- (9) *Environmental Noise Functional Application Zoning in Urban Areas in Changsha City*, Changsha Municipal Government, 1994
- (10) *EIA Technical Guideline for Controlling Dust from Construction Sites in Changsha*,

## 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

### 1. Ambient 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<sup>3</sup>**

Pollutant	SO <sub>2</sub>	NO <sub>x</sub>	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 <sup>3</sup> □	2.0		
Minimum smoke purification rate (%)	60	75	85

### 2. Water

Wuyi Bridge section of Xiangjiang River meets Class III of *Surface Water Quality Standard*

(GB3838-2002), and the Sanchaji section meets Class IV.

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	NH <sub>3</sub> -N	COD <sub>Cr</sub>	BOD <sub>5</sub>	oil
Class III	6~9	/	500	300	100

### 3. 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 noise during the operation, Class III of Ambient Noise Standard (GB22337-2008) will be applied, see Table 1-5 for detail.

**Table 1-5 Ambient Noise Standard (GB22337-2008) unit: dB (A)**

Class	Day	Night
0	50	40
1	55	45
2	60	50
3	65	55

## **II.**

### **ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

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 Great Hexi Transit Hub project**

Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
<b>A. Pre-construction</b>					
<b>1. Feasibility Study and EIA stage</b>					
Location and scope	Project selection will be kept compatible with the urban development program.	Throughout the project areas	FS stage	EIA team, Design institute	CITTC
EIA and public consultation	Public consultation has been conducted on environmental and resettlement issues.	Throughout the project areas	Before EIA approval	EIA team	Hunan EPB
<b>2. Design stage</b>					
Dust from construction activities	Waste and construction material temporary storage site should be selected at downwind of residential areas	All construction sites	Design stage	Design institute	CITTC
Waste and runoff from construction site	Construction site drainage and wastewater management, such as perimeter drainage ditch, sedimentation tanks, septic tanks. Proper runoff pattern will be designed to keep the natural pattern as much as possible.	All construction sites	Design stage	Design institute	CITTC
Landscape design	Landscape design should be conducted to ensure the building style and color consistence with each other and with surrounding structures	Throughout the project areas	Design stage	Design institute	CITTC
Design revising	Update and incorporate mitigation measures defined in EMP into the Project's detailed design to minimize adverse environmental impacts.	Throughout the project areas	Design stage	EIA team, Design institute,	CITTC
Environmental Best Practice Manual	Prepare best practice manual based on the EMP.	Throughout the project areas	Prior to construction	EIA team	CITTC
<b>3. Construction Preparation</b>					
Environmental Clauses and	To ensure environmental credibility among contractors, prepare environmental prequalification	Throughout the project corridor	Before tenders for contractors	IA	CMTB

<b>Impact/Issue</b>	<b>Mitigation Measures</b>	<b>Location</b>	<b>Time Frame</b>	<b>Implementing Agency</b>	<b>Supervising Agency</b>
Specifications for Contractor Prequalification, Technical Specifications, Environmental Clauses for Contracts, and Loan Covenants	<p>clauses and specifications to be included in the prequalification package to contractors.</p> <p>Prepare environment section in the terms of reference for bidders.</p> <p>Prepare environmental contract clauses for contractors, namely special conditions (e.g. reference EMP and monitoring table).</p> <p>Prepare covenants for Loan Agreement as defined in the EMP</p>				
Environmental Operation and Supervision Manual	Preparation of an environmental operation and supervision manual by the contractors for approval by the IA.	Throughout the project corridor	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	Throughout the project corridor	Before construction	Contractors, IA	CMTB
Environmental protection training	Invite environmental specialists and/or HEPB officials to provide training on implementing environmental mitigation measures and supervision		Before construction	IA	CMTB
Resumption of land and property	<p>Establish a resettlement office comprising local government officials.</p> <p>Conduct community consultation programs and ensure information is disseminated.</p> <p>Ensure that all relocation and resettlement activities are reasonably completed.</p>	The land and property as defined in the resettlement plan	<p>Before the commencement of resettlement activities</p> <p>Before construction</p>	IA	CMTB, local government
Utility relocation	Make full preparations and elaborate surveys; cooperate with the relevant departments. Traffic management schemes should be established; potential emergencies and mitigation should be examined.	Refer to utility location drawings	Before construction starts	Contractors, IA, and concerned departments	CMTB and concerned government agencies



<b>Impact/Issue</b>	<b>Mitigation Measures</b>	<b>Location</b>	<b>Time Frame</b>	<b>Implementing Agency</b>	<b>Supervising Agency</b>
	Relocate all utilities subject to prior approval of the concerned agencies. Notice should be prepared to inform the owner of the utility and representatives should be invited to the work site.				
Environmental impact analysis caused by new physical component	In case of slight or major additional physical component, mitigation measures should be proposed and incorporated into the detailed design, or the CMTB should form an EIA team to conduct additional environmental assessment and public consultation. The revised EIA reports should be submitted to HEPB	Entire project areas	When alignment deviation	Environment specialists contracted by IA	CMTB, HEPB, GEF
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 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.	Entire project areas	Before construction	IA	CMTB
<b>B. Construction Phase</b>					
<b>1. Soil Erosion</b>					
Refuse generated on construction sites, construction and demolition waste, excavated soil	<p>During construction, inert construction materials / excavated soil will be reused on site as much as possible and minimize the volume requiring disposal.</p> <p>The amount of surplus excavated material will be estimated during the design phase. Excavated material will be re-used on-site as far as possible in order to minimize the quantity of material to be</p>	Within ROW	During construction	Contractors	CITTC, CCE, external supervisors, CMTB, HEPB

Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
	<p>disposed of;</p> <p>Recyclable materials such as wooden plates for trench works, steel, scaffolding material, site holding, packaging material, etc will be collected and separated on-site from other waste sources. Collected recyclable material will be re-used for other projects or sold to waste collector for recycling;</p> <p>The extent of demolition of existing houses / structures due to the project will be minimized during the design through careful route selection. Major dense populated residential areas will be avoided in order to minimize the demolition;</p> <p>Handling of waste generated from on-site treatment facilities (e.g. spent betonies settled by treatment facility, sediment collected by sedimentation process, etc) will be planned during the design. Collected waste will be disposed of properly through licensed waste collector;</p> <p>Hazardous waste (or chemical waste) will be properly stored, handled and disposed of in accordance with the local legislative requirements. Hazardous waste will be stored at designed location and warning sign will be posted;</p> <p>Specification on waste management will be included in the contract for contractor(s) to follow. The Contractor(s) will be required to adopt operation measures for all aspects from waste avoidance, reduction, recycling, re-use to waste collection and disposal; and</p> <p>Good house keeping will be maintained. Domestic waste from site office and canteen will be collected by a licensed waste collector. A designed waste storage area will be provided for the proposed service area and waste will be cleaned on regular</p>				

<b>Impact/Issue</b>	<b>Mitigation Measures</b>	<b>Location</b>	<b>Time Frame</b>	<b>Implementing Agency</b>	<b>Supervising Agency</b>
	basis.				
Disposal sites	The construction waste should be transported to construction site of Changshan Meixihu International Exhibition Center	All disposal sites	During construction	Contractors	CITTC, Changsha Construction Waste Management Department
Construction sites and temporary land use areas	Set up hoarding and build temporary drainage ditch, install regular water haul road, cover the soil and aggregate materials on the truck. Build drainage ditch and slop protection. Develop rainy season construction plan.	All temporal land use	During construction	Contractors	CITTC, CCE, external supervisors, CMTB
Solid waste from work camps and canteens	All solid waste from construction camps will be collected and stored on site. The storage area will have a cover to protect from weather and avoid direct contact with surface runoff. The contractors will be demanded to separate construction waste from municipal waste. Where possible, the construction waste will be recycled for land filling. Periodically, the municipal waste will be transported off site for disposal, by environmental sanitary authority if possible.	Construction sites	During construction	Contractors	CCE, external supervisors
Management measures	Ensure that documentation for civil works contracts includes specific requirements for soil erosion prevention and definition of contractors' responsibilities. Dumping is prohibited outside designated dumping sites. All drainage systems should be well maintained.	Construction sites	During construction	Contractors	CITTC, CCE, external supervisors, CMTB
<b>2. Water Quality</b>					
Impact on surface and subsurface	Replanting should be completed to facilitate regeneration.	Project corridor	Pre-construction and during	Contractors	CITTC, CCE, external

<b>Impact/Issue</b>	<b>Mitigation Measures</b>	<b>Location</b>	<b>Time Frame</b>	<b>Implementing Agency</b>	<b>Supervising Agency</b>
water flow or drainage	Roadside drainage, intercepting ditch, chute, water retaining, various passages should be used as needed.		construction		supervisors, CMTB, street committees
Construction materials management	Effectively manage delivery and storage, storage site selection. Stockpiles will be located away from water bodies and areas where runoff flushing impacts would be minimum. All spoil soil disposal sites will only be allowed in the dedicated areas where will be erosion control measures and landscaping plan following the disposal operations	Project corridor	Pre-construction and during construction	Contractors	CITTC, CCE, external supervisors, CMTB, street committees
Wastewater from construction workers, canteens	Domestic waste water will be treated at oil separation tank and sedimentation tank. Amd septic tanks. The treated catering sewage is used for construction site watering, and greening as possible. Surplus waste water discharged into urban sewer network at the location of Fenglin road and west 2nd ring road  Waste water from foundation ditch and car washing will be treated by three stages sedimentation tanks with capacity of 80 cubic meters and 30 cubic meters respectively. The treated water will be recycled.	Project corridor	During construction	Contractors, in cooperation with local communities	CITTC, CCE, external supervisors, CMTB,HEPB

<b>Impact/Issue</b>	<b>Mitigation Measures</b>	<b>Location</b>	<b>Time Frame</b>	<b>Implementing Agency</b>	<b>Supervising Agency</b>
Vehicle and equipment maintenance and cleaning	<p>On-site fueling areas should be designed with protective dikes. The on-site fueling facilities should be only used for equipment that must be fueled on site, and all vehicles and equipment that regularly pass the work site should be fueled off-site. The vehicle and equipment wash area must be properly identified by sign, and properly placed and equipped with a septic tank to collect wash water, which should be taken and treated by appropriate treatment facilities. The wastewater from washing boats should be settled before discharging.</p> <p>A protocol for handling construction materials will be prepared and applied.</p>	All project corridor	During construction	Contractors	CITTC, CCE, external supervisors, on behalf of CMTB, and HEPB
<b>3. Air Quality</b>					
Generation of dust	<p>Avoid truck overloading; vehicles delivering fine materials to the sites must be covered; clear the fugitive materials dropped on the road in a timely manner.</p> <p>For construction sites inside of the transit hub, man-powered water spring or water syringe will be used. For the 100 meters of road outside of the transit hub, sprinkling truck will be used together with man-power road cleaning. 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.</p> <p>Two litter persons should be hired for the construction site cleaning.</p> <p>Fence the construction site with wall that not less than 2.5 meter high.</p> <p>Cover the building under construction with dust-</p>	Project corridor	During construction	Contractors	CITTC, CCE, external supervisors on behalf of CMTB, HEPB

Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
	<p>clothes at 1.5 meters outside of the building, or with dust prevention net with density not less than 2,000 mesh per 100 square centimeters.</p> <p>Material storage sites should be selected downwind of residential area and covered with canvas or sprayed with water.</p> <p>Forbid burning waste construction materials. Solvents and volatile materials and clean energy will be used properly. Enclose the demolition sites and road construction sites with colored fencing. Trucks carrying earth, sand, or stone will be covered with tarps. Proper timetables, routes, and materials classification should be developed.</p> <p>Set up hoarding for sensitive areas. All the roads used for personnel will be kept clean.</p> <p>All the construction vehicles should meet the standard of Limit on Vehicle Emission (GB3847-2005), issued by Ministry of Environment in 2005</p> <p>Pre-construction monitoring of existing ambient air quality will be undertaken.</p>				
Emissions from vehicles and equipment	Select appropriate machinery and transportation vehicles. Machinery and equipment will be fitted with pollution control devices in working order.	Project corridor	During construction	Contractors	CITTC, External supervisors, CMTB, HEPB
4. Noise					
Noise from vehicles, plant, and equipment	<p>Plants and 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.</p> <p>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.</p> <p>The IA should consult with the Wanexin Primary</p>	Project corridor, particularly important sensitive spots: all schools and hospitals in the project area	During construction	Contractors	CITTC, CCE, external supervisors, HEPB

Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
	<p>School about the construction timetable of large machinery. Noisy activities will be arranged during school vacations or after classes.</p> <p>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 honking when passing townships and nearby schools. Restrict the movement of heavy vehicles along urban and village roads. In the event that night transport is necessary, restrict vehicle speeds to less than 30 km per hour with no honking allowed</p> <p>During the construction in daytime, the construction site should be fenced.</p> <p>The construction equipment will be well maintained to keep it best operating conditions and lowest noise levels possible.</p> <p>For workers who must work with highly noisy machines such as piling, explosion, mixing, etc., ear phones will be provided for noise control and workers protection.</p> <p>Constriction team should be equipped with potable detecting device to monitor the noise level at the sensitive receptors.</p>				
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	Project corridor, particularly important sensitive spots: all schools and hospitals in the project area	During construction	Contractors	CITTC, CCE, CMTB, external supervisors, HEPB

<b>Impact/Issue</b>	<b>Mitigation Measures</b>	<b>Location</b>	<b>Time Frame</b>	<b>Implementing Agency</b>	<b>Supervising Agency</b>
	<p>suggestions for noise control prior to the commencement of night time construction. These concerns will be responded and suggestions adopted where appropriate.</p> <p>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.</p> <p>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.</p> <p>Equipment with lower noise levels will be used for concrete pouring operations, which may require 24 hours non-stop operation.</p>				
Noise Prevention Measures	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.	Project corridor, particularly important sensitive spots: all schools in the project area	During construction	Contractors	CITTC, CCE, CMTB, external supervisors, HEPB
5. Health					



Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
Health and Well-being of Communities	<ul style="list-style-type: none"> <li>☑ 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.</li> <li>☑ 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.</li> <li>☑ Adequate protective gear such as condoms will be provided to workers at the construction camps;</li> <li>☑ Periodical health check will be provided to construction workers to ensure their health and well being.</li> <li>☑ 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.</li> <li>☑ Timely actions will be taken to kill mosquitoes and vectors and create a clean environment on site</li> <li>☑ pay attention to the treatment of sewage and wastewater in the living areas on site</li> <li>☑ 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</li> <li>☑ adequate supply of medicine for epidemic prevention and vector destruction should be assured.</li> </ul>	Throughout the project areas	During construction	IA in cooperation with local health authorities	CITTC, External supervisors, CMTB, Hunan health authorities

Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
8. Safety					
Construction site and traffic safety	<p>Measures on construction staff and public</p> <ul style="list-style-type: none"> <li>☑ The contractor will provide safe and convenient passages for the public</li> <li>☑ Provide construction workers sufficient personal protection equipment such as hard hats, safety shoes, and others</li> <li>☑ Seminar on safety issues will be provided to local public, particularly school students;</li> <li>☑ Where the potential dangers are present, warning signed will be installed;</li> <li>☑ 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.</li> </ul>	All the construction sites	During construction	Contractors with assistance from the local traffic police	CITTC, External supervisors, CMTB, CCE, Hunan Safety Management Department
10. Social					
Public disturbance	<p>Further public consultations with local residents should be conducted to inform them about project activities and obtain comments.</p> <p>Consult the local government and traffic police regarding construction materials transportation on the existing roads to avoid traffic jam, especially reduce the transportation through the residential areas.</p> <p>Construction notice should be posted on the bulletin board of townships along the alignment, introducing the project activities, resettlement policies to the local people.</p> <p>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.</p>	Residential areas	Before construction starts	contractors	CITTC

Impact/Issue	Mitigation Measures	Location	Time Frame	Implementing Agency	Supervising Agency
	For the construction activities near the Wangxin school stated above, construction should be fenced with warning sign.				
<b>11. Environmental Supervision</b>					
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.	Project corridor	During construction	IA	External supervisors, CMTB,HEPB
<b>C. Operation Phases</b>					
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.	The project roads area	Within first 3 months of operation or no later than 1 year, with permission from HEPB	Licensed institutes contracted by IA	HEPB
2. Air Quality	<p>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)</p> <p>Restaurants smoke should be exhausted at top of the tall building where has better diversion. After pre-treatment by the smoke exhaust ventilator, the smoke will be further purified through deposition process in the vertical shaft. The smoke concentration will meet oil smoke emission standard (GB18483-2001).</p> <p>Introduce an annual air quality monitoring program.</p>	The project roads area	Operation phase	IA	HEPB
3. Noise	No horn when transport vehicles passing the sensitive points	Affected houses and schools	Construction and operation period	IA	HEPB

<b>Impact/Issue</b>	<b>Mitigation Measures</b>	<b>Location</b>	<b>Time Frame</b>	<b>Implementing Agency</b>	<b>Supervising Agency</b>
	<p>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</p> <p>All of the vehicles will be checked properly maintained to meet noise standard.</p> <p>Tree belt will be planted at departure and arrival areas to reduce noise impact.</p> <p>To reduce outside traffic noise impact on the hotel and office area, tree belt will be planted along the roads</p> <p>Tree belt will be planted along the roads.</p>				
4. Water					
Water pollution from sewage and garbage	<p>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). The pre-treated waste water will be finally discharge into Yuelu Waste Water Treatment Plant through the urban sewer network</p> <p>Oil traps will be maintained and monitored regularly.</p>	All service areas and toll gates	Throughout operation phase	IA	HEPB
5. Flora and Fauna	Maintenance of the planted vegetation and trees should be contracted to special people to ensure the plants survive.	Project area	Operation period	IA	Hunan forestry bureau, HEPB
6. Solid Waste	Strengthen supervision over the pollution 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.				

<b>Impact/Issue</b>	<b>Mitigation Measures</b>	<b>Location</b>	<b>Time Frame</b>	<b>Implementing Agency</b>	<b>Supervising Agency</b>
	Underground solid waste transfer station to be constructed at the southwest corner of the hub and cleaned at least twice in summer. All domestic waste will be transported to landfill.				
7. Monitoring and Inspection	Implement environmental monitoring program according to the monitoring program specified in EIA.  Semi-annually send monitoring and inspection report to HEPB and GEF to assess the needs of further mitigation measures	Project corridor	During construction and operation	CCE, IA, contracted supervisors, monitoring institutes	CMTB, HEPB, GEF

CCE = chief construction engineer, CITTC = Changsha Integrated Transport Terminal Construction and Investment Co. Ltd. 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, m = meter, ROW = right-of-way, STI = sexually transmitted infection

Source: Environmental impact assessment report and technical assistance consultants.

### 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 :

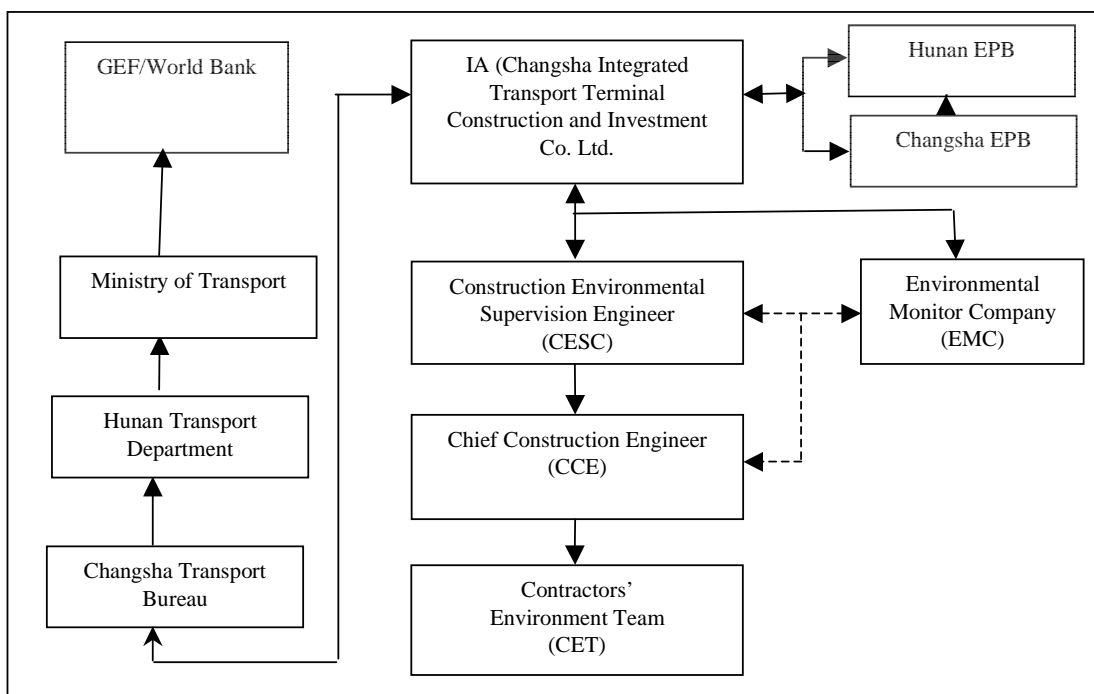


Figure 3-1 EMP Organization Chart for Construcion Phase

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**

Changsha Integrated Transport Terminal Construction and Investment Co. Ltd (CITTC) will be the Client or project owner has the ultimate responsibility for environmental performance of the project during both construction and operational phases. This is a day to day management organization for management of all aspects of project preparation and construction , as such, the CITTC 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 supervising 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 Engineer (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. EM 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-held 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 so 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 compliance 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	CMTB, HEPB
2	Environmental clauses contract and loan covenant	Confirm the clauses and specifications have been drawn and reviewed by environmental specialists	IA with assistance from Design Institute, environmental specialists	CMTB

3	Environmental Operation and Supervision Manual	Manual is prepared and reviewed	Environmental specialists on behalf of IA	CMTB
4	Complaint and Information Office	Confirm that Complaint and Information Office has been established with qualified staff	IA	CMTB
5	Environmental Protection Training Program	Confirm that training has been provided to staff members as designated	Environmental specialists or institutes on behalf of IA	CMTB
6	Removal of trees and landscaping	Confirm vegetation removal and replanting sketch plans have been submitted to local Forestry Department, and permit is received from Hunan Forestry Bureau	IA	Hunan Forestry Bureau
	Utility Relocation	See resettlement plan	IA	CMTB
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	CMTB/HEPB
2	Water pollution	Discharged into the Yuelu Sewage Treatment Plant	IA	CMTB/HEPB
3	Solid waste pollution	Develop solid waste collection management system, responsible by specially-assigned person	IA	CMTB/HEPB
4	Air Pollution	Spray water to reduce air pollution during construction, cover transport materials, and goods vehicles with canvas	IA	CMTB/HEPB
5	Noise	Construction at night is forbidden	IA	CMTB/HEPB
6	Resettlement	Develop a detailed resettlement plan	IA	CMTB/HEPB
C	Operation			
1	Water Pollution	Discharged into the Yuelu Sewage Treatment Plant	Environmental Protection Agency of Pilot District	HEPB
2	Noise	No horn when transport	Environmental	HEPB

		vehicles passing the sensitive point	Protection Agency of Pilot District	
3	Solid waste pollution	Set the waste container, collected by specially-assigned person in a timely manner	Environmental Protection Agency of Pilot District	HEPB

## **B. Environmental Quality monitoring**

In addition 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 Guangsha Xinyuan, Wangxing Jingyuan, Chengxi Appartment, Nan Jiatang and Wangxin Primary School.

### **Operation Phase**

(1) The logistics park environmental monitoring of sewage

Monitoring Items: water quality monitoring CODCr, BOD5, ammonia nitrogen, petroleum.

Monitoring Frequency: flat water and the dry season once for each.

Monitoring Location: Xiang River

(2). The environmental monitoring of noise

Monitoring parameters: Noise monitoring of the field noise boundary Leq (A).

Monitoring Frequency: once every three months during operation.

Monitoring Location: 5 sites around the Bus West Station.

### Environmental Inspection and Acceptance

According to the Stipulations for Inspection and Acceptance of Environmental Facilities for Construction Project, the owner should submit a request for inspection and acceptance of the environmental facilities such as wastewater treatment at the bus terminals and maintenance depot to the environmental authority, and subsequently prepare a monitoring plan needed by the inspection. After approved by the authority, the monitoring for acceptance will be executed with results ready for inspection. The basic information to be collected prior to the inspection includes EIA report, monitoring reports, and EMP implementation report. A checklist for inspection is provided in Table 4-2

**Table 4-2 Environmental Review on Project Completion**

Type	Polluter	Measures	Expected Effect
Construction			
Waste gas	Construction dust	Cleaning, vehicle washing facilities	Reach Comprehensive Emission Standard of Air Pollutants level 3
	Construction vehicles exhaust	Use unleaded gas, smoke and dust removal equipment	
Waste water	Concrete mixing water	Sedimentation tank → water recycling	Recycling
	Construction vehicle wash wastewater	Multi-stage sedimentation tank → water recycling	
		Oil slick → slick collector	
	Construction staff wastewater	Septic tanks → Yuelu sewage treatment plant	Reach Comprehensive Emission Standard of Air Pollutants level 3
Solid waste	Construction waste	Temporary Disposal Areas	Urban Construction Waste Management Regulations
	Garbage	Garbage collection station → Changsha garbage landfill plant	Garbage Landfill Control Standard
Noise	Excavation machinery, lifts	Rational arrangement of construction machinery operating time	Noise limits for construction site
	Construction noise	Civilized construction	
	Transportation vehicle noise	Set speed limits, no horn on sensitive section, maintain road	
Operation			
Waste gas	Automobile exhaust	Green belt, the use of unleaded gas	Reach Comprehensive Emission Standard of Air Pollutants level 3
	Food fumes	Natural gas, fume purifier, exhaust shaft	Reach Cooking Fume Emission Standard



Waste water	Wastewater	Septic tanks → Hexi Sewage Treatment Plant	Reach Comprehensive Emission Standard of Sewage level 3
	Restaurant wastewater, washing water, parking rain	Grease trap → Hexi Sewage Treatment Plant Oil slick - slick collector	
	Garbage	Garbage transfer station → Changsha Garbage Landfill Plant	Garbage Landfill Control Standard
	General merchandise waste		
Solid waste	Flushing water pump	Noise, vibration	Reach Social and Life Environmental Noise Emission Standard of Sewage level 3
	Life noise	Trees and shrubs should be planted and increase the planting density	
	Motor vehicle	Set speed limits, no horn on sensitive section, maintain road	

## **V.**

## **ENVIRONMENTAL 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 CITTC 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 transport hub operations will be provided the training. The training programs will be primarily provided by professional environmental staff or in local universities.

**Table A1.4 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	Contractors,	(i) Responsibility and duties	1	2	5	30



Strengthening activities	Agencies	Strengthening plans	Timing			
implementation	IA	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.				
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 maintenance	IA	(i) Operation and maintenance of environmental installations, (ii) Safety operation regulations, (iii) Equipment management and emergency response procedures	1	1	2	10
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 1.7: 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	Comments on resettlement, improvement of living	Persons affected by resettlement and relocation

		plan	conditions, livelihoods, and poverty reduction; comments and suggestions	
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 workshop or press conference	As needed, based on public consultation	Comments and suggestions on operational impacts, public opinions	Experts of various sectors, media

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

**Table A1.8: Reporting Plan**

<b>Report</b>		<b>From</b>	<b>To</b>	<b>Frequency of Reporting</b>
<b>Construction</b>				
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
<b>Test Operation</b>				
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
<b>Operation</b>				
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

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

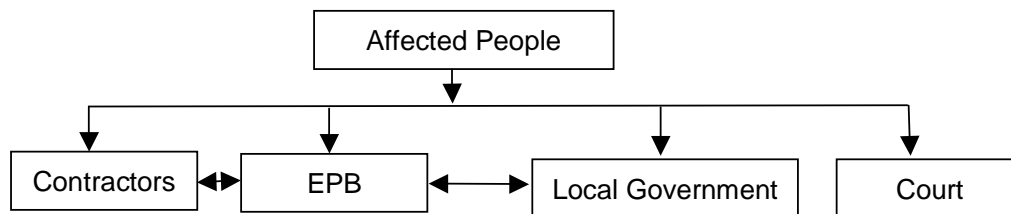
## VII.

## GRIEVANCE REDRESS MECHANISM

The affected people are all the time encouraged to participate in preparation and implementation of the EIA and EMP. However, problems, more or less, will occur in the course of the actual works and road operation. In order to solve the problems timely and effectively and guarantee the project construction to be carried out smoothly, an open and effective appeal channel is specially established for the local people in addition to the existing channel of petitions in the form of letters and visits long established by the local governments.

### A. Current Practice

In current system, when people are suffered by the Project, they can appeal to contractors, Public Complain Center of local government, Local EPB or court. Among the agencies involved, local EPB takes the leading coordination role in dealing with environmental complaints.

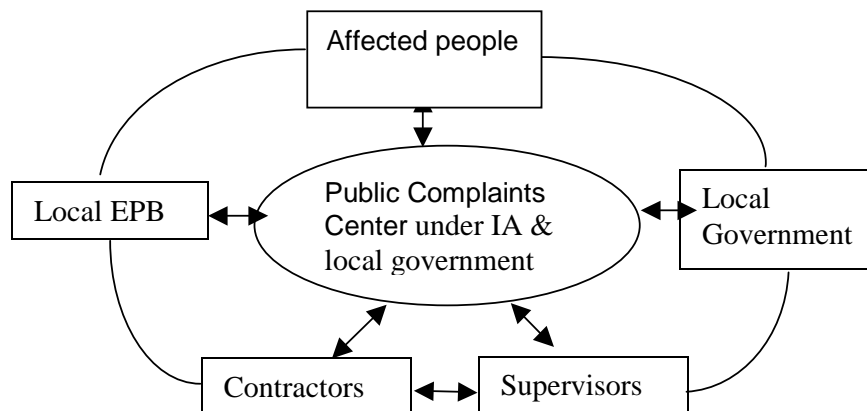


Currently, the affected people complain to the contractors, IA, local government, or local environmental protection bureau before they finally appeal to the court. In case of problems during the construction, they usually complain to the contractors first if they believe the construction is the source of issues. If the contractors' responses are unsatisfactory, they sometimes go to local government. However, for the local government it is difficult to figure out the real situation on the site because the local governments usually have no project information. If they go to the local EPB, the EPB will first record complains from the affected people side, and then goes to the site to listen to the explanation from the contractors' side. Sometimes the two sides might tell different story and each sticks to his own argument. In such case, the EPB

need to consult with the IA or environmental supervision engineer to acquire the project information. Such kind of fact finding or site investigation will take time. Therefore, it is suggest that the IA who is familiar with the project taking the leading coordination role.

## **B. Proposed Grievance Redress System**

In consultation with the project the IA, it is agreed that the IA will, together with local government, establish a Project Public Complaints Center (PPCC). The PPCC's phone number, fax, address, email address will be informed to the people through a notice board at the village head quarter. Any issue occurs, people will call to the respective PPCC and it will handle until the issues are solved. The PPCC will instruct contractors and construction supervisors if people complain about project. If necessary, it will coordinate with local government or EPB. The system is as following fig.



The affect people can appeal on any respect of the environmental issue. The organs should accept and handle the appeals free of charge and all the expenses incurred there from should be paid from the contingency cost of the project. Small issues should be solved within one week and bigger issues should be solved within one month.

## **C. Responsibilities of Construction Environmental Supervision Engineer**

Complaints will be referred to the Construction Environmental Supervision Engineer for carrying out complaint investigation procedures. The CESE will undertake the following procedures upon receipt of complaint:

- f) log complaint and date of receipt onto the complaint database and inform the CCE immediately ;

- g) investigate the complaint to determine its validity, and to assess whether the source of the problem is due to works activities;
- h) if a complaint is valid and due to works, identify mitigation measures;
- i) if mitigation measures are required, advise the Contractor(s) accordingly;
- j) review the Contractor's response on the identified mitigation measures, and the updated situation;
- k) 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;
- l) undertake additional monitoring and verify the situation if necessary as well as review that any valid reason for complaint does not recur;
- m) 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
- n) 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).

**VIII.****COST ESTIMATE**

The cost estimated for environment management covers cost for environmental facilities, environmental monitoring, supervision and training.

**Table: 8-1 Environmental Budget**

<b>Item</b>	<b>Environmental Protection Facilities</b>	<b>Cost (CNY10,000)</b>
Sewage treatment measures	sedimentation tanks, grease traps, septic tanks, fire pond	1000
	Construction of drainage and backwater	30
dust treatment measures	Canopy, water spray, wheel washing equipment, site hardening、	20
Water loss and soil erosion measures	Soil shield, construction revetment	15
Air pollution prevention measures	soot purifier, exhaust shaft residential buildings, bus and coach parking building fan	50
Noise treatment	shock pads, silencer, muffler	15
solid waste disposal measures	Muck disposal, waste separation site construction	500
greening	Planting and transplanting trees to increase the green coverage to 18.9%	800
Environmental monitoring		30
Environmental Supervision and semi-annual report preparation		30
Environmental Training		10
total		2,500

