



Environmental Monitoring Report

Project Number: 39321-013
2014

PRC: Shaanxi Qinling Biodiversity Conservation and Demonstration Project

Prepared by: Shaanxi Provincial Project Management Office

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Asian Development Bank

Shaanxi Qinling Biodiversity Conservation and Demonstration Project

ENVIRONMENTAL MONITORING REPORT

2014

1. INTRODUCTION

Although the implementation of the project started in 2010, the progress was significantly slow due to a number of reasons. To address these issues, Shaanxi Provincial Government (SPG) has made some adjustment/changes in the project implementing arrangements and project scope. Asian Development Bank (ADB) has agreed the changes through the Mid-Term Review in 2014.

Change in Implementing Arrangements

Since the inception of the project in 2010, a Provincial Project Management Office (PPMO) under Shaanxi Development and Reform Commission (SDRC) has been overseeing the project implementation and coordinates project management matters on behalf of SPG. The Project Implementation Agencies (PIAs) include Qinling National Botanical Garden (QNBG) and Shaanxi Wild Animal Rescue Center (SARC). To strengthen the project management, SPG decided to setup a project management office under Shaanxi Forestry Department (FPMO) to be responsible for daily project administration. In this regard, procurement, contract management, monitoring and reporting will be handled by FPMO in the remaining project period while PPMO will coordinate overall project management and related communication with ADB. As a result of allocation of the functions, it was agreed that PPMO would be the project executing office (PEO) to be in consistent with PDRC role of the executing agency according to the loan and project agreements.

Change in Project Scope

QNBG component: (a) Convert the planned paleontology museum into a herbarium to improve QNBG's presentation quality of Qinling flora and fauna resources. The construction space of the herbarium building will be reduced from 6,000 m² to 3,000 m² and will include a space of about 300 m² for public education and awareness. (b) Relocate the construction sites of herbarium and greenhouse from east part to west part within the ex-situ area. (c) Reduce the scale of restoration of historic building from 10,119 m² to 4,500 m².

SARC component: Due to adjustments of the government land use plan, originally planned satellite breeding areas for Golden Monkey and Red Crested Ibis, animal exhibition and rescue districts will have to be relocated into a concentrated district together with Giant Panda breeding and enclosure area. Functions and standards for these facilities will not be changed; rather they will be enhanced to some extent.

It benefited from the Mid-Term Review in Aug, 2014, the project management including environmental management has been strengthened. This report summarized the current status of environmental management plan (EMP) implementation and provided suggestions and recommendations for the next six month.

2. IMPLEMENTATION STATUS of EMP

Updated Environmental Management Plan

To reflect the changes in project management, project scope and to accommodate to the increasingly rigorous environmental regulations, the EMP which was developed during the project preparation in 2007 has been updated and submitted to ADB for review. The updated EMP (see attachment 1) established the environmental management organizational structure and responsibilities, proposed a number of measures to mitigate environmental and social impacts during the construction and operation of the proposed project, identified a set of environmental monitoring activities, developed a capacity building and training plan, estimated the budget to implement activities under the EMP to ensure achievement of the project's environmental objectives.

Internal Environmental Management Monitoring

With the strengthening of project management, the two PIAs, QNBG and SARC, have appointed designated staff to be responsible for their routine environmental management during project implementation. The two PIAs have adopted an internal environmental management monitoring mechanism. The requirements specified in the EMP are implementing in their routine project management and environmental management monitoring has been reported to the PEO at a semi-annual basis. Some of the findings are summarized as following:

QNBG Component

- Bidding and Purchasing

In the selection of service provider including design and construction, the adequate qualifications were required and environmental consideration was included. The design and technology used for the project must be feasible and apply to the present code.

Although the major plantation has not started yet, introduction of nursery stock is guided by the management system. The nursery stock has to pass quarantine inspection for any potential invasion, plant diseases and insect pests. Integrated pest management (IPM) is adopted. Low toxicity and easy degradable pesticides, such as imidacloprid, fenbutatin, pyridaben and triazolone, are recommended when it is applicable.

- Botanic Research Center Project

Construction of Botanic Research Center has started. The current construction activity is foundation excavation. Mitigation measures included: environmental training to the construction workers; dust control by hardening and sprinkling access roads, covering spoil soil and washing construction vehicles. The onsite inspection is regularly conducted and recorded.

- Road Construction Projects

Road construction is the main construction activities so far in the ex-situ area. The total length is 14.685 km. In a long run, the local environment and ecosystem will be benefit from the construction of road and its associated facilities although some issues were identified during the previous onsite inspection. Fortunately, the negative impact during construction is temporary and some of them have been addressed properly. The following four photos show the ditches, pipes and revetments under construction will prevent or mitigate soil erosion caused by rain falls.





However, some poor design or construction was found which need further improvement.

<p>TanChiRoad: K3+426 Bad design/construction need to be fixed</p>	<p>QinXia Road,West:K1+177.5 Improved drainage needed</p>
<p>TongCaiRoad:K1+420-K1+580 Soft soil – drainage system needed</p>	<p>WuTai Road:K2+576-K2+600 Potential landslide – revetment needed</p>

SARC Component

Due to the issue of land replacement, there is no physical progress in project implementation in the SARC component.

3. RECOMMENDATIONS

Some of the recommendations have been integrated in the updated EMP which has been submitted to ADB for review. Here, restate them to emphasize their importance:

- A due diligence for water management in QNBG need to be conducted to assess (i) water availability in terms of quantity and quality, (ii) water balance (income = consumption +recycling + discharge),and (iii) treatment and discharge in the ex-situ district. This has been requested in the previous monitoring report; however, the PIA did not provide an adequate report.
- Amendment of the environmental impact assessment (EIA) report and approval from domestic environmental authority is needed to reflect the change in sub-components' construction site. Considering the new construction sites are still in the previous EIA area, the amendment of EIA may be minor. But the confirmation from the environmental authority is needed.
- Develop criteria, including environmental criteria, for selecting private sector partners for building and operating the cable way, Daoist temple and historical buildings/sites, as well as recreation development in the west district.
- In addition, according to the MOU of MTR, the two PIAs need to establish a sound environment management system for all operational activities, which should be integrated into an environmental management operational manual for each of the two PIAs. The environmental management operational manual needs to be available before the projects come into operation.

Attachment 1:

ENVIRONMENTAL MANAGEMENT PLAN

Shaanxi Qinling Biodiversity Conservation and Demonstration Project
Loan 2572/GEF 0169 – PRC

SHAANXI PROVINCIAL PROJECT MANAGEMENT OFFICE

Xian, China

February 3, 2015

ABBREVIATIONS

ADB	–	Asian Development Bank
EA	–	Executing Agency
EIA	–	Environmental Impact Assessment
SEPB	–	Shaanxi Environmental Protection Bureau
FPO	–	Shaanxi Forestry Department Project Management Office
GEF	–	Global Environment Facility (of UNEP)
IEE	–	Initial Environmental Examination
IA	–	Implementing Agency
PAA	–	Project Affected Area
PDO	–	Project Development Objective
PDRC	–	Provincial Development Reform Commission
PEO	–	Project Executing Office
PMO	–	Project Management Office
PPMO	–	Provincial Project Management Office
PRC	–	People's Republic of China
QNBG	–	Qinling National Botanical Garden
SARC	–	Shaanxi Animal Rescue (Zoological) Center
SEPD	–	Shaanxi Environmental Protection Department
SFD	–	Shaanxi Forestry Department
SPG	–	Shaanxi Provincial Government
SPDRC	–	Shaanxi Provincial Development Reform Commission
TA	–	Technical Assistance
XEPB	–	Xian Environment Protection Bureau
ZEPB	–	Zhouzhi Environment Protection Bureau

Environmental Monitoring Parameters

BOD₅ - biochemical oxygen demand

CODCr - chemical oxygen demand

DO - dissolved oxygen

NH₃-N - ammonia

O&G - oil and grease

SO₂ - sulfur dioxide

NO₂ - nitrogen dioxide

PM₁₀ - fine particulate matter

LAeq - the equivalent continuous sound level

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Environmental Management Plan

Background

The Shaanxi Provincial Government (SPG), People's Republic of China (PRC) is implementing the Shaanxi Qinling Biodiversity Conservation and Demonstration Project with Asian Development Bank (ADB) loan in the amount of \$40.0 million and a grant of Global Environment Facility (GEF) in the amount of \$4.27 million (Loan 2572/ GEF 0169). The project was approved by ADB on October 22, 2009 and became effective on October 15, 2010.

The project development objective (PDO) is improved and integrated biodiversity management that provides sustainable livelihoods for the population of the project area demonstrated to other regions of the Qinling Mountains. The expected Project Outputs includes:

- Participatory Biodiversity Management in the Mountainous Area
 - Demonstrating conservation of biodiversity
 - Improved village and forest-based livelihoods
- Enhanced Biodiversity Conservation in the Plains Area
 - Develop the national botanical garden
 - Improve the animal rescue center
- Improved Project Management
 - Strengthened project management office (PMO) and implementing agencies (IAs)
 - Strengthened biodiversity safeguards
 - Conservation dissemination program

An environmental impact assessment (EIA) report was prepared by Xi'an University of Architecture and Technology (XUAT) during the project preparation and the EIA has been approved by Shaanxi Environmental Protection Bureau (SEPB) in 2007. With the ADB Technical Assistance (TA 4721-PRC), an Initial Environmental Examination (IEE) was prepared for the project and includes an Environmental Management Plan (EMP). The aim of the EMP is to ensure that potential environmental impacts caused during project construction and operation are avoided, minimized, and/or mitigated.

However, many changes have taken place since the inception of the project, including the project implementing arrangements and project scope. Specifically,

Change in Implementing Arrangements

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Agencies (PIAs) include Qinling National Botanical Garden (QNBG) and Shaanxi Wild Animal Rescue Center (SARC). To strengthen the project management, SPG decided to setup a project management office under Shaanxi Forestry Department (FPMO) to be responsible for daily project administration. In this regard, procurement, contract management, monitoring and reporting will be handled by FPMO in the remaining project period while PPMO will coordinate overall project management and related communication with ADB. As result of allocation of the functions, it was agreed that PPMO would be the project executing office (PEO) to be in consistent with PDRC role of the executing agency according to the loan and project agreements.

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To address the above changes and accommodate to the increasingly rigorous environmental regulations, an updated EMP is very necessary to ensure sound environmental measures are carried out through the project construction and operation. This EMP established the environmental management organizational structure and responsibilities, proposed a number of measures to mitigate environmental and social impacts during the construction and operation of the proposed project, identified a set of environmental monitoring activities, developed a capacity building and training plan, estimated the budget to implement activities under the EMP to ensure achievement of the project's environmental objectives.

Management Organization and Responsibilities

Environmental management of the proposed project includes two parts, internal and external, throughout two stages, i.e., construction stage and operational stage. The PEO, as the project provincial level executive agency, and the FPMO as the leading implementing agency, are responsible for overall environmental management during construction to ensure the national environmental regulations such as EIA, and the ADB safeguard policy are followed. Internal environmental management involves three parties, i.e. project owner, supervision institutes including engineering supervision and environmental monitoring, and contractors. The FPMO through the two PIAs is responsible for implementing the EMP by choosing adequate technical service, contractor with environmental consideration, embodying relative environmental clauses in the bidding/contract documents, providing the contractors with necessary environmental training, and conducting regular internal monitoring. Consultant institutions, including EIA, design and environmental monitoring should provide the PIAs with timely professional services in regarding environmental issues. The contractors are crucial for implementation of various environmental protection and mitigation

measures specified in the EMP. Meanwhile, the proposed project accepts supervision and inspection of provincial and municipal environmental authorities, including Zhouzhi Environment Protection Bureau (ZEPB), as well as inspection missions from ADB. Environmental management during construction stage is illustrated in Figure 1.

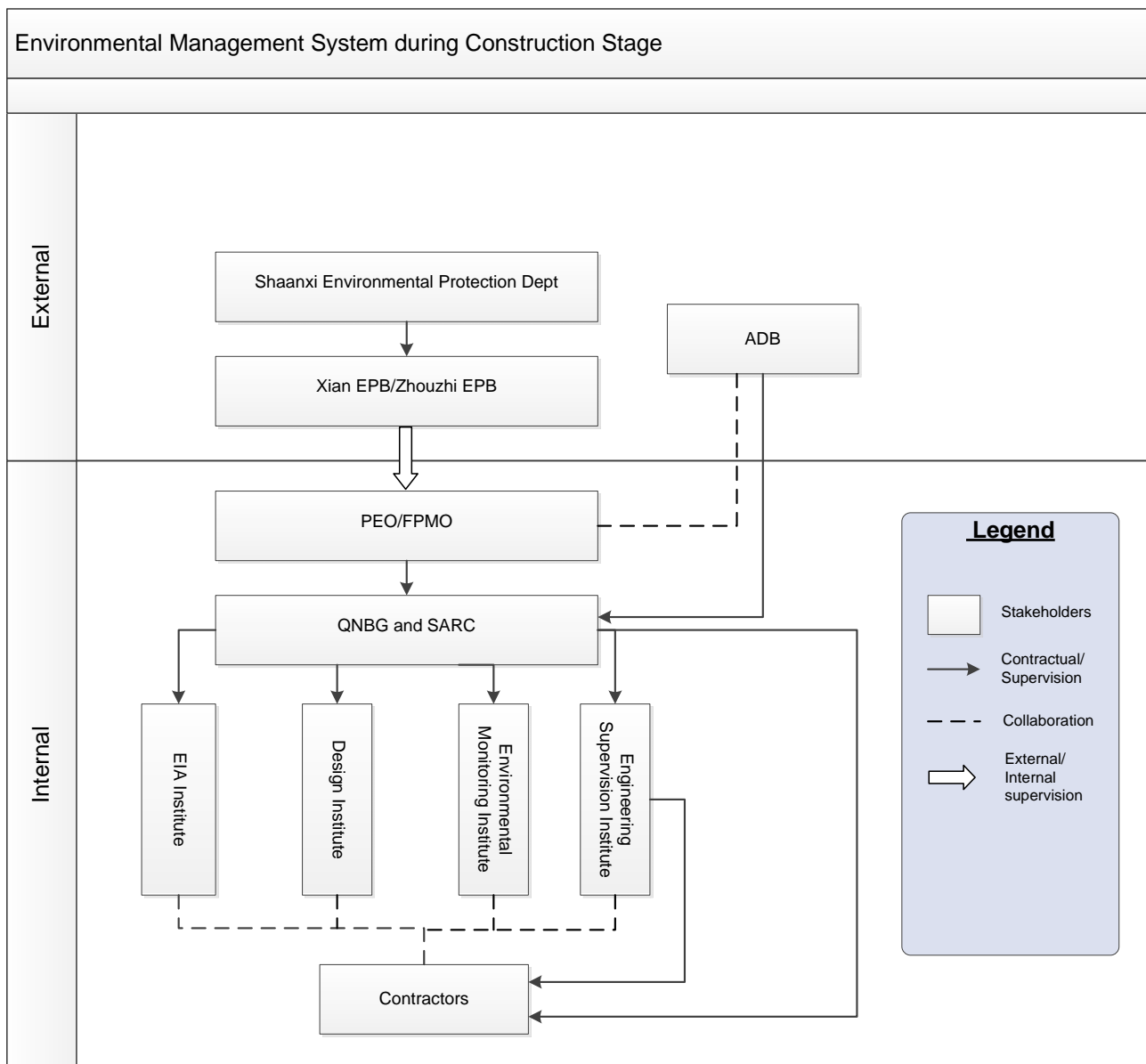


Figure 1. Environmental management system during construction stage

The two PIAs/owners will carry over its responsibilities in environmental management during operational stage. The main responsibilities include developing and implementing environmental management operational manual; maintenance of environmental facilities such sewage/wastewater treatment to ensure waste generated from the operation is treated and discharged in line with the national emission standard; regulating the visitor population to accommodate to the capacity of the facilities; conducting public environmental awareness and providing a safe and comfort environment. Environmental management structure during operation is illustrated in Figure 2.

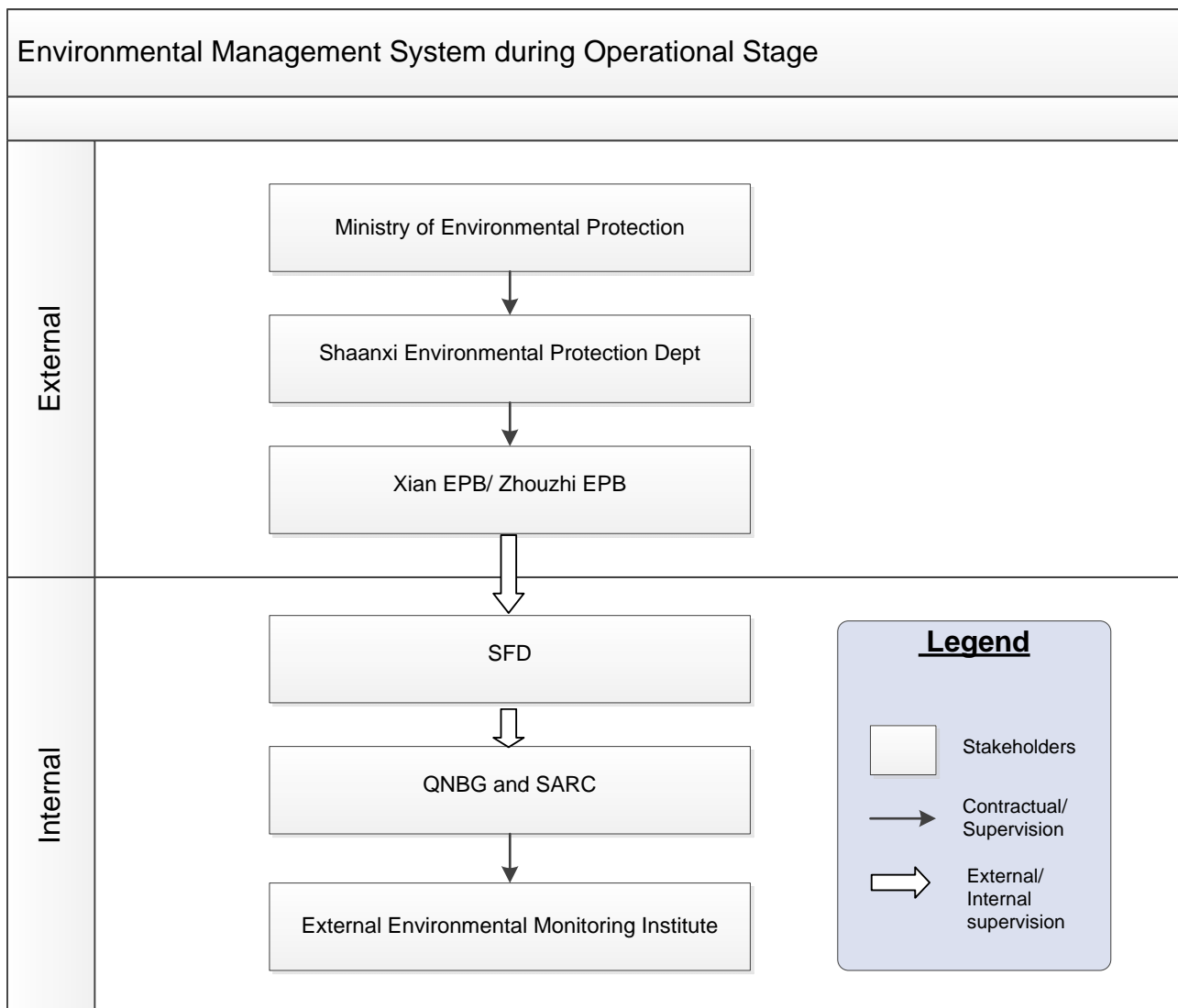


Figure 2. Environmental management system during operational stage

Mitigation Measures

The EMP addresses all issues identified in the EIA, and includes a detailed description of all activities, and institutional responsibilities for implementation. The mitigation measures are divided in two categories, i.e., generic mitigation measures and site specific mitigation measures. The former are mainly those measures of good management practice for pollution prevention and impact mitigation, which need to be followed by the construction companies and construction workers in a daily basis. However, site specific mitigation measures are the measures applying to specific sites for better environmental management or for mitigating negative environmental impact. Most mitigation measures and cost have already been considered in project design. The mitigation measures are summarized in Table 1-3.

Table 1. Common Mitigation Measures in Construction Stage

Environmental Concern	Mitigation Measures	Implementing Agencies	Supervision Agencies
Ecosystem			
invasion of exotic species	<ul style="list-style-type: none"> • Pre-assessment of the candidate species. • Adequate measures to retain them in the ex-situ area. 	QNBG	FPMO/PEO
flora	<ul style="list-style-type: none"> • Take all the measures to minimize damage or disruption to vegetation. • Illegal fuel wood collection is forbidden and adequate camp and cooking facilities for the construction worker will be provided. • Temporary occupied areas will be replanted after construction. • Environmental training to the contractors • Access to the project area will be guarded to limit potential overgrazing and forest fire. 	QNBR/SARC	FPMO/PEO
Fauna	<ul style="list-style-type: none"> • Environmental awareness education including penalties for illegal poaching and hunting. • Shorten and minimize construction activities to reduce disturbing the habitat of terrestrial animals immediately adjacent to the project site. 	QNBR/SARC	FPMO/PEO
Soil and soil erosion	<ul style="list-style-type: none"> • Optimize work schedule, especially excavation related work, to minimize the exposure time and avoid rain season. • Construct sediment trap and storm-water diversion along the access roads to collect and slow down runoff. • Build revetment where applicable to prevent potential landslide. • Strip and store topsoil where applicable for restoration afterwards. • Recover construction sites by planting shrubs and grass. 	QNBR/SARC	FPMO/PEO
Water			
Water Resources	<ul style="list-style-type: none"> • Protect water resources in the project area by all means. • Optimize water intake at Tianyu River to minimize any potential impact. 	QNBR/SARC	FPMO/PEO

	<ul style="list-style-type: none"> Control the water flow to minimize water consumption. 		
Wastewater	<ul style="list-style-type: none"> Sewage generated from the construction camps will be collected by mobile toilets and transferred to the temporary septic tank and treated to national standards and used for watering forestland on site. Wastewater generated from construction sites will be treated by sedimentation and neutralization in a treatment tank. The treated clean water will be reused. Direct discharge of sewage/wastewater to surface water bodies is forbidden. 	QNBR/SARC	FPMO/PEO
Air Quality			
Dust Control	<ul style="list-style-type: none"> Locate construction material in downstream area close to the construction site and be covered. Use commercial concrete rather than on site preparation if applicable. Covered transport truck, road compaction and water spraying are requested for controlling traffic dust. 	QNBR/SARC	FPMO/PEO
Emission Control	<ul style="list-style-type: none"> Construction vehicles and machineries must be properly maintained and their emission must be in line with the national emission standard. 	QNBR/SARC	FPMO/PEO
Noise			
	<ul style="list-style-type: none"> Use low-noise construction machinery. No construction activities are allowed within 200 m of residential area during night. Personal protective equipment (PPE) is required for the construction workers who work with high noise machinery. 	QNBR/SARC	FPMO/PEO
Solid Waste and Hazardous Materials			
	<ul style="list-style-type: none"> Domestic waste and hazardous waste will be collected in designated areas with anti-leakage measures and then will be transferred to the garbage disposal areas of Zhouzhi county that has hygienic and safety measures. Construction waste will be disposed in the project designated disposal sites. 	QNBR/SARC	FPMO/PEO

Table 2. Site Specific Mitigation Measures in Construction Stage

Environmental Concern	Mitigation Measures	Implementing Agencies	Supervision Agencies
Water management in QBNG	<ul style="list-style-type: none"> A due diligence for water management in QBNG need to be conducted to assess (i) water availability in terms of quantity and quality, (ii) water balance (income = consumption +recycling + discharge),and (iii) treatment and discharge in the ex-situ district. 	QBNG/FPMO	PPMO/ADB
Environmental considerations in partners selection	<ul style="list-style-type: none"> Develop criteria, including environmental criteria, for selecting private sector partners for building and operating the cable way, Daoist temple and historical buildings/sites, as well as recreation development in the west district. 	QBNG/FPMO	PPMO/ADB
Change in construction site	<ul style="list-style-type: none"> Amendment of the environmental impact assessment (EIA) report and approval from domestic environmental authority is needed to reflect the change in sub-components' construction site. 	SARC/FPMO	PPMO/ADB

Table 3. Mitigation Measures in Operational Stage

Environmental Concern	Mitigation Measures	Implementing Agencies	Supervision Agencies
Environmental Management during Operation	<ul style="list-style-type: none"> An integrated environmental management operational manual will be developed and followed by QBNG and SARC respectively. 	QBNG SARC	SFD
Sewage/wastewater treatment	<ul style="list-style-type: none"> Septic tank and treatment facilities will be built. The facilities will be properly maintained and be functional. Emission of effluent will be monitored at a regular basis. 	QBNG SARC	SFD/ZEPB
Solid waste disposal	<ul style="list-style-type: none"> Domestic waste will be collected separately and stored in a depot in Dianzhen, and it will be transferred to and treated (including recycle, reuse) in a designated site by the municipal sanitation authority. Biosolid from septic tank and the animal breeding area will be composted and applied to the forestland on site. 	QBNG SARC	SFD/ZEPB
Disturbance to the ecosystem	<ul style="list-style-type: none"> Integrated environmental management plan, Controlled access and visiting population Environmental awareness education. 	QBNG SARC	SFD/ZEPB
Public Awareness	<ul style="list-style-type: none"> Visitor information center established and equipped. Public education material (videos, brochures, tour guiding) developed and be available to the visitors Safety and warning signs are installed. 	QBNG SARC	SFD

Monitoring of EMP Implementation

The two PIAs should have designated staff to be responsible for the implementation of the EMP, and report the implementation status to FPMO, PEO, local EPBs and ADB at a semiannual basis. The project impact to natural environment will be monitored by environmental quality monitoring program. Monitoring program is summarized Table 4. The external environmental monitoring will be conducted by certificated environmental monitoring institutions.

Table 4. Environment Quality Monitoring Program

	Environmental Media	Location	Parameters	Frequency	Implementing Agency	Supervision Agency
Construction Phase	Air	QNBG (DianZhen, JinNiuPing) SARC	SO ₂ , NO ₂ , PM ₁₀	2 times/year	ZEMS	ZEPB
	Surface Water	Jiulongcun Tianyukou	pH, NH ₃ -N, DO, BOD ₅ , CODCr, O&G, coliform bacteria and suspended solids	2 times/year	ZEMS	ZEPB
	Noise	Construction site boundaries and sensitive sites (including residential areas)	LAeq	1 time/month	ZEMS	ZEPB
Operation and Maintenance Phase	Air	QNBG (DianZhen, JinNiuPing) SARC	SO ₂ , NO ₂ , PM ₁₀	2 times/year	ZEMS	ZEPB
	Surface Water	Jiulongcun Tianyukou	pH, NH ₃ -N, DO, BOD ₅ , CODCr, O&G and coliform bacteria	2 times/year	ZEMS	ZEPB
	Groundwater	QNBG SARC	Drinking Water Standard	2 times/year	ZEMS	ZEPB
	Effluent from WTP	QNBG SARC	pH, NH ₃ -N, DO, BOD ₅ , CODCr, O&G and coliform bacteria	4 times/year	ZEMS	ZEPB
	Noise	QNBG SARC	LAeq	4 times/year	ZEMS	ZEPB

Source: Xi'an University of Architecture and Technology, May 2007, Environmental Impact Assessment Report: Qinling National Botanical Garden (Ex-situ Area) Project and Shaanxi Animal Rescue Center Expansion Project.

Capacity Building and Training

To ensure effective implementation of the EMP, environmental training will be provided to staff involved in the project management, engineering supervision, and construction workers. Training program is summarized in Table 5. The training during construction phase will be conducted before commencement of the construction and focus on: (1) national and local regulations on environmental protection; (2) good management practice related to minimize environmental impact; (3) related requirements of environment, health and, safety (EHS); and (4) environmental mitigation measures included in the EMP.

Table 5. Environmental training during construction

Organizer	Participants	Training	Frequency	Cost
QNBG/SARC	Project management personal Contractor managers foremen	<ul style="list-style-type: none"> National and local regulations on environmental protection. Good management practice. Related requirements of environment, health and, safety (EHS). Environmental mitigation measures included in the EMP 	10 people every contract for a half day	3,000RMB/training Total of 24 contracts
Total				72,000 RMB

Budget Estimates

A total of 272,000 RMB is needed for implementing the EMP and other related environmental activities. The breakdown is listed in Table 6.

Table 6. Budget Estimation

Item	Budget Estimation	Budget in total, RMB
Implementation of mitigation measures	Included in contract	-
Environmental Quality Monitoring	100,000 RMB/year for 2 years	200,000
Environmental Training	3,000 RMB/contract for 24 contracts	72,000
Total		272,000