Gansu Cultural and Natural Heritage Protection and Development Project

Consolidated

Environmental Assessment &

Environmental Management Plan

Volume I

World Bank Financed Gansu Cultural and Natural Heritage Protection and Development
Project Management Office
July 20, 2007

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INTRODUCTION

This is the Environmental Assessment and Environmental Management Plan (hereafter referred to as 'EA') of the proposed China: Gansu Cultural and Natural Heritage Protection and Development Project (USD 79.4 million, 2008-2013), hereafter referred to as 'the project'. The project will finance a series of priority investments at key cultural and natural tourism sites in Gansu Province, in addition to the institutional strengthening and training for tourism management in Gansu.

BACKGROUND

Gansu Province, with its capital Lanzhou and a total population of 26 million, is located in north-western China. The economy has traditionally been based on agricultural production, mining of the province's abundant mineral reserves, and heavy industrial development. Poor infrastructure and Gansu's distance from the coast, has largely kept Gansu isolated from the rapid development experienced by other provinces in China in the last two decades. As a result, Gansu is the second poorest province in China, measured by per-capita GDP. Moreover, the province contains some of the country's poorest communities, as listed on the Government's national poverty register.

A major element of the poverty alleviation and economic restructuring strategy of the Gansu Provincial Government (GPG) is the development of a sustainable tourism industry. Significant portions of the ancient Silk Road, the westernmost portions of the Great Wall, early settlements of the Yellow River basin, portions of the Gobi Desert, the Qilian Mountain range, the Hexi Corridor and numerous important oases, wetlands and rivers are located in Gansu, endowing the province with a rich cultural and natural heritage. The global significance of these sites has been recognized, and some have achieved World Heritage status. In partnership with neighbouring provinces, Gansu Province is preparing an application for the Silk Road to be listed as a UNESCO World Cultural Heritage Route.

Despite Gansu's rich heritage, the tourism sector contributes only 3% of provincial GDP, Gansu attracts only 1 in every 176 of China's international tourists, and 1 in every 113 domestic tourists, and the expenditure of domestic and international tourists in Gansu is significantly below the national average. Improving the contribution of tourism to Gansu's economy provides an opportunity alleviating poverty and stimulates economic development at local levels through the multiplier effect of increased products and services to the tourism sector, and employment of unskilled or semi-skilled workers. It is noteworthy that Gansu's heritage sites are dispersed evenly around the province, including in Gansu's poorer areas.

The project will reduce several significant barriers that restrict the sustainable development of Gansu's tourism potential, through support to the sustainable development of the tourism potential at nine key sites, and improved destination management, institutional strengthening at the provincial and local levels, and improved planning, tourism segmentation and marketing.

GPG intends to use this project as a demonstration of good practice in tourism development, and to focus attention during the project on developing a suitable methodology for tourism and economic development at heritage sites, that could be applied elsewhere in the province and in China.

OBJECTIVES

This EA has the following objectives:

- To identify the potential environmental impacts of the proposed Gansu Cultural and Natural Heritage Protection and Development Project;
- To propose practical mitigation measures to avoid, manage or mitigate the environmental impacts of the project, including through the preparation of an environmental management plan (EMP) for each tourism site;
- To set out a 'framework' of procedures to be applied during project implementation for the environmental assessment and management of the potential impacts of investments that are yet to be identified; and
- To identify the training and capacity building measures that are required for the effective implementation of the environmental management framework, and individual site EMPs.

The third and final objectives address the content of an environmental management framework. The probability that investments that are yet to be identified, either at the nine key sites or at additional sites, although low, calls for a 'framework' approach to the identification and management of environmental impacts.

BACKGROUND

Classification of the Project

The project will finance temporary construction activities that have potential environmental impacts, and it will result in increased visitor numbers and ongoing site management that have potential long-term impacts. If investments are not properly planned and managed, they could lead to the irreversible degradation of the cultural and natural resources of each site. The World Bank task team accordingly proposed that the project is assigned Category A (Full Assessment) under OP/BP 4.01, and this as endorsed by a safeguards review meeting held on 18th January 2006.

Preparation of the EA

This EA was prepared by the College of Earth and Environmental Sciences at Lanzhou University, under contract to GPG. The framework is partly based environmental impact assessment reports or environmental management plans for each tourism site supported by the project, prepared by the following organisations, also under contract to GPG. The reports were prepared between the dates of 20th November 2006 and 20th April 2007.

Environment Impact Assessment Reports:

- The consolidated EIA-Lanzhou University
- EIA/EMP for roads and infrastructure in Dunhuang Yardang National Geological Park- Lanzhou Coal Mining Design & Research Institute
- EIA for Suoyang Ancient City- Gansu Academy of Environmental Sciences(GAES)
- EIA for Jiayuguan Great Wall site-Lanzhou University
- EIA/EMP for Wei Jin Folk Culture Park-Lanzhou University
- EIA for Maijishan Scenic Area- GAES with Tianshui Environmental Research Institute
- EIA for Qingcheng Ancient Town- GAES
- EIA for Mati Temple Scenic Park- Northwest Research Institute of Mining and Metallurgy(NRIMM)
- EIA for Yellow River Stone Forest National Park- NRIMM
- EIA for Lutusi Ancient Government Centre- Northwest Institute of EIA & Engineering Center of Railway Ministry

Environmental Management Plans:

- The consolidated EMP-Lanzhou University
- EMP for Jiayuguan Great Wall site-Lanzhou University
- EMP for Maijishan Scenic Area-Maijishan PMO
- EMP for Mati Temple Scenic Park- NRIMM
- EMP for Lutusi Ancient Government Centre- Northwest Institute of EIA & Engineering Center of Railway Ministry

Methodology of the Environmental Assessment

The organisations above prepared EIA and EMP reports for individual sites according to the requirements of Chinese environmental regulations, in addition to the requirements of World Bank safeguard policies. Activities that they carried out included:

- Familiarisation with background documentation;
- Site investigation to determine potential impacts;
- Stakeholder consultation and discussion with key informants at each site;
- Further detailed site investigations and measurements, as necessary;
- Analysis of information, and preparation of an EIA or EMP report; and
- Disclosure of the reports in Mandarin at public venues and through public media in Lanzhou.

Lanzhou University prepared this EA on the basis of the individual site EIA / EMP reports, their further quality control of the individual EIA / EMPs and their analysis of the wider, strategic impact of the project. The activities that they carried out included:

- Familiarisation with background documentation;
- Stakeholder consultation and discussion with key informants at the provincial level;

- Further site investigations, to fill gaps in or add further information to the individual site EIA / EMP reports as necessary;
- Analysis of the overall impact, and of the requirements of the environmental management framework for the project;
- Preparation of an EIA or EMP report; and
- Disclosure of this EA report in English at the national and international levels.

LAYOUT OF THIS REPORT

The report consists of three volumes as follows.

VOLUME I:

- Chapter 1 – Introduction (this chapter);
- Chapter 2 – Description of the Proposed Project;
- Chapter 3 – Policy and Legislative Context;
- Chapter 4 – Baseline Conditions;
- Chapter 5 –Cultural and Natural Heritage
- Chapter 6 – Planning and Assessment of Alternatives
- Chapter 7 –Predicted Impacts;
- Chapter 8 – Consultation and Disclosure;
- Chapter 9 – Environmental Management Plan.

VOLUME II: EIA reports in tabular format for each site.

VOLUME III:

- *Annex A* - Maps of the Investment Plans at Each Site;
- *Annex B* – Further Details of the Environmental Baseline at each Site;
- *Annex C* – Inventory of Physical Heritage Resources at each Site;
- *Annex D* – Examples of Reviews of Heritage Site Plans
- *Annex E* – Yinyue Lake Dam Safety Review Report
- *Annex F* – Xianren Lake Dam Site Visit Report
- *Annex G* - Sample Archaeological Chance-finds Policy;
- *Annex H* – Template Construction Management Plan;
- *Annex I* – Template Site Environmental Policy.
- *Annex J* – Work Team of the Report

DESCRIPTION OF THE PROPOSED PROJECT

This chapter provides a summarised description of the project and its components. Full details of the project description are available in Appendix 1 of the Project Appraisal Document, 'Detailed Project Description'.

PROJECT DEVELOPMENT OBJECTIVE AND COMPONENTS

The project development objective PDO is:

To generate benefits for local communities from the development of sustainable cultural tourism in Gansu Province.

The project will deliver this objective through investment in a range of key sites of sites of highly significant cultural and natural value, located across Gansu Province, accompanied by investment in the institutional capability for sustainable tourism management in Gansu.

The project consists of two components:

- Component 1 – Protection and Development of Priority Sites. The following activities would be carried out at each of nine sites:

  (i) Heritage Conservation and Presentation. The preservation and conservation of key relics, research, interpretation and presentation of cultural and natural heritage assets;

  (ii) Infrastructure, Tourism Services and Environmental Protection. Investment in high priority physical infrastructure at key cultural and natural heritage sites that raise local standards of living and have a high potential for promoting local economic development through tourism;

  (iii) Institutional Strengthening and Capacity Building. Key site-specific planning and training activities where needed to complement the overall provincial institutional strengthening component.

- Component 2 – Institutional Strengthening and Capacity Building.

  This will include detailed project design, project management strengthening, training of site managers, staff and local residents in heritage conservation, site management and tourism development (including study tours), and implementation of several key province-wide tourism and heritage studies designed to assist the GPG to develop the tourism industry in Gansu.

COMPONENT 1 – PROTECTION AND DEVELOPMENT OF PRIORITY SITES

This component will invest in heritage conservation and preservation, and in infrastructure, tourism services and environmental protection, at the following nine sites:

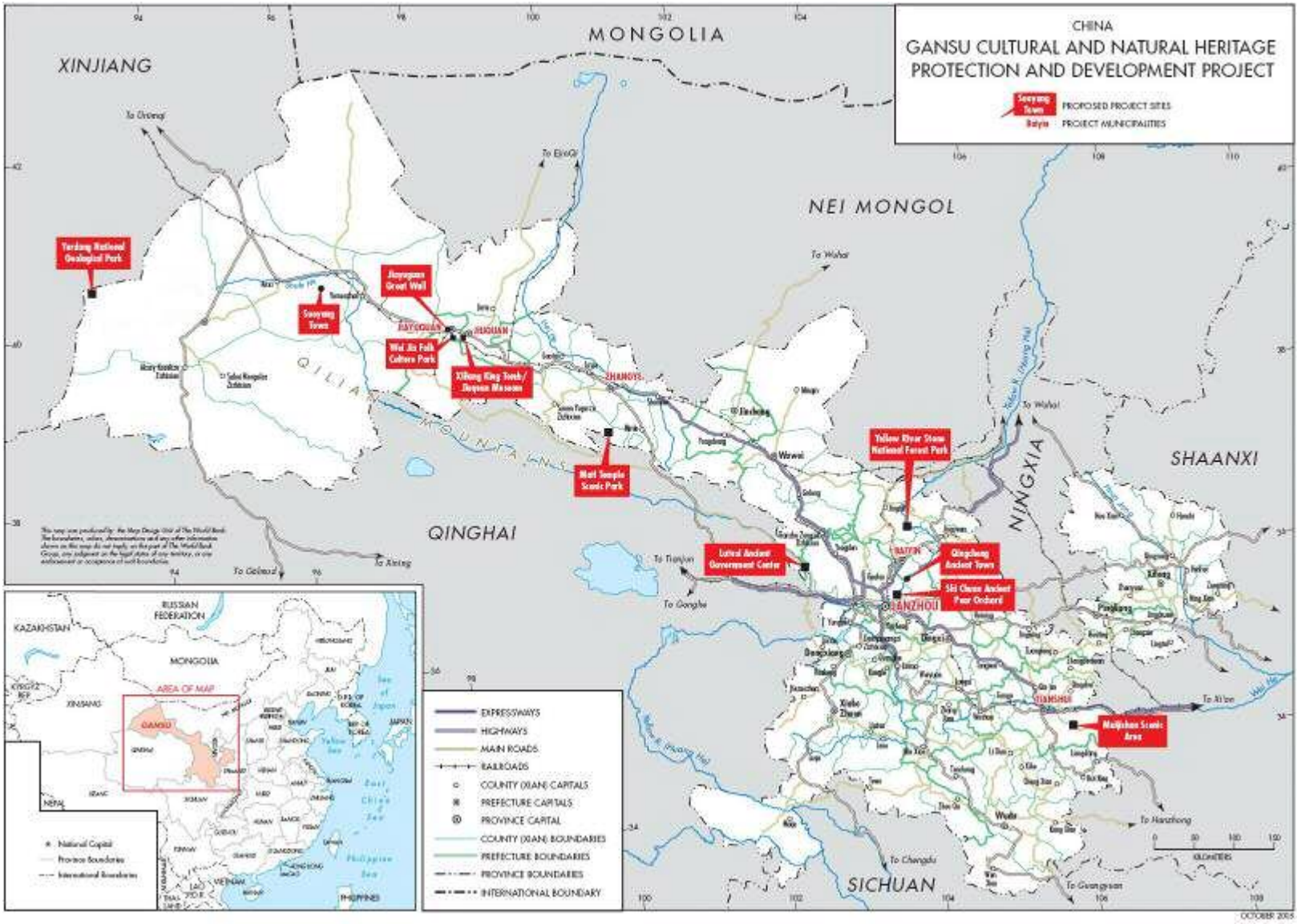
- Yardang National Geological Park
- Suoyang Town
- Wei Jin Folk Culture Park
- Jiayuguan Great Wall
- Majishan Scenic Area
- Lutusi Ancient Government Centre
- Qingcheng Ancient Town
- Yellow River Stone Forest National Park
- Mati Temple Scenic Park.

The activities that will be financed at each site include a combination of the restoration of cultural heritage, restoration and construction of buildings (tourism service centres, museum buildings etc), construction

or rehabilitation or upgrading of roads, construction of parking lots, installation or upgrading of electricity supply and lighting, water supply systems, toilets and wastewater disposal, solid waste management, landscaping, footpaths, fencing and signage. The activities at each site are summarised in the tables provided for each site in Volume II.

The location of the sites is presented in the map in *Figure 2.1*. Maps of each site, showing the key developments to be invested in, are provided in *Annex A.*

Figure 0.1 Gansu Province, Showing the Location of the Nine Priority sites



COMPONENT 2 – INSTITUTIONAL STRENGTHENING AND CAPACITY BUILDING

The second component will address the following activities.

Project Design

This sub-component will support the detailed design of investments at the outset of the project. It will build on the preparation of the conservation plans and feasibility study reports prepared for each site during project preparation. It will promote a centralized and coordinated design approach, ensuring design quality, the use of accurate correct data and information.

Training

Training will be provided to responsible persons and management staff of PMOs and PIUs, technical staff of PIUs and local community residents and people working in the tourism sector, totalling 6040 persons, of which 5510 persons are local community residents.

Training will address cultural relics protection, scenic area management, tourism development strategy (for the training of management staff), scenic area management, tourism product and market development (for the scenic area management units, the tourism management units and individuals involved in tourism activities in the PIUs), and the importance of relics protection, knowledge and skills on tourism management, design and sales of tourism products, accommodation, food and health requirements etc (for local community residents).

Training will be delivered through domestic and international study tours and training courses held in Gansu.

Study on Gansu Provincial Tourism Industry Development

The contents of the study include the basic conditions of the formation of Gansu provincial tourism industry, development and innovation of tourism products, establishment of the tourism market and management of the tourism environment. This study will identify ways in which the benefits of tourism can be translated into greater economic development benefits in Gansu.

Tourism Marketing Information for Scenic Areas

The purpose of this component is to let the world understand the long history, colorful culture, beautiful natural sights and the diversified folk customs of Gansu, and to present to the world the tourism resources with improved tourism marketing. This component includes pictures, maps and writings with innovative style, and also films of excellent quality. This is proposed as a sub-component of IST with an estimated cost of RMB 1.5 million, to be financed by the Bank loan.

Project Implementation Management and Project Procurement

Project design review, project procurement, and construction management and site supervision are essential elements of work for PPMO. This sub-component will support project implementation activities, carried out by qualified persons including experts in various field of activities.

Site-specific Institutional Strengthening and Training

Various other site specific IST activities requested by each site will be included in the various components and will be managed by the PIUs during implementation.

IMPLEMENTATION ARRANGEMENTS

To manage and implement the project, Gansu Provincial government has established a Project Leading Group (PLG) to lead the project. The head of PLG is a vice-governor of Gansu Province, and the governors from Gansu Development and Reform Commission (GDRC), Gansu Finance Bureau (GFB) and Gansu Tourism Department (GTD) attend to act as vice-team leaders of PLG. The GDRC, GFB, GTD, Gansu Communications Department (GComD), Gansu Construction Department (GConD), Gansu Culture Department (GCulD), Gansu Cultural Relic Bureau (GCRB), Gansu Forestry Department (GFD), Gansu State Land and Resources Department (GSLRD) and Gansu Environmental Protection Bureau (EPB) attend the PLG as members.

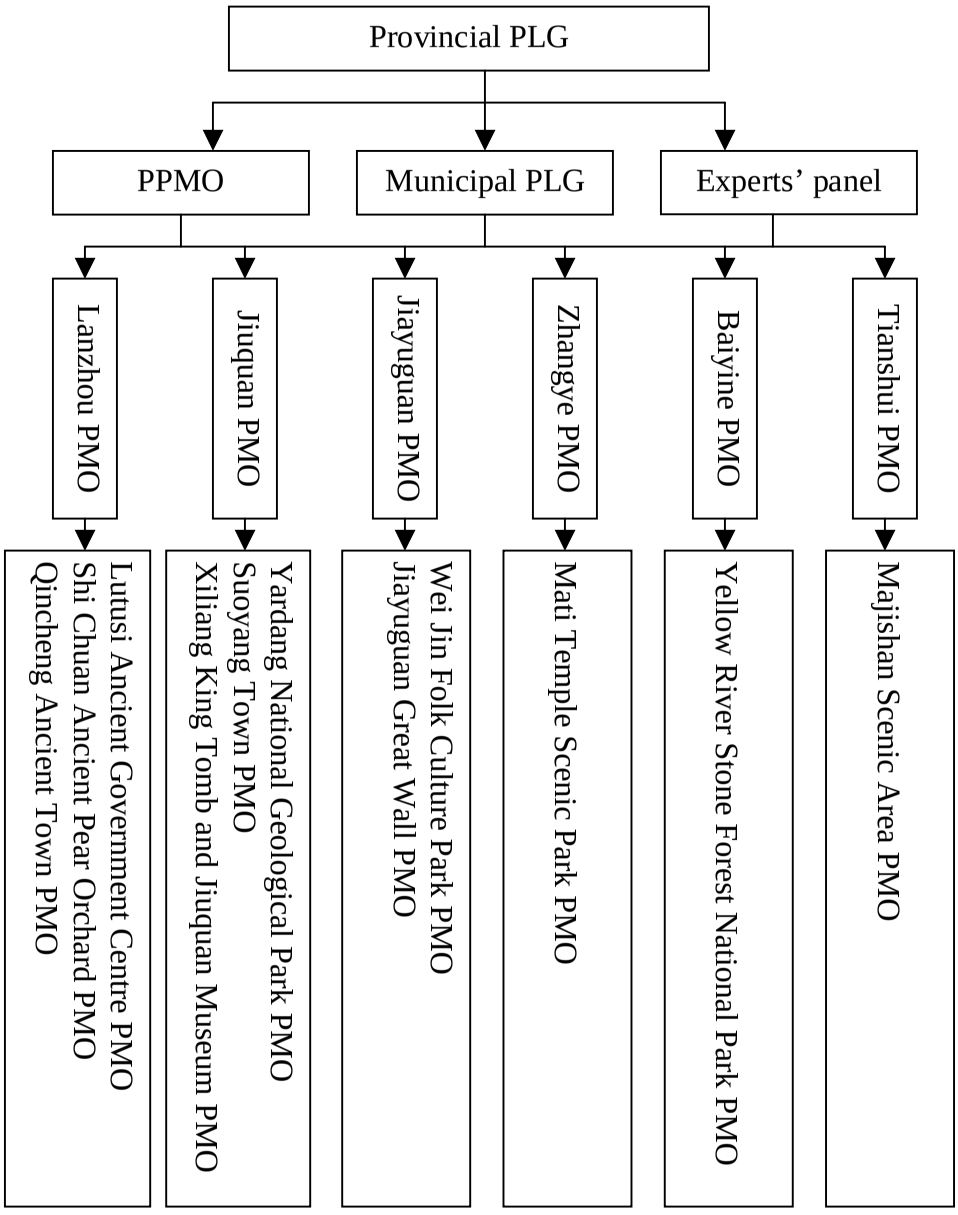
The Provincial Project Management Office (PPMO) is the main organisational body established to lead implementation of the project. The director of PPMO is a governor from GDRC. PPMO members include the Social Department and Foreign Capital Department of GDRC, the International Department of GFB, Planning and Financial Department of GTD.

Local PLGs and PMOs have been established in the relevant municipalities, including Lanzhou, Jiuquan, Jiayuguan, Zhangye, Baiyin and Tianshui. The managers of scenic areas will be responsible for the management and implementation of project activities at each priority site.

In addition, the PPMO has hired experts with tourism planning, city planning, engineering technology, cultural relic protection and environmental protection expertise to form an Experts Panel, managed by PPMO. The Experts Panel is responsible for technical guidance to the implementation of the project, reviewing technical documents of the project, supervision and evaluation, and reporting the result of supervision and evaluation to the provincial PLG.

Implementation arrangements are depicted in *Figure 2.2*.

Figure 0.2 The Organizational Structure of the Gansu Project



BUDGET

The total budget for the project is RMB 395.6 million (USD 51.4 million at 1 USD = RMB 7.8). World Bank financing is a total of USD 38.1 million.

POLICY AND LEGISLATIVE CONTEXT

This chapter describes the institutional, policy and legislative context in China that is relevant to the project, followed by a description of the relevant World Bank safeguard policies.

CHINESE INSTITUTIONAL CONTEXT

Authorities Responsible for Environmental, Health and Safety Management

Environmental, health and safety management in China is implemented through legislation and administration at various levels of government. Details are provided in *Table 3.1*.

Table 0.1 Relevant Authorities and their Responsibilities for Construction Projects

Authorities at central government level*	**Authorities at Gansu Provincial level***	**Responsibilities for Construction Projects**
National Development and Reform Commission (NDRC)	Development and Reform Commission (DRC)	• Project application approval
State Environmental Protection Administration (SEPA)	Environmental Protection Bureau (EPB)	• EIA approval • Inspection for environmental compliance
Ministry of Land and Resources (MOLAR)	State Land and Resources Department (SLRD)	• Land acquisition
Ministry of Water Resources(MWR)	Water Resources Bureau (WRB)	• Water extraction application approval • Water and soil conservation scheme approval
State Administration of Work Safety (SAWS)	Safe Manufacture Supervision Bureau(SMSB)	• Safe Production Permit • Safety pre-assessment approval • Safety assessment approval • Safety inspection approval
Ministry of Health (MOH)	Hygiene Department(HD)	• Occupational hazard pre-assessment • Inspection for occupational health compliance • Occupational diseases treatment
Ministry of Labour and Social Security (MOLSS)	Labour and Social Securities Department(LSSD)	• Occupational injuries insurance • Labour contract
Administration of Quality Supervision and Inspection and Quarantine (AQSIQ)	Quality and Technology Supervision Bureau(QTSB)	• Special equipment permit • Special equipment operator certificate
Fire Fighting Department	Local Fire Fighting Bureaus (FFB)	• Fire fighting design approval • Completion inspection of fire fighting equipment • Fire drill

* Corresponding local authorities are established at provincial, city or county levels. The level of approval authorities (national or local) for the relevant permits may vary depending on the project size and investment. In addition, local authorities will be responsible for routine operation management after the facilities are put into formal operations.

Development and Reform Commission

The National Development and Reform Commission (NDRC) is directly controlled by the State Council and is responsible for economic and resources planning and management in China.

NDRC is responsible for examining and approving the establishment of large-scale and foreign investment projects with a total investment over USD 100 million. The local development and reform commission is responsible for approving project proposals of less than USD 100 million.

Environmental Management Authorities

In China, the State Environmental Protection Administration (SEPA) is the highest-level environment management authority. Provincial Environmental Protection Bureaus (EPBs), at the level of provincial government, and municipal EPBs operating at a municipal level, are responsible for the enforcement of environmental regulations.

Local EPBs are responsible for the routine inspection of sites, including issuing pollutant discharge permits, checking the discharge compliance status, reviewing pollutant discharge registration, transmitting regulatory information, allocating mass loading targets etc. The Environmental Monitoring Station, a subsidiary of each EPB, is responsible for environmental monitoring. The monitoring data is used as evidence by the EPB to verify the discharge status of facilities.

Local government is obliged to approve applications provided by their EPBs for closing down facilities that cause significant pollution beyond applicable regulatory standards.

If any misunderstanding occurs during regulatory enforcement, the local EPB can apply to SEPA for detailed explanation and implementation procedures.

Land and Resources Authorities

The Ministry of Land and Resources (MOLAR) under the State Council is in charge of planning, management, conservation and utilisation of geological and mineral resources. Local land and resources departments under local governments are responsible for management of natural resources within their jurisdiction.

Water Resources Authorities

The Ministry of Water Resources (MWR) is the Department of the State Council that is responsible for water administration. The Yellow River Conservancy Commission (YRCC) is a branch organisation operating under the jurisdiction of the MWR. It is responsible for water administration in the Yellow River valley including Gansu Province and inland river areas in Xinjiang and Inner Mongolia. Water resources bureaux are responsible for local water administration, including, but not limited to, establishing and implementing the local water resource regulations and plans according to state policy and laws, and local requirements for water resource management and soil conservation.

Work Safety Authorities

The State Administration of Work Safety (SAWS), directly under the control of the State Council, is responsible for the general management of work safety in

China and occupational health management. Municipal Work Safety Bureaus are established to conduct routine workplace safety and occupational health inspections within their jurisdictions.

Occupational Health Authorities

The Ministry of Health, and local Health Supervision Bureaux (HSB) at provincial, municipal or county levels, are responsible for occupational health and food hygiene management.

The responsibilities of HSB includes the supervision of occupational medical surveillance, toxicity identification of chemicals, occupational disease hazards pre-assessment approval, approval of occupational hazards prevention equipment design, and completion acceptance of occupational hazards prevention equipment of new, modified or expanded projects, and occupational disease determination. In addition, HSBs are responsible for occupational diseases management, including occupational diseases treatment and reporting.

The Centre of Disease Prevention and Control (CDC), a subsidiary of the HSB, is responsible for occupational hazards monitoring and assessment and occupational disease determination. Monitoring data is used as evidence by work safety authorities to verify the compliance status of facilities.

Labour and Social Security Authorities

The Ministry of Labour and Social Security is responsible for labour and social security (including occupational injuries insurance, pension, medical, and unemployment insurance), and labour supervision (including employment, labour contract, female and minor employees protection, and wages, etc).

The Occupational Injuries Insurance Regulation applies to all enterprises in China, and requires employers to pay insurance cover for occupational injuries for all employees. Local Labour and Social Security Bureaus are responsible for the collection of occupational injuries insurance premiums and distribution of occupational injuries insurance payments.

Quality and Technology Supervision Authorities

The General Administration for Quality Supervision and Inspection and Quarantine (AQSIQ), under the direct control of the State Council, was established in August 2001.

The Safety Supervision Bureau for Special Equipment under the AQSIQ is responsible for health, safety and quality issues of special equipment. Their responsibilities cover the safety supervision of special equipment, including design, manufacture, installation, utilisation, test, repair, modification, accident investigation, and special operators' qualification management. Special equipment indicates but is not limited to boilers, compressed vessels, and elevators. Special operators comprise electricians, welding operators, boiler operators, etc. The

Standards Management Committee under the AQSIQ is responsible for organizing the development, issuance, and revision of national standards.

At local levels, quality and technology supervision authorities are responsible for detailed management of quality supervision and inspection, special equipment, and distribution of information on standard development and revision within jurisdictions.

Fire Fighting Department

At the national level, the Fire Fighting Department operates under the Ministry of Public Security. Within the Fire Fighting Department, local Fire Fighting Bureaus (FFB) are established and responsible for detailed fire fighting management, including fire fighting design approval, completion inspection of fire fighting equipment, internal decoration for new, modified or expanded projects, fire drills, and routine site inspections.

Authorities Responsible for Tourism Management, and Cultural and Natural Heritage

Tourism Administration

China National Tourism Administration (CNTA) is directly regulated by the State Council, responsible for developing, promoting and regulating China tourism industry. The Tourism Department of Gansu Province is responsible for the implementation of related tourism laws, regulations and policies, and establishes tourism strategies, guidelines, plans, policies, and standards in Gansu Province.

Administration of Cultural Heritage

State Administration of Cultural Heritage (SACH) is mainly responsible for developing, promoting and regulating China cultural relics and museum industry. Gansu Cultural relic bureau is mainly responsible for the implementation of related cultural relic and museum laws, regulations and policies, and establishes cultural relic and museum strategies, guidelines, plans, policies, and measures in Gansu Province.

Applicable Laws and Regulations

The Chinese government has issued a series of laws and regulations on environmental pollution prevention and control, and nature reserve and ecology protection. National laws and regulations are supported by administrative, ministerial and regional regulations.

Nature Reserves

The *Regulation on the Management of Nature Reserves of the People's Republic of China (1994)* regulates construction activities within nature reserves. Nature reserves are categorised into core, buffer and experimental areas as described in *Box 3.1*. Natural reserves are classified as national level or local level (provincial

or county level), and at all levels are all subject to *Management Regulations for Natural Conservation Areas*.

Box 0.1 Core, Buffer and Experimental Areas of Nature Reserves

Core Areas. Natural ecosystems and areas of greatest abundance of rare and endangered animals. Entry into core areas is strictly prohibited and no scientific research is allowed without the approval of the nature reserve administration above the provincial level. Approval must also be obtained from the related administration of the State Council for entry into a core area of a national nature reserve. All types of construction are forbidden.

Buffer Areas. These are generally designated as areas on the periphery of core areas. Only scientific study and observation activities are allowed. Entry into buffer areas for these purposes can be approved by the nature reserve administration. Construction of industrial facilities is forbidden.

Experimental Areas. These are generally designated on the periphery of buffer areas. Scientific research, educational activities and wildlife breeding are allowed. Construction activities may be permitted within these areas, subject to the approval of the relevant authority. Construction of industrial facilities that pollute the environment or damage resources in experimental areas is prohibited.

External Protection Areas may be designated beyond the boundary of the nature reserve by the local government that approved its establishment. Project contractors in these areas should not impair environmental quality.

Cultural Relic Protection

The legal framework for the protection and management of cultural resources in China is strong. The Cultural Heritage Protection Law of the People's Republic of China (1982), the Law of Cultural Relic Protection (2002) and associated regulations provide the legal basis for protection of cultural relics in China.

The *PRC Law of Cultural Relic Protection* was issued in October 2002. It stipulates that construction and tourism development should comply with the policy of cultural relic protection and damage to cultural relics caused by these activities is prohibited. The building of facilities which would cause pollution to cultural relics and its environment and any activities which may affect the safety and environment of cultural relics are prohibited in 'construction control zones' or the 'cultural relic protection unit'. Construction projects within the construction control zone that threaten the historical view and style are prohibited. The law also stipulates that existing facilities which have caused pollution to the cultural relic and its environment should be treated.

Regulations of Cultural Protection in Gansu Province were issued on 23 September 2005 and effective on 1 December 2005. They stipulate that the construction of buildings within protection and construction control zones will be prohibited without the permit of the competent cultural relic protection administration. If the construction is necessary, the style, height, body and colour should be in sympathy with the environment.

In 1985, the National People's Congress ratified the *UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage (The World Heritage Convention)*, thereby integrating international practices into Chinese regulation.

In relation to intangible heritage, in August 2004, China officially joined the UNESCO *Convention for the Safeguarding of the Intangible Cultural Heritage* and there is a draft of *Law of the People's Republic of China on the Protection of Intangible Cultural Heritage*.

The *Principles of for Conservation of Heritage Site in China* (*The China Principles*) were developed through a joint effort of China's ICOMOS and the State Administration of Cultural Heritage in 2000. *The China Principles* are professional guidelines for conservation practices within the existing legislative framework.

Presently, there are no specific laws concerning tourism development in China, although the need for such a law has become evident in respect of the rapid development of China's tourism industry over the last decade. A series of technical standards have been developed in recent years to provide technical guidance on tourism planning and facility development. For example, *Measures for the Administration of Assessment and Appraisal of the Grades of Tour Guides* and the *Decision of China National Tourism Administration on Amending the Implementation Measures for the Administration of Tour Guides* were approved.

Environmental Impact Assessment (EIA)

The *Environmental Impact Assessment (EIA) Law*, issued in October 2002 and effective on 1 September 2003, is applicable to all construction projects that may cause negative impacts on the environment.

According to the *Management Regulation on Environmental Protection for Construction Projects,* issued on November 29, 1998, by the State Council, an EIA must be prepared during the project feasibility stage. EIA approval is a necessary prerequisite for securing a construction and operating permit. Based on the severity of possible impacts on the environment, the EIA may be a simple Environmental Impact Registration (EIR), an EIA Form (EIF), or an EIA Statement. This can be determined by *Classification Management Catalogue of Environmental Protection for Construction Projects (*issued by the SEPA and effective on the 1st of January 2003). For this project, the EIA statement for each site is required.

Beside the basic EIA regulations, the Chinese EIA regulatory framework is supported by a series of environmental protection laws and regulations, which includes, but is not limited to, *Environmental Protection Law, Air Pollution Prevention and Control Law, Water Pollution Prevention and Control Law, Solid Waste Pollution Prevention and Control Law*, and *Noise Pollution Prevention and Control Law*.

An EIA shall be prepared and submitted for approval to either the local EPB or SEPA, depending on the government level the project proposal was approved at, the scale of investment, and severity of pollution. For this project, EIAs should be submitted to Gansu EPB for approval.

Water and Soil Conservation

The *Law on Water and Soil Conservation*, effective as of 29 June 1991, promotes the sustainable use of water and soil resources. Construction activities that have the potential to cause soil erosion are required to adopt appropriate measures to protect water and soil resources. The project developer is responsible for rehabilitation of soil erosion and damage of vegetation resulting from project development activities.

Water Abstraction

According to the *Water Law of the People's Republic of China (2002)* and *Implementation Regulations for Water Extraction Licence Policy (1993)*, an application for water abstraction must be submitted to the local Water Resource Bureau for approval. The *Management Method of Water Resource Demonstration of Construction Project (2002)* stipulates that a water resource demonstration report shall be submitted to the Water Resource Bureau in combination with the groundwater abstraction application.

After a water abstraction licence is obtained, the construction project shall abstract water according to the requirements of the licence. An annual water-use plan shall be submitted to the Water Resource Bureau one month before abstraction begins. The licence holder shall install flow-measuring devices and prepare a water abstraction report according to relevant requirements and submit the report to the Water Resource Bureau.

Completion Inspection

Installation of pollution prevention and control facilities in a construction project shall be undertaken concurrently with the main body facilities during the construction phase. The pollution prevention and control facilities shall be commissioned only after they are inspected and approved by the competent EPB who approved the EIA of the project. The *Management Regulations of Environmental Protection for Construction Projects (1998)* stipulates the detailed requirements for the Completion Inspection policy. The project shall apply to the Gansu Provincial EPB for the Completion Inspection within three months of the commencement of the trial operation.

Pollution Discharge Registration and Permit

New facilities are required to register their pollution discharge with the local EPB within one month of passing the *Completion Inspection*. The *Management Regulation on the Registration of Discharged Pollutants (1992)* lays out detailed requirements for pollutants discharge registration. The registration includes the type, concentration and quantity of pollutant discharges, nature of discharge, noise sources, waste storage and disposal sites and pollution control equipment.

Following the registration, the local EPB will issue a Pollution Discharge Permit to facilities with specified mass-loading quota to the facilities with large quantity of pollutants discharge.

Environmental Quality and Discharging Standards

Environmental Quality Standards

The relevant applicable environmental quality standards for the project are presented in *Table 3.2*.

Environmental Emission and Discharging standards

Prevention of pollution during project construction and operation is subject to pollutant discharge standards in China. The relevant applicable environmental emission and discharging standards for the Project are presented in *Table* 3.3.

Table 0.2 Chinese Environmental Quality Applicable to the Project

Sites	**Class of Ambient Air Quality Standard (GB3095-1996)**	**Class of Environmental Quality Standards for Surface Water (GB3838-2002)**	**Class of Quality Standards for Groundwater (GB/T14848-93)**	**Class of Standard of Environmental Noise of Urban Area (GB3096-93)**
Yardang National Geological Park	I	-	Ⅴ	0 or 2 depending on location
Suoyang Town	I	-	Ⅲ	0
Jiuquan Museum	I	Ⅲ	-	1
Wei Jin Folk Culture Park	Ⅱ	-	Ⅲ	1
Jiayuguan Great Wall	Ⅱ	Ⅲ	Ⅲ	1
Majishan Scenic Area	I	I	-	0
Lutusi Ancient Government Centre	I	Ⅲ	-	1 or 4 depending on location
Shi Chuan Ancient Pear Orchard	Ⅱ	Ⅲ	-	1
Qingcheng Ancient Town	Ⅱ	Ⅲ	Ⅲ	2
Yellow River Stone Forest National Park	Ⅱ	Ⅲ	-	1
Mati Temple Scenic Park	I	I	-	0

Ambient Air Quality Standard (GB3095-1996) divides ambient air quality into Class I, II, and III, each with criteria stipulating maximum allowable concentrations for various contaminants based on defined sampling and analytical protocols. **Class I**: Nature Reserves, scenic areas, places of historic interest and areas requiring special protection; **Class II**: Urban residential areas, multi-purpose areas (commercial, cultural basic industry) and rural areas; and **Class III**: Classified industrial zones.

Environmental Quality Standards for Surface Water (GB3838-2002) are based on five classes, each with criteria stipulating maximum allowable concentrations for various contaminants based on defined analytical protocols. **Class I**: Source water, State Nature Reserves; **Class II**: Class A of surface water resources for central drinking water, rare aquatic animals habitat, spawning grounds for species as fishes and shrimps, feeding ground for larva, juvenile and young fish; **Class III**: Class B of surface water resources for central drinking water, wintering ground for species as fishes and shrimps, migrating channels, fisheries area such as aquatic products raising area, swimming area; **Class** Ⅳ: Water resources for general industrial use, non-direct contact entertainment water area; and **Class** Ⅴ: Water resources for agriculture, water area for general scenery.

Quality Standards for Ground Water (GB/T 14848-93) are based on five classes each with criteria stipulating maximum allowable concentrations for various contaminants based on defined analytical protocols. Class I: Low environmental background concentration of chemical components in ground water. Suitable for all kinds of usage; Class II: Normal environmental background concentration of the chemical components in ground water. Suitable for all kinds of usage; Class III: Based on the human health reference value, suitable for central drinking water source and industrial and agriculture usage; Class Ⅳ: Based on requirements for industrial and agriculture usage. Can be used as drinking water after appropriate treatment; Class Ⅴ: Not potable.

The **Standard of Environmental Noise of Urban Area** (GB3096-93) stipulates the noise limitations for five

Sites	Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)
kinds of urban area. Class 0: areas requiring special quiet, such as sanitarium area, special villa area and special hotel. If this kind of area located in the rural area, the noise limitation should be 5 decibels lower than the requirement of this class; Class 1: residential and cultural areas, including rural areas; Class 2: multi-purpose area of residents, business and industries; Class 3: industrial zones; Class 4: both sides of major transportation routes.				

Table 0.3 Chinese Pollutant Discharge Standards Applicable to the Project

Relevant Emission or Discharging Standard (and Code)	Description
Integrated Emission Standard of Air Pollutants (GB16297-1996)	The Integrated Emission Standard of Air Pollutants (GB16297-1996) stipulates the emission limits for 33 kinds of air pollutants and requirements in executive process of the standard. The standard is classified into Class I, II, and III, which are corresponding to the air quality zones defined by the Ambient Air Quality Standard (GB3095-1996). The air pollutant generated from the Gansu project is mainly fugitive dust during construction. The fugitive dust should be subject to the monitoring concentration threshold of fugitive emissions.
Noise Limits for Construction Site (GB12523-90)	During the construction phase, the Noise Limits for Construction Site (GB12523-90) regulates the construction noise permissible for this project. In detail, the daytime noise limits for earthwork stage, structural stage, piling stage and decoration stage are 75 decibel, 70 decibel, 85 decibel and 65decibel respectively. The piling during night is prohibited and the nighttime noise limits for other stages are all 55 decibel.
Integrated Wastewater Discharge Standard (GB8978-1996)	New wastewater discharge into Class I and II surface water (and protect areas around the surface water) is prohibited. Wastewater discharge into Class Ⅲ surface water is subject to the Class I limit of the Integrated Wastewater Discharge Standard (GB8978-1996), which stipulates the discharging limits for 69 kinds of water pollutants according to where these pollutants will be discharged into. . Wastewater discharge to irrigation after treatment is subject to the Standards of Irrigation Water Quality (GB5084-52).
Standards of Irrigation Water Quality (GB5084-52)	The Standards of Irrigation Water Quality (GB5084-52) stipulates the irrigation water quality requirements for dry farming crops, waterlogged crops and vegetables.

WORLD BANK SAFEGUARD POLICIES

The World Bank safeguard policies that are applicable to the activities at each site are summarised in Volume II. This indicates that the following policies are triggered by the project:

- OP 4.01 Environmental Assessment
- OP 4.04 Natural Habitats
- OP 4.11 Physical Cultural Resources
- OP 4.10 Indigenous Peoples
- OP 4.12 Involuntary Resettlement
- OP 4.37 Safety of Dams.

BASELINE CONDITIONS

This chapter sets out the key baseline characteristics of Gansu Province and the nine priority sites.

ENVIRONMENTAL CONDITIONS IN GANSU PROVINCE

Location

Gansu Province is situated in central China, at the upper reaches of the Yellow River, between 32°11′- 42°57′ north latitude and 92°13′-108°46′ east longitude. It borders Shanxi Province in the east, Sichuan Province in the south, Qinghai and Xinjiang Provinces in the west, and Inner Mongolia and Ningxia Provinces, and the neighbouring country of Mongolia in the south. Gansu Province is roughly oriented northwest to southeast. Its easternmost and westernmost points are separated by a distance of 1,655 km, and its northernmost and southernmost points by 530 km.

Topography and Physiography

Geomorphology

The topography of Gansu Province consists of mixed mountainous regions, plateaus, plains, river valleys, and deserts, and forms six main regions with differing features. These are the Longnan mountainous region, Longzhong loess plateau, Gannan plateau, Hexi corridor, Qilian mountain area and the northern area of Hexi corridor. Mountainous and hilly land occupies 78.2% of the area of the province.

Soils

There are more than forty soil types in Gansu Province, for example yellow-cinnamon soil, grey cinnamon soil, Heilu soil, loessal soil, meadow soil, chernozem, grey desert soil, grey-brown desert soil, aeolian sandy soil, bog soil, and fluvo-aquic soil.. The majority of soils are loess with sparse vegetation, and suffer severe wind and water erosion, and ongoing desertification.

Land Use

Gansu Province has a total land area of 425,800 km^2, occupies 4.72% of China, and is China's seventh largest province. The land area per capita is 1.82 ha, almost twice as high as the national average. Approximately 43% of the land area is not used directly for productive purposes, including desert, Gobi, alpine-arctic stone mountain, bare rock, saline-alkali lowland and wetlands.

Climate

Gansu has a strongly continental warm temperate monsoon climate. Daily average temperature ranges between 0º and 16º C. However, temperature varies greatly across the province, according to elevation.

Length of frostless periods shows significant differences across the province. For example, the frostless period at river valley area in Longnan is commonly about 280 days. However, the frostless period on the plateau in South Gansu is the shortest, at only 140 days.

Annual precipitation varies between 36.6 mm to 734.9 mm, and roughly decreases from southeast to northwest. The western part of the province to Wuqiao Mountain has less precipitation while the Longnan area and Qilian Mountain have more.

Hydrology

Surface Water

Surface water resources consist of the Yellow River, Changjiang River and inland river valleys. The total water runoff of all rivers in Gansu is 60.3 billion cubic meters per year. Seventy-eight of Gansu's rivers have a water flux of more than 0.1 billion cubic meters. The Yellow River valley covers a vast area in the east of Gansu.

The Changjiang River watershed provides abundant water resources, over a large water path gradient. There are many gorges in the Changjiang River watershed, containing tremendous water energy.

The inland river valley is 270,000 square kilometres, and encompasses 15 rivers, including the Shiyang River system, Heihe River system and the Shule River system. The annual total water flux of the inland river valley is 17.45 billion cubic meters.

Surface Water Quality

According to the *Summary of Environmental Quality in Gansu Province in 2006*, among the 30 river sections subject to monitoring, only 16 sections meet the required standard (according to their function). The number of sections that met the standards in 2005 was only 13. The main pollutants are domestic sewage, industrial wastewater discharges, and residues of chemical fertilizers and pesticides from adjacent areas.

Groundwater

The volume of groundwater resources in Gansu Province is 873.2 million cubic metres, which includes 513.8 million cubic metres under the inland river valley, 357.4 million cubic metres under the Yellow River valley and 2 million cubic metres under the Changjiang River Valley.

Groundwater Water Quality

Groundwater quality under the cities in the Hexi Corridor is good, but polluted to differing levels downstream of each city. The groundwater under cities in the Hedong area is less polluted than would be expected for the scale and industrialisation of the cities.

Natural Habitats and Ecology

Natural Habitats and Protected Areas

The terrestrial natural habitats of Gansu are mainly steppe grassland, and semi-natural pastureland. Grasslands are most extensive in Gannan meadow, Qianlian hilly region, West Qin Mountain, Maxian Mountain, Hasi Mountain and Guan Mountain. The total forest area in Gansu is approximately 8 million ha, covers 16.5% of the land area, and consists of firs, spruces, oak, poplars, pines and birches.

There are 58 natural conservation areas in Gansu Province with a total area of 9,798,421 ha, occupying 23% of the province. Thirteen are nationally-designated, 41 are provincially-designated and 4 are designated at the county level. Eight farms breed rare or endangered animals and four farms conserve rare plants.

To preserve biodiversity, GPG has issued Management Regulations on Natural Reserve Zones in Gansu Province, Protection Regulations on wetlands, Management Regulations for the Qilian Mountain Reserve Zone, Regulations for the Xianglong Mountain National Natural Reserve Zone, and Management Regulations on the Baishui River Natural Reserve Zone.

Fauna and Flora

Eight-hundred and twenty-two species of vertebrates are found in Gansu Province, including 32 amphibian, 63 reptile, 572 bird, and 163 mammalian species. Among these, 105 are protected under national law, and 18 are protected under provincial regulations. Wildlife is most abundant in in Wen County, Wudu County, Kang County, Cheng County, Tianshui city and Liangdang County.

Gansu's flora has a significant proportion of species with economic uses, including 100 of oil plant species, nearly 100 of fibre and paper-making plant species, more than 20 for teas and brewing, more than 20 species used as chemical raw materials, more than 100 edible fruit-bearing species, more than 951 species of medicinal plants, and more than 10 species of edible wild plants.

Species of Conservation Concern

Gansu Province is highly species-rich, owing to its position between four faunal regions (the North China Region, inner Mongolia- Xinjiang Region, Qinghai-Tibet Region and Central China Region) and five floral regions, (temperate grassland region, temperate desert region, warm-temperate deciduous broad-leaved forest region, Tibetan Plateau alpine cold vegetation region and subtropical evergreen broadleaved forest region).

Eight hundred and sixty-four species of vertebrates are found in Gansu, equivalent to 27.8% China's vertebrates. One hundred and eight of these vertebrate species are national-level protected wild animals (29 are first class and 79 are second class). Four thousand insect species are found in Gansu, 10% of China's total. One hundred and thirty-six species in Gansu are included as priorities for conservation

in the *China Biodiversity Conservation Action Plan*, 33.9% of the total of 401 species of conservation priority in China.

Amongst temperate plants alone, there are over four thousand species of vascular plants, (292 fern, 50 gymnosperms and 4000 angiosperms). Thirty-four species of flora are included in the national key protected plant species catalogue (2 in the first protection class, 9 in the second, 23 in the third). Ten species are included amongst the priority conservation species listed in the *China Biodiversity Conservation Action Plan*.

The southern part of Gansu Province was not affected by the last ice age. This has contributed to the high level of biodiversity in the region, and the survival of many relict species, such as black-necked crane, long-tailed pheasant, mandarin duck, giant panda, golden monkey, giant salamander, katsura-tree, Davidia involucrate, *Tetracentron sinensis* and Sargentgloryvine Stem. The Qianlian Mountain range, Arkin Mountain range and Gannan area, located at the east end of Tibet Plateau, is another area with abundant biodiversity in Gansu Province, including species adapted to the snow plateau, including white-lipped deer, snow leopard, Tibetan antelope, argali sheep, blue sheep, musk deer, wild camel, wild donkey, takin, black-necked crane, blue-eared pheasant, aweto, safflower, snow lotus, Radix Astragali, Picea carassifolia, Betulautilis, and Qinghai cuckoo.

Air Quality

Dust storms are an increasing problem. Dust storms occurred 16 times in Gansu Province in 2006, mainly in March and April, and were long in duration. This frequency is three times the number experience in 2005. Particulate pollution aggravates air quality in cities in Gansu, contrubting to a deterioration in air quality in nine out of thirteen cities (Summary of Environmental Quality in Gansu Province in 2006).

Solid Waste Disposal

In 2005, the provincial general utilization rate of industrial solid waste is 29.4%. The storage rate is 49.1%. And the disposal rate is 21.4%.

No information was available on the extent of recycling and reuse of waste, but this can be expected to be rare or at least informal.

Wastewater Management

In 2005, the total volume of discharged wastewater was 437.28 million cubic metres. The *Table* 4.1 provides details. Currently, there are 11 municipal wastewater treatment plants constructed and 14 are under construction.

Table 0.1 Wastewater and Pollutants Discharged in Gansu Province in 2005

Wastewate discharged (million cubic metres)			**Chemical Oxygen Demand (Tonnes)**			**Ammonia nitrogen (Tonnes)**		
Industrial	Domestic	Total	Industrial	Domestic	Total	Industrial	Domestic	Total

Wastewate discharged (million cubic metres)			Chemical Oxygen Demand (Tonnes)			Ammonia nitrogen (Tonnes)		
167.98	269.30	437.28	58831	123467	182298	21390	13011	34401

Health and Safety

In 2006, 2067 people died from various accidents in Gansu Province. The number of died people is 146 less than the national control target for the province of 2213. The number of deaths from construction accidents was 34, 49 less than the national control target of 83.

The top five infectious diseases in Gansu are hepatitis, dysentery, tuberculosis, gonorrhoea and measles. There are 90 centres for disease control, 10 municipal infectious disease areas, 69 departments of infectious diseases in county hospitals, 61,801 hospital beds (2004), 14 emergency assistance centres, 14 provincial or municipal blood stations, 13 county blood banks, and 4 infectious disease hospitals.

BASELINE CONDITIONS AT THE NINE PRIORITY SITES

Volume II provides summary information on the baseline environmental conditions at the nine priority sites. Further details on environmental conditions at each site are provided in *Annex B.*

Cultural and natural Heritage

This chapter provides key information on the cultural and natural heritage value of each of the nine priority sites. A detailed inventory of the heritage of each site is provided in *Annex C*.

OVERVIEW

The significant cultural and natural heritage of Gansu Province results from the following historical and natural features within its boundaries:

- Significant portions of the ancient Silk Road;
- The westernmost portions of the Great Wall;
- Early settlements of the Yellow River basin;
- Part of the Gobi Desert;
- The Qilian Mountain range;
- The Hexi Corridor; and
- Numerous important oasis, wetlands and rivers.

The global significance of these sites has been recognized, and some have achieved World Heritage status. In partnership with neighbouring provinces, Gansu Province is preparing an application for the Silk Road to be listed as a UNESCO World Cultural Heritage Route. The concentration of sites in Gansu suggests that the Luoyang-Xi'an-Baoji-Tianshui-Lanzhou-Wuwei-Hexi Corridor-Turfan-Kashi axis has the potential to become one of the world's great Grand Tours to compete with the (Nepali) Everest Route, Route 66 in the USA, the Garden Route in South Africa and the riverine Rhine and Danube routes.

PROJECT CONCEPT

The nine project components cover a broad spectrum of attractions from natural and cultural heritage assets to stunning geological formations. They are roughly distributed along the ancient Silk Road that runs along the Hexi Corridor in Gansu Province. Several of the sites are located on the banks of the Yellow River, which is of immense importance to the Chinese identity and is known as "the cradle of ancient civilisation". Another focus of the proposals is the Great Wall, an internationally recognised icon of China.

With these characteristics of the various components in mind, the project concept is roughly built around the following three historical and cultural themes:

1. The history of the Silk Road (exemplified by Suoyang Town in particular);
2. The political and military significance of the Great Wall of China (Jiayuguan Great Wall, Jiuquan Museum and Weijin Tombs); and
3. The social and economic significance of the Yellow River in China's civilization (exemplified by Qingcheng Ancient Town, Yellow River Stone Forest and Shi Chuan Orchard for example).

These themes provide a coherent project framework and have contributed to the rationale for the selection of the nine sites from the far larger number of potential sites in Gansu, and the original seventeen sites proposed by GPG.

HERITAGE VALUE OF THE SITES

The following sections describe the cultural and natural heritage value and baseline conditions and threats at each site. *Figures 5.1* to *5.11* provide a visual indication of their value, and further details and photographs are provided in *Annex C*.

Yardang National Geological Park

This is a National Geological Park, located 180 km northwest of Dunhuang City. It covers an area of 25 km by 18 km, and consists of spectacular "yardan" scenery, formed through the weathering action of sand-laden winds.

Despite its appearance, the surface of Gobi desert is fragile. The surface has formed over thousands of years by wind action that blows away the fine material, leaving a surface layer of gravel that protects the underlying material. Vehicle movements on the gobi surface disturb this gravel layer, exposing the underlying material. Under high wind conditions, these vehicle tracks can quickly become scars that take many years to recover. In a scenic area such as the Yardang Geological Park, this is especially relevant; the black gobi gravel contrasts strongly with the lighter coloured subsurface material and consequently vehicle tracks detract from the natural landscape.

Site management has been successful in restricting vehicles to a single black-top road to date.

Since June 2001, the site has received 400,000 tourists.

Figure 0.1 Wind-eroded Scenery at Yardang National Geological Park

Figure 0.2 Suoyang City

Suoyang City

In Anxi County, and with National-level Cultural Heritage Protection. Suoyang City was first constructed in the Han Dynasty, and the fortress was subsequently built in the beginning of the Tang Dynasty. Both are of high value in terms of historical archaeological research. It was once a county seat of the Dunhuang prefecture in the Han Dynasty and was made a prefecture during the Tang Dynasty. The site is very closely linked to the history of the Silk Road.

Threats to the archaeological heritage include wind erosion, unrestricted visitor access, and the loss of artefacts prior to adequate archaeological investigation.

Wei Jin Folk Culture Park

With National-level Cultural Heritage Protection, located about 25 km northeast of Jiayuguan City, the site comprises over 1,400 tombs covering an area of about 20 sq km.

The tombs were built of brick during the Wei and Jin Dynasties (220-420). The tombs are known as the largest subterranean art gallery in the world because they house a large number of vivid and colourful murals. The site was excavated in 1972.

In 2004, the site received 14,000 visitors, 86% of them from overseas.

Jiayuguan Great Wall

Close to Jiayuguan City, Jiayuguan Great Wall is a National-level Cultural Heritage, and a UNESCO World Heritage Site.

Jiayuguan Pass was built in the late Ming Dynasty, around 1372 near an oasis that was then on the extreme western edge of China. The Great Wall used to end at Yumen (about 50 miles to the west of Jiayuguan) before the pass was abandoned during the Ming Dynasty. The walls in the northwest region were originally constructed under the Han, and remains of the Han wall have been found near Dunhuang, but the portions of the wall standing at Jiayuguan date from about 600 years ago.

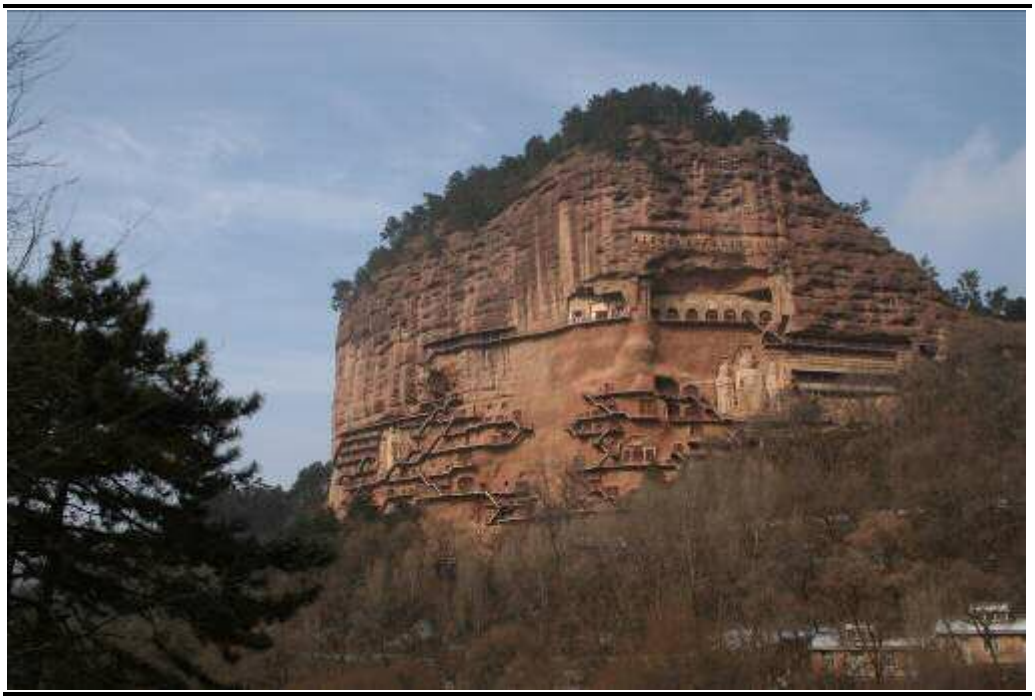
Threats include inappropriate buildings and site planning, unplanned visitor management, and the weathering of the buildings.

In 2004, there were 329,000 visitors, generating RMB 66 million in tourism revenue.

Figure 0.3 *Wei Jin Folk Culture Park*

Figure 0.4 *Jiayuguan Great Wall*

Figure 0.5 Majishan Scenic Area



Maijishan Scenic Area

A nationally-designated scenic area, encompassing grottoes with National Cultural Heritage Protection, near to Tianshui city.

This is amongst the four largest Buddhist cave complexes in China with 194 grottoes, 7,200 clay and stone statues and 1,300 square meters of murals. The earliest carvings date as early as 384 (Wei Dynasty) and continue over the next 1,500 years. The mountain is studded with caves and wrapped in rickety walkways and spiral stairs, and rises dramatically from its surroundings.

Threats include unmanaged visitor numbers and the decline of sacred documents that are threatened by mold and rot, and damage by moths and mice.

In 2004, the site received 310,000 tourists and RMB 417.6 million in tourism revenue.

Lutusi Ancient Government Complex Site

In Yongdeng County, Lanzhou City, the site has National Cultural Heritage Protection. It is the most complete local ancient palace complex that has survived through Chinese history. The complex was used by local leaders under the Minority Rule System. Under this system, during the Yuan, Ming and Qing Dynasties, hereditary chiefs were put in charge of local governance and this building is an emblem of the minority peoples' rights of autonomy. It is the oldest, largest and most complete example of an administrative building complex used by local leaders under the Minority Rule System in the late 14th Century.

Threats include the risk of unsympathetic or overenthusiastic restoration, and there is already some evidence of inappropriate material use at the site.

Figure 0.6 ***Lutusi Ancient Government Complex***

Figure 0.7 ***Qingcheng Ancient Town***

Qingcheng Ancient Town

In Yuzhong county, 90 km from Lanzhou City, Qingcheng town encompasses courtyard houses, under county level protection, and the Chenghuang Temple under Provincial level protection.

Qingcheng has a population of 22,600, and is a "living museum" of fine dwellings with exceptional woodcarving and highly decorated walls. The Ming and Qing Dynasty courtyard houses are the main cultural asset of the town. Other heritage sites of interest include the Gao Family Ancestral Temple, the City Academy, the Chenghuang Temple and the ancient ferry crossing. Lotus ponds to the east of Qingcheng complement the tranquil village environment and a functional water wheel on the northern bank of the Yellow River (opposite Qingcheng) may also be of interest to tourists.

However, the structural integrity of many of the courtyard structures is poor and in urgent need of restoration.

In 2004, there were 22,000 visitors to Qingcheng, generating RMB 380,000 in tourism revenue.

Yellow River Stone Forest Park

Yellow River Stone Forest Park is a National Geological Park, located near Longwan Village in Jingtai County.

It includes a unique geological formation created over a period of more than 4 million years. The site remained beyond tourists' reach until a road was completed in 2003. Tourists are able to travel along a scenic gravel road along the valley floor for approximately 2 km, with spectacular views of near-vertical eroded cliffs on both sides. The main threat to the site is unplanned visitor management.

Mati Temple Scenic Park

A National-level Nature Conservation area, encompassing cultural sites with national-level protection, located 65 km south of Zhangye City in the Sunnan Tibetan Autonomous Prefecture.

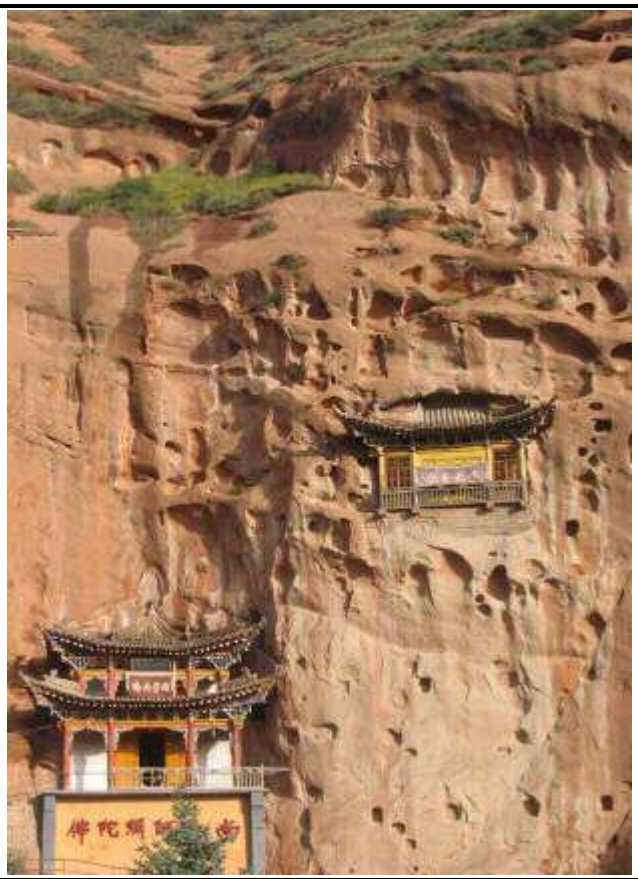
A Buddhist cave complex, including Jinta Temple containing a mummified body that has been decorated in the form of Asparas, the Chinese flying goddess, preserved by the dry climate of Gansu.

The site is threatened by theft and vandalism.

In 2004, the site received 100,000 visitors, generating tourism revenue of RMB 6 million.

Figure 0.8 *Yellow River Stone Forest National Park*

Figure 0.9 *Mati Temple Scenic Park*



Planning and Assessment of alternatives

To address both World Bank OP 4.01 *Environmental Assessment*, requiring the consideration of alternatives as part of the EA, and project planning overall, a significant amount of planning has taken place during the preparation of the project, at provincial, municipal and site-levels. This has included detailed assessment of alternative sites, and iterative preparation of tourism development plans, heritage conservation plans, and feasibility study reports for each site.

Table 6.1 presents the detail of these plans and reports.

Table 0.1 Tourism development plans, Heritage conservation plans and feasibility study reports

Site	Tourism Development Plan	Heritage Conservation Plan		Feasibility Study Report	
		Completion	Prepared by	Completion	Prepared by
Yardang National Geological Park	Completed thoroughly	none		Completed and waiting for approval	Lanzhou Coal Mining Design & Research Institute; Jingwei Environmental Engineering Technology Co., Ltd
Suoyang City	completed thoroughly	completed	Institute of Architectural History of Chinese Architectural Design and Research Academy	Completed and waiting for approval	Forestry Investigation and Planning Institute of Gansu Province
Jiayuguan Great Wall	completed thoroughly	The Second draft completed	China Academy of Urban Planning and Design	Completed and waiting for approval	College of Tourism, Northwest Normal University
Wei Jin Folk Culture Park	completed thoroughly	Outline	Lanzhou University; Dunhuang Academy	Completed and waiting for approval	College of Tourism of Northwest Normal University
Mati Temple Scenic Park	completed thoroughly	Under preparing	Cultural Relics Protection Institute of Zhangye City	Completed and waiting for approval	Engineering Consultation Center of Zhangye City

Site	Tourism Development Plan	Heritage Conservation Plan		Feasibility Study Report	
		Completion	Prepared by	Completion	Prepared by
Qingcheng Ancient Town	completed thoroughly	Draft	Lanzhou Engineering&Research Institute of Nonferrous Metallurgy Co.; Gansu Cultural Relics Protection and Maintenance Research Institute; Institute of Dunhuang Studies of Lanzhou University.	Completed and waiting for approval	Lanzhou Engineering&Research Institute of Nonferrous Metallurgy Co.; Gansu Highway Communication Surveying and Design Corp.; Institute of Dunhuang Studies of Lanzhou University.
Lutusi Ancient Government Center	completed thoroughly	Completed and waiting approval	China National Institute of Cultural Property	Completed and waiting for approval	Forestry Investigation and Planning Institute of Gansu Province; School of Management of Lanzhou University
Yellow River Stone Forest Park	completed thoroughly	none		Completed and waiting for approval	Forestry Investigation and Planning Institute of Gansu Province
Majishan Scenic Area	completed thoroughly	On a bidding		Completed and waiting for approval	Yuanjian tourism research Co., Ltd
The whole project	Completed by Chinese Academy of Sciences and waiting for approval	none		Completed and waiting for approval	Forestry Investigation and Planning Institute of Gansu Province

This chapter presents a summary of the planning and assessment of alternative sites and alternative investments at each site.

PLANNING AND ASSESSMENT AT THE PROGRAMME-LEVEL

At the programme level, a range of activities have contributed to the assessment of alternatives:

- Screening of an original seventeen proposed sub-components;
- A strategic overview study; and
- A safeguards review study.

Sub-component Screening

At the outset of the preparation of the project, GPG proposed sub-components at seventeen sites for appraisal by the World Bank. Screening began during the Pre-identification mission in July 2005 and carried on until the pre-appraisal mission in March 2007, when the list of programme sub-components was finalised.

Alternatives were considered via screening of the initial proposals against criteria that included consideration of environmental, heritage and social aspects of individual sub-components. The criteria were:

1. Cultural and Natural Heritage Content
   - sustainable high value heritage content;
   - commitment to appropriate use, protection, presentation, research, education;
   - heritage focus - separation (actual or planned) from recreation and amusement;
   - dual content - both cultural and natural heritage content;

2. Financial Viability
   - availability of counterpart funding within a sustainable debt structure;
   - commitment to allocate sufficient preparation budget;
   - significant revenue generation potential supported by realistic financial analysis;

3. Potential for Local Economic Development
   - employment opportunities and community participation for the local population;
   - poverty alleviation potential;
   - reasonable economic rate of return supported by a realistic economic analysis;

4. Market Potential
   - located close to a tourist hub and/or potential for site clustering;
   - contribution to project branding (Silk Road, Great Wall, and Yellow River);
   - significant projected demand supported by realistic market analysis;

5. Need for Immediate Protection
   - immediate threat to valuable heritage content;
   - highly technical probable mitigation measures;
   - demonstrated intent to apply protection measures that respect heritage content.

Table 6.2 shows the full list of sites appraised. Seven of the original proposals were ultimate screened. For example, Moon Crescent Lake, was screened out of the programme during this stage, in large part owing to environmental and technical concerns associated with proposals for artificial recharge of the aquifer underlying the lake.

Table 0.2 Initial Seventeen Sites Screened for Potential Inclusion

Municipality	Provisional Site Reference	Site Name
Jiuquan	1	Moon Crescent Lake
	2	Yardang National Geological Park
	3	Yang Guan Gate
	4	Western Han Dynasty Park (Wine Spring)
	5	Jianshui Jinguan Military Gate
	6a	Suoyang Town
	6b	Qiaowan Town
	7	Huo Shao Gou Tribal Village
	7a	XiLiang King Tomb/Jiuquan Museum
Jiayuguan	8	Jiayuguan Great Wall
	9	Wei Jin Folk Culture Park
	10	July 1st Glacier
	11	International Gliding Facility
Tianshui	12	Maijishan Scenic Area
Lanzhou	13	Lutusi Ancient Government Center
	14	Shi Chuan Ancient Pear Orchard
	15	Qingcheng Ancient Town
Baiyin	16	Yellow River Stone Forest Park
Zhangye	17	Mati Temple Scenic Park

Strategic Overview Study

A Strategic Overview Study was completed, which contributed to the screening process. The study:

- Assessed Gansu's long-term strategy and logical framework of policy and development options for the protection, conservation, rehabilitation, and sustained use of the cultural assets in the Province;
- Provided guidance on cultural (including ethnic and eco) tourism potential in Gansu, based on a brief national overview;
- Reviewed existing cultural heritage and tourism plans (including policy and development options) prepared by the Borrower; and
- Assessed the adequacy of Gansu's policies and development scenarios for the cultural tourism sector in Gansu.

A total of 526 cultural heritage sites protected at or above the provincial level was compiled by the study, indicating the range of potential alternative sub-components for project-financing.

Safeguards Review Study

A safeguards review study was prepared, setting out safeguards issues at provincial, municipal and site levels.

- At the strategic level, baseline information for the province and municipalities was gathered, and used to inform the overall geographical spread of the project;
- At the site level, each World Bank safeguard policy was considered, drawing conclusions on the requirements for an environmental assessment report, environmental management plan etc, and triggering the detailed assessments

which have fed into this report. Twelve sites were considered in total, ten of which went on to final list.

The July 1st Glacier site was ruled out on the grounds that many of the proposed physical investments were inappropriate (eg viewing platform, fencing, etc) and would threaten the sustainable development of the area. July 1st Glacier is located in an area of high environmental sensitivity.

PLANNING AND ASSESSMENT AT THE SUBCOMPONENT LEVEL

At the sub-component level, several mechanisms were built into project preparation to ensure the consideration of alternatives, including:

- A review of Heritage Master Plans; and
- The preparation of environmental assessment reports or environmental management plans for each site (summarised in this report);
- Regular feedback from the World Bank's Task Team and specialist consultants in the fields of environmental protection, heritage conservation and social development, through a series of missions, during which draft cultural heritage and tourism development plans were reviewed. Feedback was communicated to the PMO and to individual sites via a series of workshops held in Lanzhou City and via Aides Memoire after each mission that were shared with Provincial and site level authorities.

Heritage Master Plan Review

A detailed review of heritage site master plans was carried out. Examples of the recommendations made in relation to each plan are provided in *Annex D* for Jiayuguan Great Wall and Majishan Scenic Area.

The review commented on the adequacy of existing site management plans and tourism strategies, and developed strategic and technical proposals that would raise the quality of the plans.

The overall conclusion of the review led to the development of the institutional strengthening component of the project, as to address shortcomings in the system of financing tourism and heritage, in the management and planning of tourism and heritage and in the institutional capacity at provincial, municipal and local level in the province.

Preparation of Environmental Assessment and Environmental Management Plans

Environmental assessment at each site has also contributed to the assessment of alternatives to specific measures. The key alternatives cited in the site assessments are summarized below.

Alternative Wastewater Treatment Plans at Yellow River Stone forest:

Two alternative schemes were assessed: Sequence Batch Reactor, and A/O (Anaerobic-aerobic) process, as shown in *Table 6.3*. The Sequence Batch Reactor was chosen finally.

Table 0.3 Alternative Wastewater Treatment Processes at Yellow River Stone Forest

Items	**Scheme □**	**Scheme □**
Merits	• Short process, few and simple facilities, and easy to operate; • The process can be operated according to the water volume and water quality; • The process runs stably and the time for sedimentation is short and the effect is good with low power consumption; • The bulking sludge can be controlled effectively; • This process also has biological removal of nitrogen and phosphorus.	• The organic materials can be removed effectively; • The ammonia-nitrogen removal rate can reach beyond 60%, and the phosphorus in wastewater also can be removed; • Easy to manage; • Occupies a small area.
Shortcomings	The treatment period is long.	• High investment; • High operation cost; • The sludge generated will be of a large volume.

Alternative Road Routings at Yardang National Geological Park:

Two alternative routes for the road at the park were assessed: (i) a 19 km road entirely in the experimental area of the nature reserve zone; (ii) a 23 km road, starting from the same point, but passing through a saline area for 1 km. *Table 6.4* presents a comparison of the roads, showing that the 19 km road was selected, on the grounds lower ecological impacts, and accordance with the reserve regulations.

Table 0.4 Alternative Road Routings at Yardang National Geological Park

Items	**Scheme □**	**Scheme □**
Landform along the road	Flat, easy for construction	The road will pass through a saline area 1 kilometre in length. Difficult for construction.
Investment	Low	High
Ecology	The road will pass through a wetland 2.5 kilometers in length.	The road will pass through a wetland 4 kilometers in length□
Visual impacts	It will have visual impacts.	It will have visual impacts.
According with *Natural Reserve Zone management regulations* or not	The entire road is located in the experimental area of the nature reserve zone. It is in accordance with the reserve regulations.	The road is located in the buffer area of the nature reserve zone. It is not in accordance with the regulations.
Recommendation	Recommended	Not recommended

Alternatives at Lutusi Ancient Government Centre

Two alternative parking lot locations were compared at Lutusi: (i) 60 metres south of the heritage pedestrian street and west of Minmen Road, and (ii) at the southeast corner of the junction between the heritage pedestrian street and Minmen Road. *Table 6.5* presents details of the alternatives.

The second scheme was recommended by the site environmental assessment, on the basis of lower solid waste and noise impacts, and the adoption of mitigation measures for the disposal of construction waste and tourism safety.

Table 0.5 Alternatives Comparison for Parking Lot

Items	Scheme □	Scheme □
Key features of the alternatives		
Scale	120 parking spaces and relevant service facilities	120 parking spaces and relevant service facilities
Area of parking lot	2000 m^2	2000 m^2
Area to be displaced	Low resident house density, 1315 m^2	High resident house density, 1450 m^2
Others	Building a new toilet and new stores 600 m^2	Building a new toilet and new stores 680 m^2
Social impacts		
Households displaced	13	17
People displaced	69	77
Traffic impact	Tourists can visit the Lututsi Yamun, Liancheng ancient town, Xianjiao Temple and Leitan Temple without going through the S301road. No impact on traffic.	Tourists have to go through the S301road to visit the Lututsi Yamun, Liancheng ancient town, Xianjiao Temple and Leitan Temple. There are some impacts on traffic.
Ancient houses to be removed	None	None
Comparison of Tourism Potential		
Distance from main scenic spots	The distance between parking lot and Lututsi Yamun is about 310 metres. Tourists have to pass a village path and the heritage pedestrian street to reach the Lututsi Yamun. The distance is a little longer.	The distance between parking lot and Lututsi Yamun is about 220 metres. Tourists only need to pass the heritage pedestrian street to reach the Lututsi Yamun. The distance is a little shorter.
Tourists safety	Tourists need not to go through the road during sightseeing.	Tourists need to go through road twice during sightseeing. Higher road safety concerns than scheme I.
Sightseeing	Tourists can see the scenes of ancient town and house styles on the way to the main scenic spots.	Tourists can only visit the main scenic spots. If they want to see the scenes of ancient town and house style, they need to walk around.
Items	**Scheme □**	**Scheme □**
Environmental impacts		
Construction waste	The construction waste generated during house removal will be used to fill the area of the parking lot.	The construction waste will be 2831.2m3, and will require transport to landfill for disposal.
Solid waste management	Garbage bins are available only on the heritage pedestrian street. There are no garbage bins on other roads. The garbage generated by tourists will require additional facilities.	Tourists can directly enter the main scenic spots by the heritage pedestrian street. So there is less requirement for additional facilities.
Noise	Tourists need to pass two village paths to visit the main scenic spots. The area influenced by tourism noise will be larger than scheme II.	Tourists can directly enter the main scenic spots by the heritage pedestrian street. The area influenced by tourism noise will be smaller than scheme I.

Also at Lutusi, two alternative schemes for toilets were assessed: (i) water flushing toilets and (ii) dry toilets without water flushing. *Table 6.6* shows the comparison. The assessment concluded that the toilets with water flushing are recommended, except that one (in a location where water supply is limited) will be a dry toilet.

Table 0.6 Assessment of Alternative Toilet Schemes at Lutusi

Items	Water flushing toilets	Dry toilets
Scale	7 toilet cubicles	4 toilet cubicles
Area occupied	72 m^2	60 m^2
Investment (10,000 RMB)	570, 000 RMB	400, 000 RMB
Requirement	Good sanitation conditions, fitting with tourists' custom. Able to satisfy demand during the peak tour period.	Relatively bad sanitation conditions and not according to the tourists' customs. Satisfies demand only during normal tour period.
Operation Cost (10,000RMB)	29000 RMB	39000 RMB
Water consumption (t/d)	6.45	0
Power consumption (kwh/d)	2	12
Environmental Impacts	Waste will be treated and discharged into an irrigation channel. No impacts on Datong River water quality.	Waste will be packaged and used as fertilisers. The urine will be treated and discharged into irrigation channesl. No impacts on Datong River water quality.
Air Quality	No impacts on air quality.	There may be odours around the toilets.

Alternatives at Maijishan Scenic Area

Examples of proposed activities that have been removed from the project are:

- A landfill site; now replaced by the alternative of twelve garbage collectors;
- A tourist boat and dock construction; replaced by environmental improvements around Yinyue Lake (dam restoration, mud dredging and ecological restoration).

Feedback from the World Bank Task Team

Regular feedback from the World Bank task team to the provincial, municipal and site authorities in Gansu has contributed to a shift of emphasis from the original project concept. This has occurred (i) from an overemphasis on infrastructure towards a holistic approach to tourism development and cultural heritage conservation, and (ii) from an overemphasis on increasing tourism levels towards a win-win balance between tourism revenues and cultural heritage conservation.

From Infrastructure to a Holistic Approach

At the Identification Mission, the World Bank staff noted that the plans for cultural and natural heritage conservation, both at provincial and municipal levels, focused on the construction of assets rather than a creation of a platform for sustainable heritage and tourism management. It was a centrally-planned, supply-led approach, based upon insufficient tourism market knowledge or cultural heritage management standards. However, the preparation of the Gansu project has contributed to a mindset change, with a positive trend throughout the province of many individuals to learn from the success and mistakes of others elsewhere in China, Asia or the world, and to plan site development in a way which preserves the value that the site offers to tourists.

The initial plans of the authorities in Gansu tended to seek to maximize revenue from tourism, with little attention being paid to the need to preserve the heritage that is attracting the tourists. Discussions between the World Bank task team and the authorities have led to a very shift from this position. Initially the shift led to the converse approach – of focusing too much on heritage conservation, to the detriment of planning for tourism to increase revenues that can be ploughed back into conservation. Through repeated discussions, a strong understanding is held amongst the project partners of a suitable balance between tourism and heritage protection.

ADDITIONAL ALTERNATIVES

In keeping with the GPG's plans to promote sustainable tourism to the Province, additional opportunities will be sought for improved use of environmental technologies at each site. This may include solid waste management, procurement of materials from sustainable sources, and use of rainwater harvesting for example (see *Section 7.4*). There may be further opportunities related to environmental technologies including the use of small-scale wind and solar energy to provide electricity at the sites, water heating and technologies to reduce demand for electricity.

Importantly, each of these can make a positive contribution to a successful tourism marketing strategy for Gansu, encompassing reference to the environmentally and socially sustainable approach of Gansu, and Gansu's 'brand'.

PREDICTED IMPACTS

This chapter describes the predicted environmental benefits and adverse environmental impacts of the project. Details of the predicted impacts and mitigation measures for each site are provided in Volume II.

OVERALL BENEFITS AND IMPACTS OF THE PROJECT

Overall Benefits

The project addresses the sustainable development of Gansu's cultural and natural heritage, and therefore can be predicted to deliver ***significantly positive benefits*** in improved preservation and conservation of this heritage. The project will instil a commitment to, and practical experience of, sustainable approaches to tourism development amongst the GPG and the public in Gansu, resulting in enhanced cultural heritage appreciation, environmental sustainability and economic development of isolated populations.

Owing to the national significance of Gansu's heritage, the project also has the potential to make a substantive contribution to the development of approaches to sustainable tourism in China as a whole.

The project also can be predicted to deliver positive environmental and social benefits. If the investments at each site are carried out responsibly, they will contribute to the improvement of local environmental conditions. Landscaping at some of the sites, including planting of trees, will deliver local improvements in the environment, conserve water and soil, and reduce noise.

Social and economic benefits can be realised through the use of increasing numbers of tourists to accelerate the development of service industries, with associated improvements in working conditions for employees. Economic development driven by tourism will increase job opportunities and enhance incentives for the protection of natural and cultural heritage.

Risks of Adverse Impacts

However, there are the following risks of adverse impacts, both at a strategic, provincial level, and at the level of the nine key sites of investment.

- **Inappropriate, unsustainable tourism development**

There are risks that the project will fail to deliver its predicted benefits for cultural heritage preservation at particular sites, or overall. In the worst case scenario, significant investments may be made in inappropriate infrastructure at any particular site, resulting in a reduction in the economic and cultural value of the site. This may be a risk if the investments are made without an accompanying ethic of sustainable tourism and cultural heritage preservation, and careful design of investments.

- **Damage to physical cultural heritage**

There is a risk of damage to physical cultural heritage from demolition, reconstruction or inappropriate restoration of physical monuments, structures and significant architecture and from unintended archaeological "chance-finds" during construction.

Unnecessary reconstruction or restoration that does not match the original architecture, style and colour is a threat to Gansu's heritage. Similarly, renovation of traditional buildings with low quality materials or without expert guidance may result in the irreversible loss of valuable heritage.

- **Distribution of benefits**

There is a risk that the economic benefits arising from increasing levels of tourism may not be evenly spread through local communities. People who are particularly vulnerable – for example the elderly and disabled – may not have the capabilities to benefit from the tourism industry, but may be adversely affected by increased demand on local resources or higher prices. Men or women may disproportionately benefit, leading to social and family tensions. At one site where there are a range of ethnic groups, some groups may benefit to a greater extent than others, leading to inter-ethnic resentment and conflict.

- **Induced development**

If the numbers of tourist visits to Gansu and to each site, increase as planned, it is inevitable that additional developments will be made to cater for the increased

numbers. At each site, this may threaten the visual beauty or cultural heritage of the site, and create risks of environmental pollution. However, at each site, zoning plans (core zone, buffer zone etc) are in place to control induced development.

Increased tourism in Gansu will contribute to the pressure for increasing development in Gansu (in hotels, water infrastructure, waste management etc), but the contribution of increasing tourism is insignificant, in comparison to trends in investment in the province from other sectors.

- **Introduction of social ills**

Unplanned development of the tourism sector may carry the risk of increasing social ills such as begging and prostitution. These may arise if the industry attracts numbers of migrant workers in excess of the availability of new jobs, or if revenues from tourism fail to trickle down to local communities. The adoption of clear employment policies during construction, and programmes to support the development of small enterprises are required mitigation measures at each site.

SPECIFIC RISKS LIKELY AT ALL SITES

There are risks of adverse environmental impacts at each site, but all can be avoided, and none are so significant or severe that they cannot be readily mitigated or managed.

The most significant potential impacts are at the Jiayuguan Great Wall (related to the restoration of the First Signal Tower that is in a precarious position) and Majishan Scenic Area (related to the rehabilitation of two small-scale dams). All other impacts are of more limited significance and can be readily mitigated.

In addition, there are some opportunities to deliver environmental benefits. *Table 7.1* sets out a summary of the risks that apply to more than one site, and in most cases all sites, including proposed mitigation measures. Further detail on risks that are unique to particular sites is provided in *Section 7.3*.

Visual impact

Poor design of the infrastructural civil works, poor planning of the location of facilities, and the construction of facilities that are not warranted by realistic predictions of visitor numbers, threaten the visual and aesthetic features of the sites, which are vital to their economic value. It is imperative that infrastructure is in keeping with the local heritage and environment, and is built in accordance with each site plan.

The careful design of infrastructure, also offers an opportunity to create a consistency of design of buildings, roads and paths, and signage etc across Gansu's heritage sites, contributing to the development of a Gansu tourism 'brand'.

Disposal of solid waste and construction waste

Construction and renovation activities will create construction waste which will require responsible disposal. Increased visitor numbers will also result in increased

solid waste arisings. An approach to solid waste management is required that: minimises waste arisings, promotes the re-use of waste, promotes local recycling and composting, and is based on 'circular economy' principles. Landfill should be used only as a last resort, and landfill sites must be suitably located. If environmental constraints prevent landfill disposal on site, solid waste must be transferred to off-site disposal facilities.

There is an opportunity to develop and implement a waste management strategy for Gansu's tourism sites that encompassed minimisation, reuse and recycling. The strategy could contribute to the development of small waste management enterprises amongst local communities. In particular, a successful waste management strategy would contribute to Gansu's tourism marketing strategy and brand. Waste management strategies would be particularly important for the town sites of Lutusi and Qingcheng.

Procurement of materials from sustainable sources

The use of construction materials from sources that have an impact on the environment should be avoided. This would include stone, cement, gravel and sand, and bitumen used in building and road construction. There is an opportunity for the PMO to investigate options to maximise the procurement of materials from sustainable sources. A successful 'sustainable procurement' strategy would contribute to Gansu's tourism marketing strategy and brand, through the use of traditional, local materials from sustainable or renewable sources.

Unsustainable groundwater and surface water extraction

Construction of buildings and roads, and ongoing maintenance of the facilities, will use water. The availability of groundwater and surface water varies from site to site, and is extremely limited in some cases. Extraction of water must therefore be kept within the amounts permitted in *Detail Implementation Rules of Water Extraction Permit in Gansu Province* inspections by the Water Resource Bureau.

Depending on local levels of precipitation, there may be opportunities for rainwater and snowmelt harvesting. In addition, it may be possible to use roof-collected water and

Pollution of local surface water courses with wastewater

Disposal of wastewater to local surface water courses will have adverse impacts on local ecology, and on human health. In all cases, disposal of wastewater to water courses must be avoided. The location, construction and maintenance of cesspits and wastewater treatment plants must be managed to avoid any leakage of effluents to watercourses.

Risk of injury to workers and the public

Key issue at all sites will be the health and safety of construction workers, and the prevention of access to the site by the public. At some sites in particular (Jiayuguan Fortress and First Signal Tower), workers will be operating at great

height, requiring meticulous attention to health and safety. The public will also be at a low probability of injury when the sites are open to the public. An emergency response procedure is required for all sites during construction, and it should be adapted and kept in place during operation.

Land take

At all sites, small areas of land will be taken by buildings, parking lots, roads and other facilities. In most cases the land is not occupied, or used for any economic purpose. However, in two cases (Lutusi and Qingcheng) land that is occupied will be required. Resettlement Action Plans have been prepared for these sites, and an overall Resettlement Action Plan and Policy Framework for the project has been prepared.

SPECIFIC RISKS APPLYING TO INDIVIDUAL SITES

At some sites, there are environmental risks that are a result of the sites unique environment, or the particular investments to be made at the site.

The most significant risks are expected at Jiayuguan Great Wall, related to the restoration of the First Signal Tower, and at Majishan Scenic Area, related to the restoration of two small-scale dams. The relevant tables for these sites in Volume II describe the specific risks and proposed mitigation measures.

Jiayuguan Great Wall

Structural enhancement to the foundation of the First Signal Tower , and reconstruction of river embankment of the First Signal Tower has the potential cause significant damage to the First Signal Tower itself, and disturbance to the river.

The First Signal Tower is located in a precarious position at the top of a cliff adjacent to the gorge of the Yellow River. Works at the tower will have to be carried out with extreme care to avoid *undermining* its foundation, and to avoid highly serious health and safety risks of both workers and the public.

In addition, intentional or unintentional disposal of construction debris into the adjacent river during construction could potentially damage the riverine ecological communities, and downstream users of the river water. The renovation of the embankment adjacent to the river – intended to protect the cliff from further erosion that threatens the foundation of the First Signal Tower – is likely to alter river sedimentation processes, leading to erosion downstream, or erosion of the new river embankment.

Mitigation measures required are:

- The construction of the river embankment according to engineering design that takes full account of river sedimentation and erosion;
- Appointment of a competent contractor to carry out foundation enhancement, with demonstrable track record of work of this nature.

Majishan Scenic Area

Activities at Majishan will include two activities of potential significance:

- Yinyue Lake protection in Shimen sub-area, including engineering enhancement to the existing dam (10 m high, 60 m long) through new sluice gate, building lake embankment of 300 meter long on north side, 1000 m of footpaths, dredging of 6,000 m3 of mud, constructing administration building of 500 m2 floor space;
- Xianren Lake protection in Xianrenya sub-area, including engineering enhancement to the existing dam, landscaping and ecological restoration to the surrounding hills; dredging of 3 creeks at entrances to future lake.

These activities have been subject to initial dam safety analysis in April 2007, which has concluded as follows.

Yinyue Lake

The height of the dam is 10 m. The dam consultant concluded that the structure is as safe with the planned restoration, and at the limited storage water level of 1.20 m. Based on a 1 in 50 year flood in 2005, discharge capacity is large enough to pass floods and meets the flood control requirement. In addition, based on the geological condition and 50 year's natural operation, the structure of the discharge tunnel can be also considered as safe with necessary lining treatment.

The consultant recommended that dam operation and management is assigned to management personnel and an OMS manual is prepared (Proposed content of the OMS Manual is included in the consultant's report in *Annex E*), and that an EPP is prepared (a proposed content of the EPP is included in *Annex E*).

Xianren Lake

The maximum height of the dam is 20 m. The dam safety consultant recommended:

- A comprehensive dam safety appraisal according to "The Method of Dam Safety Appraisal" and "Guidelines on Dam Safety Evaluation", to clarify the safety situation and make recommendations for dam operation.
- Assignment of dam operation and management personnel and preparation of OMS manuals. (A proposed content of the OMS Manual is included in the consultant's report in Appendix D).
- Preparation of an Emergency Preparedness Plan (EPP) to ensure the safety of tourists and protect the ecological environment of the scenic area (A proposed content of EPP is included in Annex F);
- Several specific recommendations concerning dam and mechanism structures.

In addition, in order to avoid disturbance to the ecological integrity of the area, the location of building, paths and roads etc and all construction activities should take place within spatial and seasonal constraints, based on important habitats and rare or endangered species, and avoidance of disturbance to these areas.

OPPORTUNITIES

In addition to the opportunities referred to above, for improved solid waste management, procurement of materials from sustainable sources, and use of rainwater harvesting, there may be further opportunities related to environmental technologies. They would include the use of small-scale wind and solar energy to provide the electricity requirements for the sites, water heating, technologies to reduce demand for electricity, etc.

Importantly, each of these can make a positive contribution to a successful tourism marketing strategy for Gansu, encompassing reference to the environmentally and socially sustainable approach of Gansu, and Gansu's 'brand'.

Consultation and Disclosure

This chapter describes the public consultation and disclosure carried out during project preparation, and its results.

BACKGROUND

Based on the *Interim Method for Public Participation in Environmental Impact Assessment* issued by SEPA on 14 February 2006, construction projects that may have significant environment effects must incorporate public comments into the EIA report. Either the project proponent or the EIA agency must provide project information to the public and to the EPB during the process of conducting the EIA. Information disclosure can be conducted by the project proponent or the EIA institute via:

- Bulletin or public media in the project area;
- Handout containing the information on the bulletin; or
- Other means that ensure a convenient access to the project information by the public.

Public consultation shall be organized by either the project proponent or the EIA institute after bulletin or brief EIA report is publicised, via:

- Public survey, such as questionnaire survey;
- Expert consultation;
- Workshops;
- Debates; and
- Public hearing.

The public opinions and suggestions shall be carefully considered by the project proponent, or the EIA institute, and the reasons for adoption or dismissal shall be incorporated into an annex attached to the EIA report.
The *Law on Environmental Impact Assessment of PRC (2003)* stipulates that the state encourages relevant entities, experts and the general public to participate in the process of the environmental impact assessment (EIA) in appropriate ways (*Article 5*).

METHODOLOGY OF PUBLIC CONSULTATION

Public consultation during the preparation of this project was carried out using a questionnaire survey, expert consultation, workshops and a public hearing. Participants in of public consultation mainly included the organisations and individuals potentially affect by environmental impacts, NGOs and experts. The methods used, participation of stakeholders, and findings of consultation are summarised for each site in Volume II.

DISCLOSURE

Information on the project and potential environmental impacts has been publicly disclosed through various means, summarized in *Volume II*.

The sites of Mati Temple, Qingcheng, Shi Chuan, Suoyang and Yardang have selected public representatives to supervise the environmental protection during construction and operation. These representatives will report the environmental problems existing in these sites and relevant suggestions to the site managers and EPB, and will take part in EPB inspection of completion of civil works.

Please also note that monitoring reports produced during project implementation will be disclosed through similar means as in the site tables in Volume II.

ENVIRONMENTAL MANAGEMENT Plan

This chapter describes the elements of the Environmental Management Plan (EMP) that will be used by the project. Specific mitigation measures to be implemented at each site are provided in Volume II.

This chapter includes: environmental management measures; responsibilities for environmental management; procedures to be followed to ensure that any project activities that are not currently included in the current design are subject to the required environmental assessment process; a summary of monitoring requirements; training requirements; and costs of implementation of the EMP.

ENVIRONMENTAL MANAGEMENT MEASURES

Assessment of the potential impacts of the project, and its activities at each site, shows that there is a wide range of mitigation measures that are applicable to all sites, as well as actions required of the PPMO to support environmental management. *Table 9.1* describes the actions that are necessary to put these mitigation measures in place.

The measures can be grouped as follows.

Preparation

- Appointment of the PPMO environmental management officer, and appointment or identification of officers with responsibility for environmental management at each site;
- Detailed design of the investments at each site to ensure minimum standards of design, and production of a design that enhances visual and landscape value;
- Review of the detailed designs for all investments to identify feasible options for the use of sustainable environmental technologies at each site;
- Design of a project-wide chance finds policy.

A sample ‘chance finds’ policy is provided in *Annex G*. This proposal is consistent with Chinese regulations, and the approach has been used by other Bank-financed projects.

Measures Required Prior to Construction

- Preparation of the detailed requirements of sound construction management, including the measures required to avoid damage to fragile cultural heritage, to include in the bidding process for contracted operations as well as operations to be carried out directly by government agencies;
- Attaining all required permits, including (i) formal approval of each site-level EIA / EMP from the relevant EPB; (ii) a water abstraction permit obtained from the Water Resources Bureau for all water supply developments; (iii) approval of a Construction Management Plan from the relevant EPB Construction Department; (iv) approval of Health and Safety plans from the relevant EPB Construction Department.

Please note that Construction Management Plans are required to be submitted to the local EPB, and must be approved before construction can begin. The plans will be reviewed by both the PPMO environmental officer, third party supervising engineer, and EPB. Construction Management Plans will be a contractual requirement of all construction contractors. The third party supervising engineer will monitor adherence to the plans.

A template 'Construction Management Plan' is provided in *Annex H*.

Measures Required During Construction

Implementation of:

- Construction Management Plans, encompassing erosion control, noise control, wastewater management and solid waste management, and the miinimisation of use of construction materials from non-sustainable sources;
- Site Health and Safety Plans encompassing protective clothing, safe working at height, safe use of pesticides, procedures to follow in the event of an emergency, and prevention of public access;
- 'Chance finds' policies.

In addition, there is a requirement for independent third party supervision of construction management and health and safety, and third party supervision of cultural heritage preservation.

Measures Required During Operations:

- Adoption and implementation of environmental policies by each site, incorporating water and wastewater management plans, vehicle management, air quality management etc;
- Site Health and Safety Plans encompassing public safety and emergency procedures, in addition to worker health and safety;
- Ensure that a water abstraction permit has been obtained from the Water Resources Bureau when surface water or groundwater is required for site operations;
- Community engagement to maximise benefits from tourism for local communities, and prevent unplanned gathering of vendors and beggars.

A template environmental policy is provided in *Annex I*.

Table 0.1 Environmental Mitigation Plan

Measures	Responsibility	Timing	Incremental Cost (RMB)
Preparation			
Detailed design of the investments at each site to ensure minimum standards of design, and production of a design that enhances visual and landscape value	PPMO director, through appointment of design consultants	YR 0	Nil (in IST component)
Review of the detailed designs for all investments to identify feasible options for the use of sustainable environmental technologies at each site	PPMO director, through appointment of suitable consultants	YR 0	Nil (in IST component)
Design of a project-wide chance finds policy.	PPMO	YR 1	Nil (to be carried out by PPMO)
Measures Required Prior to Construction			
Employment of PPMO environmental management officer, continuing through project implementation	PPMO director	YRS 1-6	20,000 per annum X 6 years = 120,000
Employment of officer with responsibility for environmental management at each site, continuing through project implementation	Site PIUs	YRS 1-6	20,000 per annum X 6 years X 10 sites = 1,200,000
Preparation of the detailed requirements of sound construction management	Site management	In advance of bidding for construction	Nil (to be carried out by site management)
Attain approval of EIA / EMP from relevant EPB	Municipal PMOs	YR 0	Nil
Attaining all required permits for each investment, including water abstraction permit, approval of a Construction Management Plan, and approval of Health and Safety plans from the relevant EPB Construction Department	Site Management / Municipal PMOs	In advance of bidding for construction	Nil
Appointment of independent third parties	Site management / Muncipal PMOs	In advance of bidding for construction	Nil
Measures Required During Construction			
Implementation of Construction Management Plans	Contractors or Government Construction Depts	During construction	Nil
Implementation of Site Health and Safety Plans	Contractors or Government Construction Depts	During construction	Nil
Implementation of 'Chance finds' policies	Contractors or Government Construction Depts	During construction	Nil
Independent third party supervision of construction management, health and safety, and cultural heritage preservation	Third party contractors	During construction	Total of USD 305,455 (details set out for each site in Volume II)
Measures Required During Operations:			
Adoption and implementation of environmental policies	Site management / Muncipal Authorities	Following completion of construction works and continuing through operation	Nil (covered by ongoing operating costs)
Implementation of Site Health and Safety Plans	Site management / Muncipal Authorities		
Ensure that a water abstraction permit has been obtained for continuing water extraction	Site management / Muncipal Authorities		
Community engagement	Site management / Muncipal Authorities		

Specific Measures at Each Site

Table 9.2 lists measures that will be taken at each site concerning a range of impacts that are unique to particular sites. These include adequate design of river embankments at the Jiayuguan First Signal Tower and Yellow River Stone Forest, adequate design of the construction works to support the foundation of the First Signal Tower, dam safety measures at Majishan Scenic Area, and implementation of sufficient mitigation measures concerning small landfill facilities or solid waste management at Mati Temple Scenic Area, Qingcheng, Lutusi, Majishan Scenic Area, Yellow River Stone Forest and Yargdang National Park.

More specific suggestions concerning construction management, health and safety, cultural heritage preservation etc are set out in the individual site tables in Volume II.

Table 0.2 Additional Mitigation Measures Specific to Certain Sites

Measures	Responsibility	Timing	Incremental Cost (RMB)
Preparation			
Jiayuguan First Signal Tower: Design of river embankment according to engineering design that takes full account of river sedimentation and erosion	Municipal PMO	YR 0	Nil
Jiayuguan First Signal Tower: Risk of damage to the First Signal Tower during strengthening of the cliff, owing to its precarious position on the cliff top: design of works and to avoid risk to First Signal Tower	Municipal PMO	YR 0	Nil
Yellow River Stone Forest: Design river embankment on sound principles of river geomorphology, and minimise the size of the embankment to reduce habitat loss	Municipal PMO	YR 0	Nil
Majishan Scenic Area: Implementation of measures recommended in dam safety reports, prepare Operation and Maintenance plans and Emergency Preparedness Plans	Site management, Municipal PMO	YR 0	2000 RMB per day for dam safety consultant X 20 days = 40,000 RMB / USD 5195
Qingcheng: Design of landfill to avoid pollution from leachate, and inclusion of adequate stream crossing on approach to landfill site	Muncipal PMO	YR 0	Nil
Measures Required Prior to Construction			
Jiayuguan First Signal Tower: Appointment and monitoring of contractor with full understanding of Gansu Water Resources and Hydropower Design Institute's designs for river embankment	Municipal PMO, Supervision Management Engineer	YR 1	USD 31,169 for supervision
Jiayuguan First Signal Tower: Appointment and monitoring of contractor with full understanding of the Ministry of Railways' designs for cliff strengthening works	Municipal PMO, Supervision Management Engineer	YR 3	As above for supervision
Majishan Scenic Area: Identification of the spatial and seasonal constraints to the location of building, paths and roads etc and to construction operations, based on important habitats and rare or endangered species, and avoidance of disturbance to these areas.	Site management	YR 1	Nil
Majishan Scenic Area: Construction supervision and quality assurance of dam safety work, Implementation of operation and maintenance plans, and emergency preparedness plans	Site management and supervising engineers	YR 1 for construction supervision, YRS 1-5 for O&M and EPP plans	USD 93,506 for supervision
Mati Scenic Area: Incorporation of adequate screening (tree planting) around the site to limit visual and odour impact.	Scenic Area Administration	YR 1	Nil
Lutusi: Provide assurance that solid waste will be disposed of at the nearest sanitary landfill, and monitoring of this.	Municipal PMO	YR 0	Nil
Majishan: Completion of full environmental assessment of proposed site for landfill, as part of procurement of a new	Municipal PMO	YR 1	Nil (included in cost of contracting landfill

landfill through contractors.			construction and operation)
Measures Required During Construction			
Yellow River Stone Forest: Measures to limit visual impact and assure sound management of solid waste disposal site (tree planting, etc)	Site PIU	YR 1	100,000 RMB / 12,987 USD
Yardang: Measures to limit visual impact and assure sound management of solid waste disposal site	Site PIU	YR 1	100,000 RMB / 12,987 USD

In the unlikely event that the project is required to finance infrastructure at sites other than the nine priority sites, or infrastructure that is not part of the currently envisaged activities at the nine priority sites, steps will be taken to ensure compliance with Chinese environmental regulations and World Bank safeguard policies.

In the Event of Amendment of Activities at the Existing Priority Sites

If activities at any of the existing sites are amended, the Municipal PMO will discuss the changes with the PPMO, and reach one of the following decisions:

- To update the EIA / EMP for the site, in cases where significant changes are planned, for example a change in the siting of a parking lot, or a wastewater treatment plant;
- To update the relevant plans and policies of the site (ie construction management plan, solid waste management plan etc), if necessary, to take account of the new activities.

The PPMO will seek approval for this decision from the Gansu EPB member of the PLG.

Approval by the Municipal EPB of the updated EIA or plans will be required, prior to PPMO approval of the amended activities.

In the Event of Additional Investment at Other Sites

In the event that the project finances new investments at additional sites, the normal procedure for EIA will be followed. EIA approval is a necessary prerequisite for securing a construction and operating permit. Based on the severity of possible impacts on the environment, the EIA may be a simple Environmental Impact Registration (EIR), an EIA Form (EIF), or an EIA Statement. This will be determined by *Classification Management Catalogue of Environmental Protection for Construction Projects (*issued by the SEPA and effective on the 1st of January 2003).

Through the PPMO, the relevant Municipal PMO will notify the Gansu EPB member of the PLG of the EIA required, and describe how the EIA will be produced.

The PPMO will advise the Municipal PMO to produce an EIA for the site that results in a practical environmental management plan, encompassing the elements of:

- Securing a water abstraction permit (if necessary);
- Use of sustainable environmental technologies at the site;
- Key design requirements to ensure minimum standards of design, and production of a design that enhances visual and landscape value.
- Action to minimise use of construction materials from non-sustainable sources;
- A ‘chance finds’ policy;

- A Construction Management Plan, encompassing soil erosion control, noise control, wastewater management and solid waste management;
- A Site Health and Safety Plan during use during construction;
- Steps to put in place a water and wastewater management plan, site waste management strategy, site health and safety plan, and community engagement during operation of the facilities.

Approval by the Gansu EPB of the updated EIA or plans will be required, prior to PPMO approval of the new site activities.

RESPONSIBILITIES FOR THE ENVIRONMENTAL MANAGEMENT PLAN

The relevant organisations at different government levels that are responsible for the implementation of the EMP are listed in *Table 9.4*. Ultimate responsibility for the EMP implementation lies with the PLG.

Table 0.3 Responsibilities in EMP Implementation

Organisation	Responsibilities
Provincial PLG	• Responsible for environmental protection and management during design phase, construction phase and operation phase. • Reporting and discussion on progress with World Bank and State Government Agencies
PPMO	• Oversight of the implementation of the EMP • Provision of guidance and support to Municipal PMOs and site management • Production of annual reports on progress against this EMP
Municipal PMOs	• Organizing the implementation of activities at each site • Coordinating with government departments and local construction units on all issues of environmental management described in *Table 8.1* • Guiding the construction units to implement the EMP • Reporting environmental protection status to PPMO quarterly • Guarantee the enough funds for the environmental protection.
Site management	• Responsible for the implementation of the local project • Supervision of and quarterly reporting on implementation of all plans (construction management, health and safety etc) under the EMP; • Ensuring funds and labour etc are available for the environmental measures
EPBs	Gansu EPB acts as the general supervision institution while the municipal EPBs act as the daily supervision institutions. The main responsibilities are: • Supervision the implementation of EMPs by the construction units and the implementation of relevant environmental laws, regulations and standards; • Coordinating environmental protection management with different institutions; • Reviewing the environmental monitoring reports; • Responsible for the "three Synchronies" completion inspection of the environmental protection facilities.
Water Resources Bureau, NDRC, Cultural Relics Bureau, Tourism Department, Safe Manufacture Supervision Bureau	Responsible for advising on, and monitoring implementation of the parts of the EMP.

Site management at the nine priority sites will establish "environmental protection management offices" (EPMOs) and recruit 1 or 2 experienced environmental protection management persons. The EPMO will supervise the implementation of environmental protection measures to comply with national regulations and legislations, and obtain provincial level approvals. The EPMO has also to establish close relations with the local EPB in order to arrange the implementation of environmental monitoring at each stage properly.

Environmental monitoring during construction operation will be carried out by the environmental stations at municipal levels.

Reporting

Two levels of reporting will be followed:

- **Annual** Reporting on progress in implementation against the measures and commitments set out in this EMP, by the PPMO, reporting to PLG and the World Bank;
- Detailed **Quarterly** reporting on the implementation of the individual policies and plans that are part of the EMP, by site managers, to the Municipal PMO and relevant government agencies (eg reporting on Health and Safety to the Safe Manufacture Supervision Bureau), and in turn to the PPMO.

In addition, a formal annual audit of environmental performance will be carried out by an independent entity.

Annual PPMO reporting will include:

- A description of progress against the commitments set out in *Table* 9.1 and Volume II;
- Analysis of the environmental monitoring data described in Section 9.4 below;
- Analysis of any evidence for the strategic environmental impacts set out in *Chapter 7;*
- Progress in the implementation of training plans;
- If there are public complaints, the substance of the complaints, and recommended solutions to achieve public satisfaction;
- Description of any additional investments at new sites, and the environmental impacts assessment procedures that have been taken during preparation of the new investments;
- Updates to the EMP and plans for its implementation over the following year.

Site Management / Municipal PMO reporting will describe progress in detail against the measures set out in the individual plans and policies of the site (eg health and safety policy, construction management plans, site waste management plans etc), in addition to the monitoring parameters set out in *Section 9.4.* Reports will be submitted to the local EPB.

Supervision

Supervising organisations are the SEPA, Gansu Provincial EPB, the project 'expert panel', and municipal level EPBs. *Table 9.5* sets out the details of supervision.

Key responsibilities include:

- Coordinating environment management, and relevant government units and departments for the implementation of environmental protection;
- Supervising compliance with environmental protection regulations;

- Supervising project construction management, the environmental approval of the project, and progress in taking environmental protection measures;
- Reporting on environmental management and environmental impacts to higher levels of environmental protection departments and relevant government departments.

Corrective Actions

Corrective actions and disciplinary procedures will be set out, and where possible, included in contractual agreements. Without fixed disciplinary action there is a risk that environmental management measures will not be implemented.

Construction Contractors or Department / Operator: Direct Impacts

Where the municipal PMO finds that the contractor or operator has violated the environmental measures set out in their contractual agreement(s), corrective action, and *in extremis*, disciplinary action will be taken.

1. If a violation is detected during a site visit, the site manager will be notified of the verification, and the means of rectification, verbally. The municipal PMO staff will discuss with the site manager a realistic deadline for rectifying the violation.

2. If the violation is reported to the municipal PMO by some other entity, the municipal PMO will conduct a site visit and, similarly, issue the verbal warning and deadline.

3. The verbal warning will be confirmed in writing to the contractor within 5 working days.

4. The municipal PMO will return to the site on the deadline, and if the violation is still occurring, the municipal PMO will notify the contractor in writing of the continuing violation, informing them of the disciplinary action to be taken. The municipal PMO will inform the Provincial PMO and EPB in writing of the situation.

5. If after 2 months the violation has not been rectified, the Provincial PMO and EPB will instigate disciplinary procedures.

Adherence to EMP measures

Many of the measures in the EMP concern actions to be taken in order to prevent environmental impacts, or to enhance positive impacts, or to protect relevant natural and cultural relics and scenes. In these cases, it will not be possible to monitor for 'violations' of the EMP. A system of reporting and audit of the EMP commitments is required, as set out in *Section 9.3.1* above.

MONITORING

Environmental monitoring plans have been developed for each of the nine sites. These outline monitoring indicators, locations, and frequencies. *Tables 9.6* and *9.7* summarise the monitoring plans for individual sites during construction and operational phases respectively. Monitoring will be carried out by the relevant EPB office, and will be reported and disclosed by the

PPMO environmental officer. Monitoring reports will be disclosed using the same means at each site as has been used during preparation (for example at Jiayuguan, through a bulletin at the site, and the site website.

Table 0.4 Supervision Plan

Period	Organization	Supervision Content	Supervision Objectives
Preparation and Feasibility Study	Gansu Provincial EPB Municipal EPBs	EIA / EMP reports	Review of all individual environmental assessment or EMP reports, and approval
	World Bank and PPMO	Review of design studies	Ensure that environmental considerations (visual impact etc) and sensitive cultural heritage protection are integrated into designs.
Construction	Gansu Provincial EPB, PPMO	Monitoring of adherence to EIA / EMP measures	Ensure that site management and contractors follow regulatory requirements and the measures set out in the EA / EMP, including third party supervision
	World Bank and PPMO	Supervision of adherence to EIA / EMP measures and construction designs	Annual check on adherence of project activities to the EIA /EMP measures and construction designs
Operations	Gansu Provincial EPB, Municipal EPB	Site environmental policies, and health and safety management	Ensure that sites have developed and are implementing environmental policies (on solid waste management, vehicle management etc etc), and are fulfilling statutory requirements on worker and public health and safety.

Table 0.5 Environmental Monitoring Plan - Construction Phase

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Jiayuguan Great Wall			
Ambient Air	TSP	Three locations (2 at Fortress, one at FST)	Twice monthly
Noise	Leq(A)	Four monitoring points in sensitive project areas	Once per week, at least 10 minutes per time
Water quality	pH, COD, BOD, Suspended Solids	Two sites: Jiu Yan Quan Lake at Fortress, Taolai River	Once monthly
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At Fortress Site and FST	Continuous
Majishan Scenic Area			
Ambient Air	TSP	At each construction site	Twice monthly
Noise	Leq(A)	At each construction site	Once per week, at least 10 minutes per time
Water quality	pH, COD, BOD, Suspended Solids	At at least three selected streams in the scenic area (in Quxi, Xianren, Yinyue)	Once monthly
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At Fortress Site and FST	Continuous
Mati Temple Scenic Area			
Ambient Air	TSP	At road and building construction sites	Twice monthly
Noise	Leq(A)	At road and building construction sites	Once per week, at least 10 minutes per time
Water quality	pH, COD, BOD, Suspended Solids	Matihe River and Xiaolinghe River	Once monthly
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Scenic area-wide	Continuous
Wei Jin Folk Culture Park			
Ambient Air	TSP	Building and parking lot construction sites	Twice monthly
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Building and parking lot construction sites	Continuous
Suoyang City			
Ambient air	TSP		

Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Site-wide	Continuous
Yardang Geological Park			
Ambient air	TSP	Construction site roadside	Duplicate samples every two months
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Site-wide	Continuous
Yellow River Stone Forest			
Ambient air	TSP	Around road, building and embankment construction sites	Four times per day for three successive days during peak construction period.
Noise	Leq(A)	Around road, building and embankment construction sites	A whole day monitoring (day and night) during peak construction period.
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At construction sites	Continuous
Qingcheng Ancient Town			
Ambient air	TSP	At all construction sites	Five days of successive monitoring, once during heating period.
Noise	Leq(A)	At all construction sites	Monitoring during day and night times once per year.
Wastewater effluent from construction sites	pH, SS, COD	At all construction sites	Once weekly
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At all construction sites	Continuous
Lutusi Ancient Government Complex			
Ambient air	TSP	Backyard garden of *Lutusi* Yamun and *Liancheng* Middle School	Five days of successive monitoring, once during heating period.
Noise	Leq(A)	• Screen wall in front of *Lutusi* Yamun; • In front of *Liancheng* Kindergarten, *Liancheng* Primary School and Ancestor Hall of *Lutusi* Yamun; • Car park entrance; • Plaza boundaries; and • In front of *Dengshan*.	Monitoring during day and night times once per year.
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At all construction sites	Continuous

Table 0.6 Monitoring Plan – Operational Phase

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Jiayuguan Great Wall			
Ambient air	TSP	Sensitive areas including roadsides and car park surrounding areas	Twice monthly
Noise	Leq(A)	Sensitive areas including roadsides and car park surrounding areas (3-4 points)	Twice monthly
Water quality	pH, COD, BOD	Taolai River	Three times per year
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At Fortress Site and FST	Continuous
Majishan Scenic Area			
Ambient air	TSP	Sensitive areas including roadsides and car park surrounding areas	Once monthly
Noise	Leq(A)	Sensitive areas including roadsides and car park surrounding areas (3-4 points)	Once monthly
Water quality	pH, COD, BOD	In selected streams	Three times per year
Solid waste	Conditions of solid waste collection and disposal	Restaurant, guesthouse, hotel, office, waste collection at the service area, and waste transfer point	Peak tourism seasons
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)		Continuous
Mati Temple Scenic Area			
Ambient air	TSP	Matisi Temple scenic site	Twice per year
Noise	Leq(A)	Matisi scenic site	Twice per year
Surface water	pH, COD, BOD, Suspended Solids	Matihe River and Xiaolinghe River	Twice per year
Landfill leachate	COD, BOD5, Ammonia nitrogen, Total iron content, Chlorides	Leachate collection well	Twice per year
Groundwater	Standard water quality monitoring	Up and downstream groundwater at landfill site	Once per year
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Scenic area-wide	Continuous
Wei Jin Folk Culture Park			
Conditions inside tombs	Humidity and temperature	Underground tombs	To be determined
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Building and parking lot construction sites	Continuous

Suoyang City			
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Site-wide	Continuous
Yardang Geological Park			
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Site-wide	Continuous
Yellow River Stone Forest			
Noise	Leq(A)	Roadsides	Twice monthly
Discharge of wastewater treatment station	pH, SS, COD, BOD, Ammonia nitrogen, petroleum	Wastewater treatment station discharge point	Quarterly, both day and night
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Site-wide	Continuous
Qingcheng Ancient Town			
Discharge of wastewater treatment station	pH, SS, COD, BOD	Wastewater treatment station discharge point	Quarterly, both day and night
Landfill leachate	COD, BOD_5, Ammonia nitrogen, Total iron content, Chlorides	Leachate collection well	Twice per year
Groundwater	Standard water quality monitoring	Up and downstream groundwater at landfill site	Once per year
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Town-wide	Continuous
Lutusi Ancient Government Complex			
Ambient air	TSP	Backyard garden of *Lutusi* Yamun and *Liancheng* Middle School	Five days of successive monitoring once per heating period
Noise	Leq(A)	In front of Ancestor Hall of Lutusi Yamun; Car park entrance; and Plaza boundaries	Annually both day and night.
Discharge of wastewater treatment station	pH, SS, COD, BOD, Ammonia nitrogen, petroleum	Wastewater treatment station discharge point	Quarterly, both day and night
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Town-wide	Continuous

TRAINING REQUIREMENTS

In order to ensure effective environmental management for the project, it is recommended that those responsible for project management, and contractors undertake training to strengthen their capacity to implement mitigation measures, and monitoring. The training will be developed and delivered by the PPMO environmental manager, and will consist of: brief summary of World Bank safeguard policies; relevant Chinese environmental legislation and standards; EMP contents and requirements; responsible construction management; cultural heritage background and requirements; the scenic area management system.

Table 9.8 sets out the cost of the training. There are slightly differing costs between each of the sites.

Table 0.7 Training Costs

Site Name	Phase	Personnel	Total No.	unit price (RMB Yuan/person)	cost (RMB Yuan)
Mati Temple Scenic Park	Construction period	Project Environment Managers	2	1,900	3,800
		Contractor	2	2,250	4,500
	Operation period	Project Environment Managers	2	1,800	3,600
Suoyang Town	Construction period	Project Environment Managers	3	1,900	5,700
		Contractor	2	2,250	4,500
	Operation period	Project Environment Managers	2	1,800	3,600
Wei Jin Folk Culture Park	Construction period	Project Environment Managers	2	1,650	3,300
		Contractor	2	1,950	3,900
	Operation period	Project Environment Managers	1	1,500	1,500
Qingcheng Ancient Town	Construction period	Project Environment Managers	3	2,050	6,150
		Contractor	2	2,250	4,500
	Operation period	Project Environment Managers	2	1,950	3,900
Lutusi Ancient Government Centre	Construction period	Project Environment Managers	2	1,900	3,800
		Contractor	2	2,250	4,500
	Operation period	Project Environment Managers	1	1,800	1,800
Yellow River Stone Forest National Park	Construction period	Project Environment Managers	6	1,900	1,1400
		Contractor	2	2,250	4,500
	Operation period	Project Environment Managers	4	1,800	7,200
Yardang National Geological Park	Construction period	Project Environment Managers	2	1,500	3,000
		Contractor	2	1,700	3,400
	Operation period	Project Environment Managers	1	1,300	1,300
Jiayuguan Great Wall	Construction period	Project Environment Managers	2	2050	4100
		Contractor	2	2250	4500
	Operation period	Project Environment Managers	2	1950	3900

Majishan Scenic Area	Construction period	Project Environment Managers	9	2250	20250
		Contractor	10	2550	25500
	Operation period	Project Environment Managers	9	2100	18900
Total					**167000**

COSTS

Table 9.9 summarises the cost of EMP implementation. The total cost is **USD 822,186**. A detailed breakdown of the cost of the measures at each site is provided in the tables for each site in Volume II.

Table 0.8 Costs of EMP

Description	**Rate**	**Unit**	**Number**	**Base Cost (1 USD = 7.7 RMB)**	
				Yuan	**USD**
SITES					
Jiayuguan Great Wall				491,700	63,857
Majishan Scenic Area				955,270	124,061
Yellow River Stone Forest				310,744	40,356
Yardang National Geological Park				301,920	39,210
Suoyang				144,345	18,746
Wei Jin				160,624	20,860
Mati Temple Scenic Area				455,286	59,128
Lutusi				152,562	19,813
Qingcheng				1,031,382	133,946
SITES TOTAL				**4,003,833**	**519,978**
PROVINCIAL					
PPMO Environmental Manager	20000	Annual Salary	6	120,000	15,584
PIU Environmental Managers	20000	Annual Salary	54	1,080,000	140,260
Lump for transport etc	20000	Annual lump per employee	42	840,000	109,091
Annual independent audit of environmental performance	20000	Expert fees plus expenses	6	120,000	15,584
PROVINCIAL TOTAL				**2,160,000**	**280,519**
TRAINING				**167,000**	**21,688**
GRAND TOTAL				**6,330,833**	**822,186**