

Gansu Cultural and Natural Heritage
Protection and Development Project

Consolidated
Environmental Assessment & Environmental
Management Plan
Executive Summary

World Bank Financed Gansu Cultural and
Natural Heritage Protection and Development
Project Management Office
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INTRODUCTION

This is the Executive Summary of 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 of tourism management in Gansu.

OBJECTIVES

The 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, 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.

BACKGROUND

Classification of the Project

The project will finance temporary construction activities that have potential environmental impacts, and will result in increased visitor numbers and ongoing site management with potential long-term impacts. If investments are not properly planned and managed, they may 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 was endorsed by a safeguards review meeting held on 18th January 2006.

Preparation of the EA

The EA was prepared by the College of Earth and Environmental Sciences at Lanzhou University, between the dates of 20th November 2006 and 20th April 2007, based on environmental impact assessment reports and environmental management plans for nine sites prepared by a range of institutes (College of Earth and Environmental Sciences at Lanzhou University, Lanzhou Coal Mining Design & Research Institute, Gansu Academy of Environmental Sciences (GAES), Tianshui Environmental

Research Institute, Northwest Research Institute of Mining and Metallurgy (NRIMM), Northwest Institute of EIA, and the Engineering Center of the Railway Ministry).

The institutes above prepared EIA and EMP reports for individual sites according to Chinese environmental regulation requirements, in addition to World Bank safeguard policy requirements. 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.

Safeguards Review Study

The environmental assessment was informed by an earlier safeguards review study which presented 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 when drawing conclusions on the requirements for an environmental assessment report, environmental management plan etc, and triggering the detailed assessments which fed into this report. Twelve sites were considered in total, nine of which are on the final list.

DESCRIPTION OF THE PROPOSED PROJECT

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 is comprised of two components, the first of which is conducted at each of nine key cultural and natural heritage sites within the following six municipalities in Gansu Province: Jiuquan and Jiayuguan Municipalities in the west; Zhangye, Baiyin and Lanzhou Municipalities in central Gansu; and Tianshui Municipality in the east. The second component, a provincially-managed institutional strengthening and capacity building component, will benefit the citizens, government officials and others at all nine project sites and within the municipal and provincial governments. The two components are as follows.

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

1.1 - Heritage Conservation and Presentation – preservation and conservation of key relics, restoration of historical buildings, heritage inventory, archaeological research, interpretation, and presentation of cultural and natural heritage assets;

1.2 - 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 (including small-scale or link- roads and bridges, vehicle parking lots and buildings for tourism services and exhibitions, walkways, lookouts, signage and electric vehicles, landscaping and fencing, water supply and drainage facilities, sanitation facilities, toilets and wastewater treatment, solid waste collection and disposal, power and heating, and safety and security systems).

1.3 - Community training and studies – key site-specific planning and community training activities.

The nine priority sites are: Majishan Scenic Area, Qingcheng Ancient Town, Jiayuguan Great Wall, Yardang National Geological Park, Yellow River Stone Forest National Park, Wei Jin Folk Culture Park, Suoyang Town, Mati Temple Scenic Park, and Lutusi Ancient Government Centre.

The location of the sites is presented in the map in *Figure 2.1*. The sites are presented in this report in order of the component cost, which ranges from USD 20.9 million at Majishan Scenic Area to USD 2.1 million at Lutusi.

Component 2 – Institutional Strengthening and Capacity Building includes project management strengthening, training of site managers, staff and local residents in heritage conservation, site management and tourism development, and implementation of several key province-wide tourism and heritage studies designed to assist the Gansu Provincial Government develop the tourism industry in Gansu.

PROJECT PREPARATION AND PLANNING

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 1* in *Annex A* presents the detail of these plans and reports.

IMPLEMENTATION ARRANGEMENTS

To manage and implement the project, Gansu Provincial Government has established a Project Leading Group (PLG) to lead the project and a

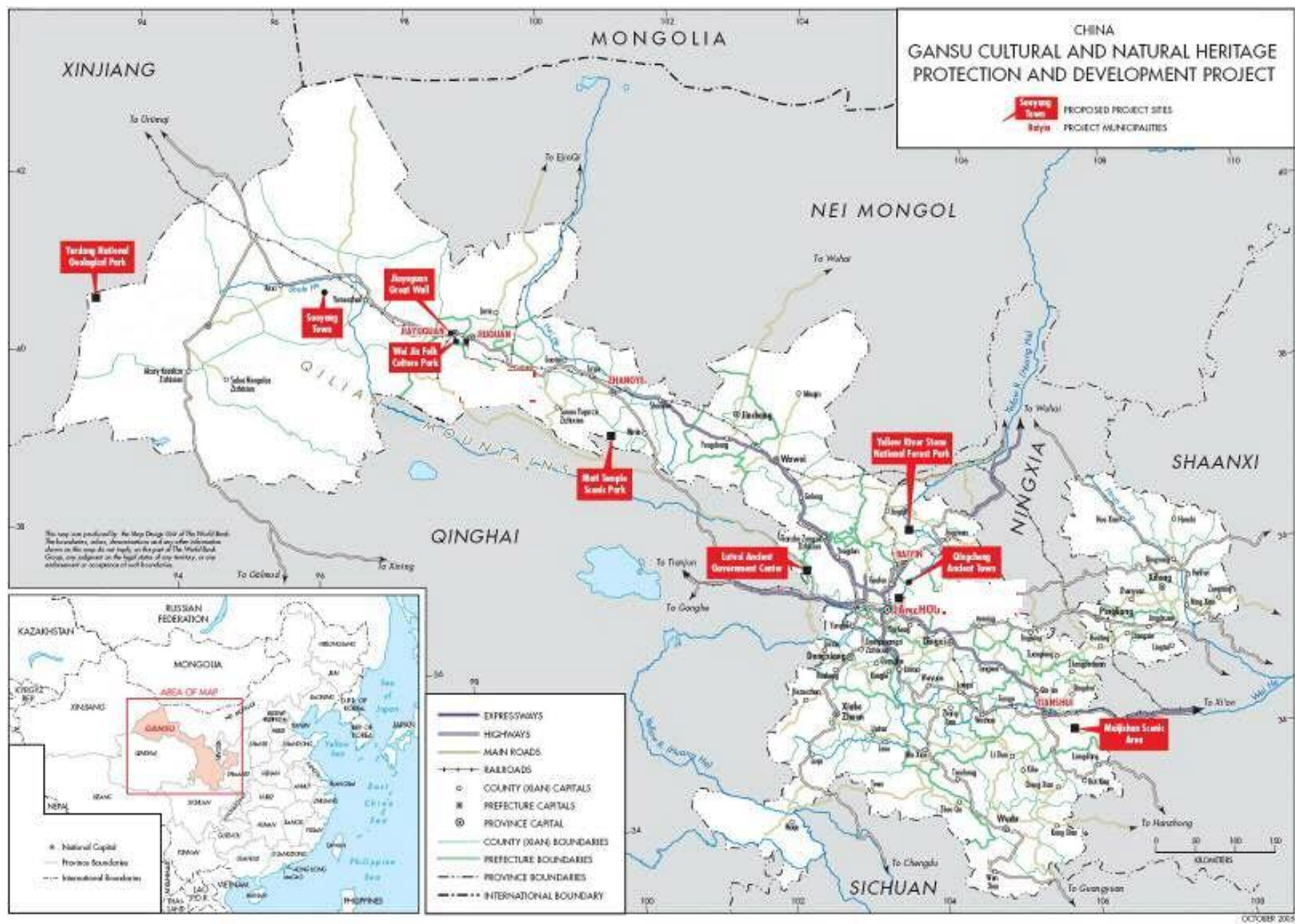
Provincial Project Management Office (PPMO) to serve as the main organisational body leading the implementation of the project. Local PLG and PMO managers will be responsible for the management and implementation of project activities at each site.

Additionally, the PPMO has hired experts to form an Experts Panel. 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.

BUDGET

The total budget for the project is RMB 444.7 million (USD 57.0 million at 1 USD = RMB 7.8). World Bank financing is a total of USD 40.0 million.

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



POLICY AND LEGISLATIVE CONTEXT

The EA report provides details on relevant aspects of Chinese institutional and regulatory context. Key points of greatest pertinence are summarised below, and further details are provided in *Annex B*.

CHINESE INSTITUTIONS AND REGULATORY REQUIREMENTS

The key Chinese authorities responsible for environmental, health and safety management are the Gansu Provincial Environmental Protection Bureau and local Environmental Protection Bureaux, linked to the State Environmental Protection Administration (SEPA). In addition, Local Land Resources Bureaux, Water Resources Bureaux, the Yellow River Conservancy Commission (YRCC), and local EPB Construction Departments carry out specific permitting functions related to, respectively, land acquisition, water resources extraction, and construction, health and safety management.

Authorities concerned with tourism development and cultural and natural heritage are the Tourism Department of Gansu Province (responsible for the implementation of related tourism laws, regulations and policies, and establishing tourism strategies, guidelines, plans, policies, and standards in Gansu Province), the State Administration of Cultural Heritage (responsible for developing, promoting and regulating China's cultural relics and museum industry), and the Gansu Cultural Relic Bureau (responsible for the implementation of related cultural relic and museum laws, regulations and policies, and establishing cultural relic and museum strategies, guidelines, plans, policies, and measures in Gansu Province).

The most pertinent regulatory requirements are defined in the *Management Regulations on Environmental Protection for Construction Projects*, and China's environmental emission and discharging standards. The first of these sets out the process required for EIA, and securing a construction and operating permit. For this project, an EIA statement is required for each site, to be submitted to Gansu Provincial EPB for approval. Environmental emission and discharging standards concern ambient air quality, surface water quality, noise, emissions of air pollutants, wastewater discharge and irrigation water quality.

The basic EIA regulations are supported by a series of environmental protection laws and regulations. These concern nature reserves, cultural heritage protection, water and soil conservation, water extraction, construction completion inspection, and registration of discharged pollutants. Further details are provided in Annex B and the main report.

WORLD BANK SAFEGUARD POLICIES

The World Bank safeguard policies that are applicable to the activities at each site are summarised in Volume II of the EA report. 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.

Civil works are to be carried out at all sites, triggering OP 4.01 (Environmental Assessment). Although civil works at several sites are relatively insignificant, the works are to be carried out in areas of sensitive cultural and natural heritage, and therefore the project is Category A.

OP 4.11 (Physical Cultural Resources) applies at seven of the sites, where the sites have profound, and sensitive cultural heritage value. OP 4.04 (Natural Habitats) is triggered by activities at three sites. Critical natural habitats will not be affected, but there are risks of impacts on each area's natural habitats. A range of minority groups live in the area of Mati Temple Scenic Area, requiring the preparation and implementation of a separate Indigenous Peoples Plan, under OP 4.10 (Indigenous Peoples). There are limited land acquisition requirements at three sites, triggering OP 4.12 (Involuntary Resettlement). Two existing dams will be rehabilitated at Majishan Scenic Area, triggering OP4.37 (Dam Safety).

BASELINE CONDITIONS

The EA report provides detail on the baseline environment, including summary information on the baseline environmental conditions at the nine priority sites in Volume II of the EA report, and further details on environmental conditions at each site in Annex B, Volume III. The baseline conditions in Gansu Province as a whole are summarised below.

ENVIRONMENTAL CONDITIONS IN GANSU PROVINCE

Location, Topography and Physiography

Gansu Province is situated in central China, at the upper reaches of the Yellow River. Gansu Province has a total land area of 425,800 km², 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.

The topography of Gansu Province consists of mixed mountainous regions, plateaus, plains, river valleys, and deserts, and forms six main regions with differing features. Soils in Gansu are mainly loess, and suffer severe wind and water erosion, and ongoing desertification.

Climate

Gansu has a strongly continental warm temperate monsoon climate. However, depending on elevation, temperatures vary greatly across the province, with the length of frostless periods showing significant provincial differences. Annual precipitation varies between 36.6 mm to 734.9 mm, and roughly decreases from southeast to northwest.

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.

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. 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 the cities in the Hedong area is less polluted than would be expected for the scale and industrialisation of the cities.

Natural Habitats and Ecology

The terrestrial natural habitats of Gansu are mainly steppe grassland, and semi-natural pastureland. The total forest area in Gansu is approximately 8 million ha, which 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. There are eight farms that breed rare or endangered animals and four farms that propagate rare plants.

Gansu Province is highly species-rich, owing to its position between four faunal regions and five floral regions. 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*.

Amongst temperate plant species alone, there are over four thousand species of vascular plants, and Gansu's flora has a significant proportion of species with economic uses. Thirty-four species of flora are included in the national key protected plant species catalogue. Ten species are included amongst the priority conservation species as listed in the *China Biodiversity Conservation Action Plan*.

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 experienced in 2005. Particulate pollution aggravates air quality in cities in Gansu, contributing to a deterioration in air quality in nine out of thirteen cities.

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. *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*

Wastewater discharged (million cubic metres)			Chemical Oxygen Demand (Tonnes)			Ammonia nitrogen (Tonnes)		
Industrial	Domestic	Total	Industrial	Domestic	Total	Industrial	Domestic	Total
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, which is below the national control target for the province. The number of deaths from construction accidents, 34, was also below the national control target. The top five infectious diseases in Gansu are hepatitis, dysentery, tuberculosis, gonorrhoea and measles.

BASELINE CONDITIONS AT THE NINE PRIORITY SITES

The full consolidated Environmental Assessment report provides relevant information on the baseline environmental conditions at the nine priority sites.

Cultural and natural Heritage

A detailed inventory of the heritage of each site is provided in Annex C, Volume III of the EA report. Key information on the cultural and natural heritage value of each of the nine priority sites is presented below.

OVERVIEW

The cultural and natural heritage of Gansu Province is of global significance, as recognised through the attainment of World Heritage status at some sites. 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 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, with several sites located on the banks of the Yellow River. The project concept is roughly built around the historical and cultural themes of the history of the Silk Road, the political and military significance of the Great Wall, and the social and economic significance of the Yellow River in Chinese civilization.

HERITAGE VALUE OF THE NINE SITES

Majishan Scenic Area

A nationally-designated scenic area, encompassing grottoes with National Cultural Heritage Protection, near Tianshui city. In 2004, the site received 310,000 tourists and RMB 417.6 million in tourism revenue.

This is one of 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, studded with caves and wrapped in rickety walkways and spiral stairs, rises dramatically from its surroundings.

Threats include unmanaged visitor numbers and damage to sacred documents by moths and mice, mold and rot.

Figure 0.1 Majishan Scenic Area

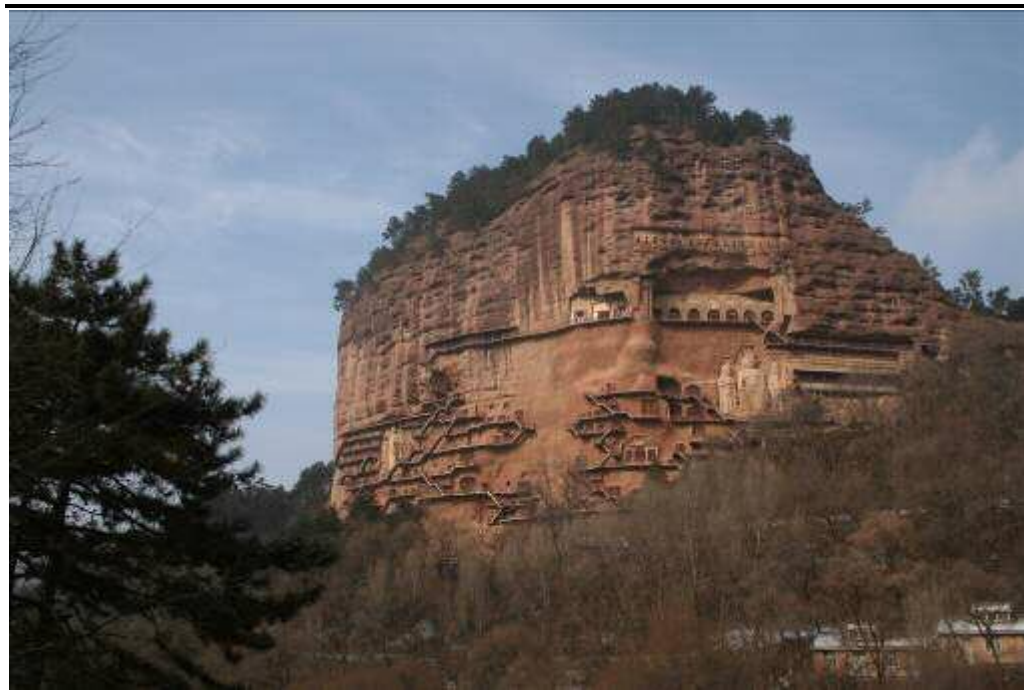


Figure 0.2 Qingcheng Ancient Town



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

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

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.

Jiayuguan Great Wall

Close to Jiayuguan City, Jiayuguan Great Wall is a National-level Cultural Heritage site, and a UNESCO World Heritage Site. In 2004, there were 329,000 visitors, generating RMB 66 million in tourism revenue.

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 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 building and site planning, unplanned visitor management, and building weathering.

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 a spectacular “yardang” scenery, formed through the weathering of sand-laden winds. Since June 2001, the site has received 400,000 tourists.

Despite its appearance, the surface of the Gobi desert is fragile. The surface has formed over thousands of years due to wind blowing 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. Site management to date has been successful in restricting vehicles to a single black-top road.

Figure 0.3 Jiayuguan Great Wall



Figure 0.4 Wind-eroded Scenery at Yardang National Geological Park



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.

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

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.

Suoyang City

Located in Anxi County, with National-level Cultural Heritage Protection, Suoyang City was first constructed in the Han Dynasty, while the accompanying fortress was subsequently built in the beginning of the Tang Dynasty. The site was once a county seat of the Dunhuang prefecture in the Han Dynasty and later a Tang Dynasty prefecture, and is of high historical archaeological research value owing to its relation 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.

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. In 2004, the site received 100,000 visitors, generating tourism revenue of RMB 6 million, but is threatened by theft and vandalism.

The site is valued for its Buddhist cave complex, including a Jinta Temple which contains a mummified body that has been decorated in the form of Asparas, the Chinese flying goddess, and that is preserved by the dry Gansu climate.

Figure 0.5 *Yellow River Stone Forest National Park*



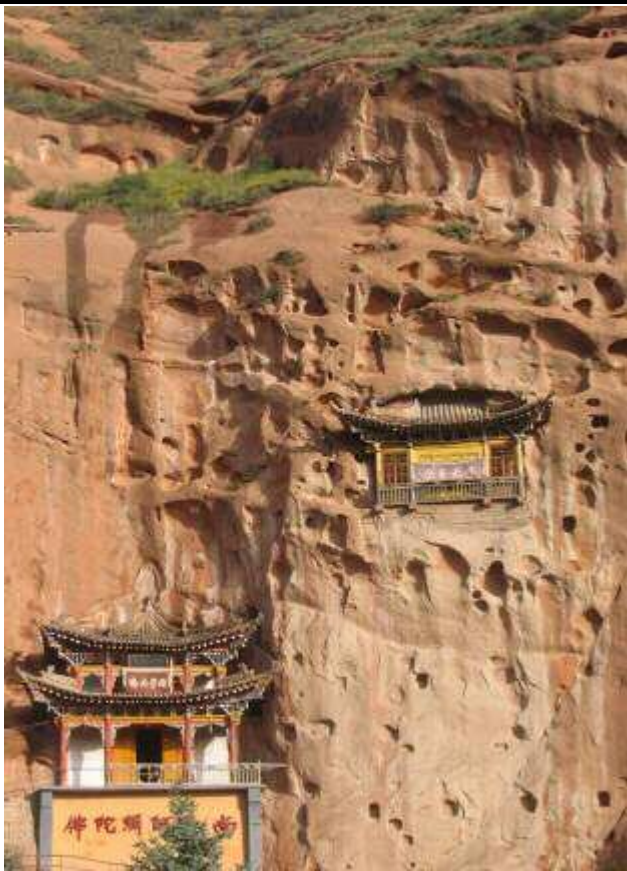
Figure 0.6 *Wei Jin Folk Culture Park*



Figure 0.7 Suoyang City



Figure 0.8 Mati Temple Scenic Park



Lutusi Ancient Government Complex Site

Located in Yongdeng County, Lanzhou City, the site has National Cultural Heritage Protection. The complex was used by local leaders under the Minority Rule System. 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 0.9 *Lutusi Ancient Government Complex*



Assessment of alternatives

ASSESSMENT AT THE PROGRAMME-LEVEL

At the programme level, screening of an original seventeen proposed sub-components, a strategic overview study, and a safeguards review study contributed to the assessment of alternatives. *Table 2, Annex A* lists the original seventeen sites.

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 continued until the pre-appraisal mission in March 2007, when the list of programme sub-components was finalised. Proposals

were screened against criteria of cultural and natural heritage content, financial viability, potential for local economic development, market potential, and the need for immediate protection.

Eight of the original proposals were ultimately screened out. For example Moon Crescent Lake was screened out of the programme during this stage, largely due to environmental and technical concerns associated with proposals for artificially recharging the aquifer.

A Strategic Overview Study was completed, which contributed to the screening process. A total of 526 cultural heritage sites protected at or above the provincial level were compiled by the study, indicating the range of potential alternative sub-components for project-financing.

ALTERNATIVES AT THE SITE LEVEL

At the site 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 which assessed alternatives.

Heritage Master Plan Review

A detailed review of heritage site master plans was carried out. The review commented on the adequacy of existing site management plans and tourism strategies, and developed strategic and technical proposals that would improve the quality of the plans.

The overall conclusion of the review led to the development of the institutional strengthening component of the project, 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 levels in the province.

Preparation of Environmental Assessment and Environmental Management Plans

Environmental assessments at each site have also contributed to the assessment of specific measures. Examples of alternatives cited in the site assessments include: alternative solid waste management (especially landfill) options at Mati Temple Scenic Area, Qincheng, Lutusi, Majishan, and Yellow River Stone Forest; alternative wastewater treatment plants at Yellow River Stone Forest; alternative road routings at Yardang National Geological Park; and alternative parking lots at Lutusi Ancient Government Centre.

Alternative Solid Waste Management Options

Solid waste management options were considered for six sites. At Majishan Scenic Area, alternatives included improvement to an existing landfill, contracting the

service out, or the construction of a new landfill for the sole use of the scenic area. At Qingcheng Ancient Town, consideration of alternatives led to the site of the landfill being shifted by 500m up the valley to reduce the land area of the landfill. At Yardang National Geological Park and at Yellow River Stone Forest, potential off-site landfill of solid waste was considered, but rejected in favour of improvements to existing small-scale disposal sites, including wind protection, fencing and coverage. At Mati Temple Scenic Area, alternative sites for a landfill were considered, but all rejected, particularly because the amount of solid waste generated is small and can easily be transported to an existing nearby landfill. A similar solution was found at Lutusi Ancient Government Complex.

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. The 19 km road was selected, on the basis of lower ecological ground impacts, and in accordance with reserve regulations.

Alternative Wastewater Treatment Plans at Yellow River Stone Forest:

Two alternative schemes for wastewater treatment were assessed: Sequence Batch Reactor, and A/O (anaerobic-aerobic) process. The former was selected on the basis of the lower amount of sludge generated, low water volume requirements, and its ease of operation.

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. 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.

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

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 A.

ENVIRONMENTAL 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 heritage preservation and conservation. The project will instil a commitment to, and provide practical experience in, 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 sustainable tourism approaches in China as a whole.

The project also can be predicted to deliver positive environmental and social benefits. Social and economic benefits can be realised through increasing the number of tourists to accelerate service industry development, and 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, at any particular site, in inappropriate infrastructure, resulting in a reduction in the economic and cultural value of the site.

- **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.

- **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 an increased demand of 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 environmental pollution risks. 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 hotels, water infrastructure, waste management etc), but the contribution of increasing tourism is insignificant, in comparison to investment trends 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 ENVIRONMENTAL 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. *Table 7.1* lists the impacts applicable to all sites, and proposed mitigation measures.

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.

Table 0.1 ***Impacts and Mitigation Measures Applying at All Sites***

<i>Impact</i>	<i>Mitigation Measures (Site Level only)</i>
<i>Prior to Construction</i>	
<i>Visual impact of new facilities, if not located, designed or constructed in sympathy with the local heritage and surroundings</i>	<i>Construction of all facilities according to minimum standards of design, and in keeping with a site design that enhances its visual and landscape value</i>
<i>During Construction</i>	
<i>Adverse impacts of construction activities including fugitive dust and noise, soil erosion</i>	<i>Construction Management Plan</i>
<i>Risk of injury of labourers and the public during construction and rehabilitation activities</i>	<i>Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, and prevention of public access.</i>
<i>Casual disposal of solid waste and construction waste materials in the local environment</i>	<i>Implementation of Site Waste Management Plans</i>
<i>Reduced local availability of groundwater or surface</i>	<i>Identify permitted level of water extraction, and limit</i>

<i>water</i>	<i>extraction within this level, taking steps to reduce water consumption through water reuse, and capture of rainwater, where necessary</i>
<i>Disposal of wastewater into surface water courses</i>	<i>Prevent disposal of wastewater that exceeds environmental quality standards to local water courses</i>
<i>Loss of 'chance finds' of archaeological artefacts during rehabilitation or construction</i>	<i>Education of labourers in the recognition of potential artefacts, and use of a protocol for steps to take in the event of chance finds.</i>
<i>Risk of damage to cultural heritage through vibrations created during construction</i>	<i>Use of professional contractors with experience of working in areas where fragile cultural relics are present. Temporary removal of cultural relics if feasible.</i>
<i>Impacts associated with use of materials (water, timber, cement etc) from unsustainable sources</i>	<i>Use only materials from sources approved as sustainable</i>
<i>During Operation</i>	
<i>Reduced local availability of groundwater or surface water, disposal of wastewater into surface water courses, unmanaged disposal of solid waste.</i>	<i>Adoption and implementation of an environmental policy by the site</i>
<i>Risk of injury of public and staff</i>	<i>Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, prevention of public access, and planning for emergencies.</i>
<i>Induced environmental impacts of traders and public gathering around the site, adverse social impacts associated with increased tourism to the area</i>	

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.

Careful infrastructure design, also offers an opportunity to create a consistency of building designs, 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 onsite landfill disposal, solid waste must be transferred to off-site disposal facilities.

There is an opportunity to develop and implement waste management strategies for Gansu's tourism sites that encompass minimisation, reuse and recycling. The strategies could contribute to the development of small waste management

enterprises, amongst local communities. In particular, a coordinated provincial 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 the *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, and collection of roof-collected water.

Pollution of local surface water courses with wastewater

Disposal of wastewater to local surface water courses will have adverse impacts on the 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 issues 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.

SPECIFIC ENVIRONMENTAL 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.

Jiayuguan Great Wall

Structural enhancement to the foundation of the First Signal Tower, and the reconstruction of the river embankment of the First Signal Tower have the potential to cause significant damage to the First Signal Tower, 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 for 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 affect 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 the river sedimentation processes, leading to downstream erosion, or the 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 a demonstrable work track record of this nature.

Majishan Scenic Area

At Majishan, the location of buildings, 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, in order to avoid disturbance to the ecological integrity of the area.

In addition, 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 the 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 the future lake.

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

Yinyue Lake

The height of the dam is 10 m. The dam consultant concluded that the structure with the planned restoration is safe, 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 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* of the Main Report), and that an EPP be 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).
- 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 the consultant's report);
- Several specific recommendations concerning dam and mechanism structures.

SOCIAL IMPACTS

Direct social impacts of the project are the temporary or permanent displacement of people due to land acquisition, and (at one site) potential impacts on ethnic communities.

Land Acquisition and Resettlement

A separate Resettlement Action Plan (RAP) has been prepared, based on detailed social surveys and consultation. The RAP concerns only Qingcheng and Lutusi sites, because they are the only sites that will physically or economically displace people. Part of the RAP provides a policy framework to guide provincial and local PMOs to meet the objectives of the RAP, if further displacement is inevitable at the other nine sites or elsewhere, during the implementation of the project. For example at Yellow River Stone Forest Park and Maijishan Scenic Area the exact

location of infrastructure is still under consideration and not confirmed at the time of the RAP's preparation.

Key impacts on project-affected people (PAP) are:

- Loss of land;
- Loss of productive assets (for e.g. crops, trees and livestock pens etc.) and other assets (for e.g. facility, small businesses);
- Loss of houses (for e.g. dwelling house) and structures (for e.g. wall, shelter);
- Loss of assets by vulnerable groups; and
- Effects on public utilities and assets.

Project Land Take and Affected Population

At Qincheng, in total, 13.5 mu ⁽¹⁾ (8,932m²) land of four villages (Chenghe, Dongtan, Xiaping and Wayao) of Qingcheng Town will be permanently used for the Qingcheng project. Road and bridge construction will temporarily occupy a small amount of land along the road totalling 6 mu within 7 villages. People will be compensated for their standing crops at the site of the landfill. The land in the area is collectively-owned.

At Lutusi, in total, 9.46 mu ⁽²⁾ (6500m²) of land of two Village Groups (No.3 and No.9), Liancheng Village, Liancheng Town will be permanently used for the Lutusi project.

Further details are provided in *Annex C*.

Vulnerable Groups

There are two households identified as vulnerable groups in the Lutusi Project through the household survey and consultation. One household was displaced several years ago as a result of local urban development and did not receive any compensation from that project developer. The household has not yet paid its debts resulting from the first resettlement and would become extremely vulnerable due to the secondary relocation. The second household is an elderly couple both over 60 years old and unable to work. Special support will be given to these households.

Impacts on Minorities at Mati Temple Scenic Area

People of Yugu, Tibetan and Mongol ethnicity, in addition to the national majority of Han, live at Mati Temple Scenic Area. A separate Indigenous People's Plan has been prepared to set out the measures required to ensure free, prior and informed consultation with these groups, and to ensure they benefit from project activities.

(1) 1 MU= 667 m²

(2) 1 MU= 667 m²

The benefits of the project for the ethnic minorities in the area will be: income diversification, and a reduced reliance on herding; personal skills development; and preservation of ethnic culture through ethnic characteristic tourism.

Predicted adverse impacts include:

- Rapid tourism development might cause environmental pollution, resulting in adverse impacts to the local ecology and environment on which ethnic communities are dependent. There is some environmental damage in the Mati Temple scenic area, related to a lack of solid waste management, littering, and inappropriate burning of wastes, due to the pressure of visiting populations and low awareness of environmental protection. Smoke from burning waste does not dissipate quickly in sheltered areas, especially near Mati Temple.
- Some forms of modern civilization would come with tourism development, which might generate cultural shock against certain local ethnic traditions and culture. For example, fewer people may engage in the traditional livelihood of livestock farming, social structural changes might take place amongst the traditional community of ethnic minorities, and younger generations may be less keen to carry forward their ethnic traditions and culture.

The project will finance the gathering and documentation of cultural resources for display at the 2,000 m² Yugu folk cultural heritage centre. Consultations with World Bank specialists on OP 4.10, has confirmed that these activities do not constitute “commercial development” as set out in paragraphs 18 and 19 of OP 4.10. The project will not finance the commercial development of the knowledge or cultural resources of any of the ethnic minorities at Mati Scenic Area.

None of the activities to be financed by the project will restrict physical access to sites or areas of customary value in the area.

Consultation and Disclosure

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 public consultation mainly included the organisations and individuals potentially affected by environmental impacts, NGOs and experts.

Participants in the questionnaire surveys included residents, tourists, scenic area managers, government staff, teachers in local schools, members of social groups and village committees. The number of responses was around 100 at each site, and response rates were above 90% (in three cases it was 100%). Public consultation workshops were held at seven sites (all except Suoyang, and Majishan), including participants from the local residents, EPB, site management, DRC, and village committee members.

Generally the responses from the questionnaire surveys and workshops indicate that the majority of the public believe that the project is necessary and that it will promote economic development, bringing benefits to local residents. Suggestions were received on the specific requirements for environmental protection measures at each site.

Additional Consultation at Mati Temple Scenic Area

During the preparation of the Indigenous People's Plan, consultations with communities at the Mati Temple Scenic Area were carried out in July 2006 over a period of four days and in late June 2007. During the first round of consultation, the team responsible for the IPP preparation consulted 7 tourism investors (out of a total of 11 investors, 64%), 30 employees (18%) and 40 visitors at random in the scenic area. In addition, a workshop involving 29 people also was held by the scenic area committee. The second round of consultation included interviews with 4 households in 3 villages, 1 tourism investor, 5 commercial service households (small shops in the scenic area), 4 horse-service households and 2 employees. Findings are provided in the Indigenous People's Plan.

DISCLOSURE

Information on the project and potential environmental impacts has been publicly disclosed through various means, over March-May 2007. The information disclosed at each site was a briefing on the project to be carried out at the site, with the site EIA report or a summary of the site EIA or EMP report. The means of disclosure included bulletins at the site, distribution of printed materials, disclosure on the site's website, and newspaper articles.

The sites of the Mati Temple, Qingcheng, Jiuquan Museum ,Shi Chuan, Suoyang and Yardang have selected public representatives to supervise environmental protection during construction and operation. These representatives will report the environmental problems existing in these sites and provide relevant suggestions to

the site managers and EPB, and will take part in the EPB inspection of completed civil works.

enVIRONMENTAL MANAGEMENT Plan

The elements of the Environmental Management Plan (EMP) that will be used by the project are summarised below. Specific mitigation measures concerning construction management, health and safety, cultural heritage preservation etc are set out in the individual site tables in Volume II of the main report. An environmental mitigation plan, monitoring plan, costs and training requirements are provided in *Annex D*.

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.

The measures can be summarised 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, consistent with Chinese regulations, and precedents on previous 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 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.

Measures Required During Construction

Implementation of:

- Construction Management Plans, encompassing erosion control, noise control, wastewater management and solid waste management, and the minimisation 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, 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.

Specific Measures at Each Site

Specific mitigation 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 the implementation of sufficient mitigation measures concerning small landfill facilities or solid waste management at the 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.

ENVIRONMENTAL ASSESSMENT OF ADDITIONAL INVESTMENTS

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 the *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 required EIA, 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.

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

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 also has to establish close relations with the local EPB in order to properly 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. Ultimate responsibility for EMP implementation lies with the PLG.

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.

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 and Corrective Measures

Supervising organisations are the SEPA, Gansu Provincial EPB, the project ‘expert panel’, and municipal level EPBs. The main report sets out the supervision responsibilities of each of these organisations.

Corrective actions and disciplinary procedures will be set out, and where possible, included in contractual agreements. 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.

MONITORING

Environmental monitoring plans have been developed for each of the nine sites. These outline monitoring indicators, locations, and frequencies. Monitoring reports will be disclosed using the same means at each site as used during preparation (for example at Jiayuguan, through a bulletin at the site, and the site website. Details of monitoring are set out in *Annex D*.

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: a 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. *Annex D* sets out the cost of the training. There are slightly differing costs between each of the sites.

COSTS

The total cost of implementing the EMP is **USD 822,186**. This consists of third party supervision of civil works at each site, selected additional work (for example preparation of operation and maintenance plans for small dams at Majishan Scenic Area), monitoring costs, salary costs and expenses for the PPMO and site environmental managers, and training costs. Details of costs are set out in *Annex D*.

MITIGATION OF SOCIAL IMPACTS

Resettlement

The RAP sets out full details of eligibility for compensation, rates of compensation, grievance procedures, organisational responsibilities etc.

Resettlement will be compensated as follows:

- ⌘ Compensation for dwellings will be made as replacement dwellings;
- Otherwise, compensation will be made in cash;
- Compensation will be paid to affected parties prior to the commencement of construction activities on the affected land; and
- (Where relevant) To counteract the risk of livelihood deterioration from the loss of land, the project will assist in providing employment opportunities in the non-agricultural sector.

The budgets for resettlement compensation at Qingcheng and Lutusi are RMB 719,540 (USD 93,446) and RMB 3,397,863 (USD 441,280) respectively, total RMB 4,117,403 (USD 534,727).

Annex C sets out the details of compensation.

Ethnic Minorities

Steps will be taken to provide an effective way to consult with ethnic communities at the Mati Temple Scenic Area, in a timely manner. These include:

- ⌘ The Management Committee of Mati Temple scenic area will appoint the Administrative Division as the organization responsible for issuing information on the project, collecting public opinions, and informing the public where they can take their complaints;
- ⌘ Sunan county government will address and deal with public opinions collected by the Administrative Division, the Management Committee of Mati Temple scenic area;
- ⌘ Regular meetings involving local community representatives and the project parties will be organised;
- ⌘ Easily readable brochures on all related project information will be prepared and copies made available to the public;
- ⌘ MTSAAC will collect any comments or suggestions from the public from five suggestions boxes set up within the scenic area;
- ⌘ Information on the project will be made available by internet.

Measures to enhance project benefits for ethnic communities at Mati will be taken. This will include: training to address ethnic communities' concerns that they have insufficient skills or knowledge of their traditional culture; an RMB 840,000 project on relics and folk handicraft preservation, collection and training; presentations at an Ethnic Cultural Exhibition Centre; a workshop for the development of ethnic and folk handicraft; research and development for the marketing of traditional ethnic food and recipes; and research on ethnic and folk culture. Full details are set out in the IPP.

Gansu Cultural and Natural
Heritage
Protection and
Development Project

Consolidated
Environmental Assessment
& Environmental
Management Plan
Volume III

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

Annex A: Maps of Each Site

Figure.1 Map for Yardang National Geological Park

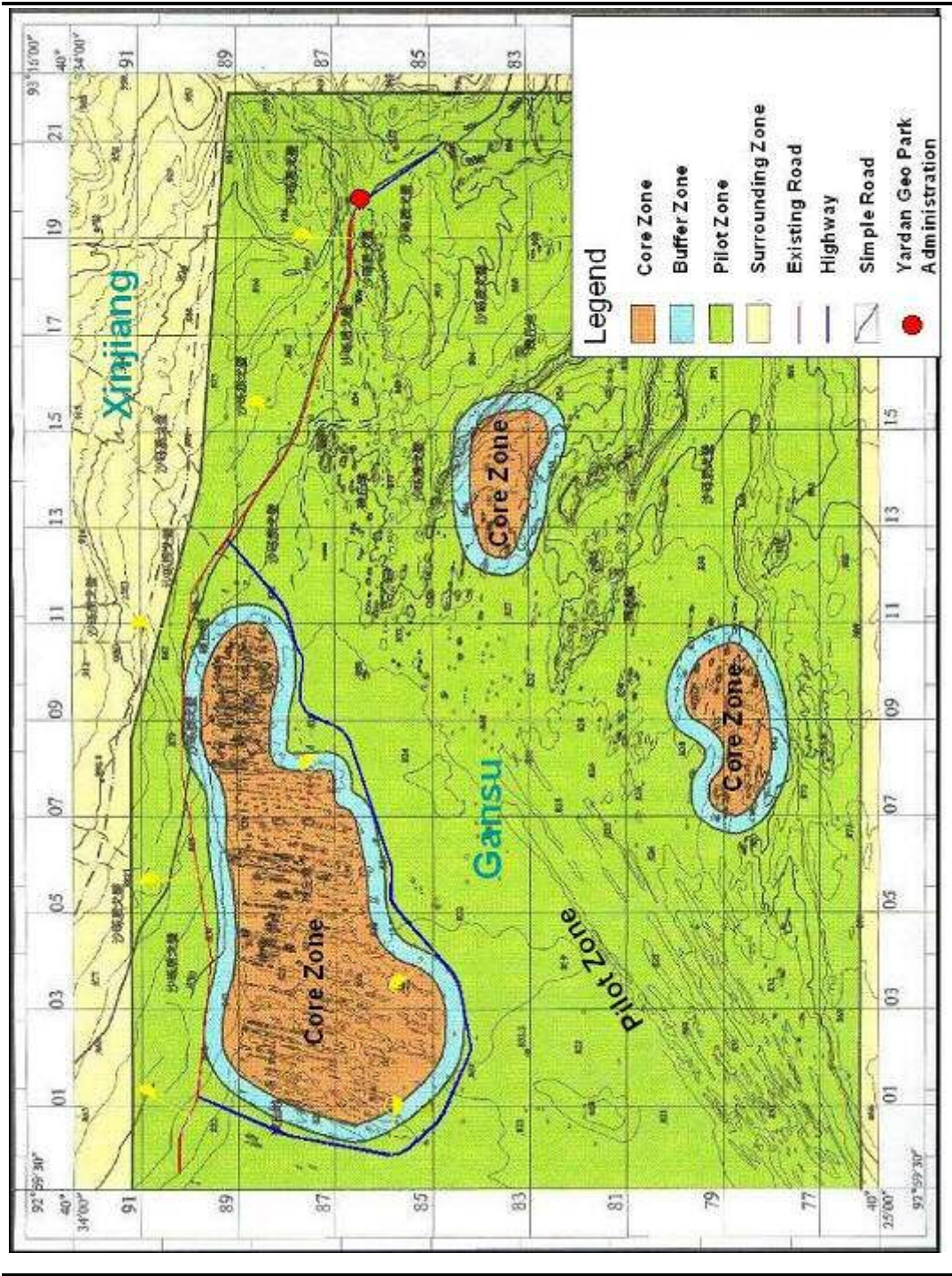


Figure.2 Map of Suoyang Ancient Town



Suodong Highway

Figure.3 Map for Jiuquan Museum

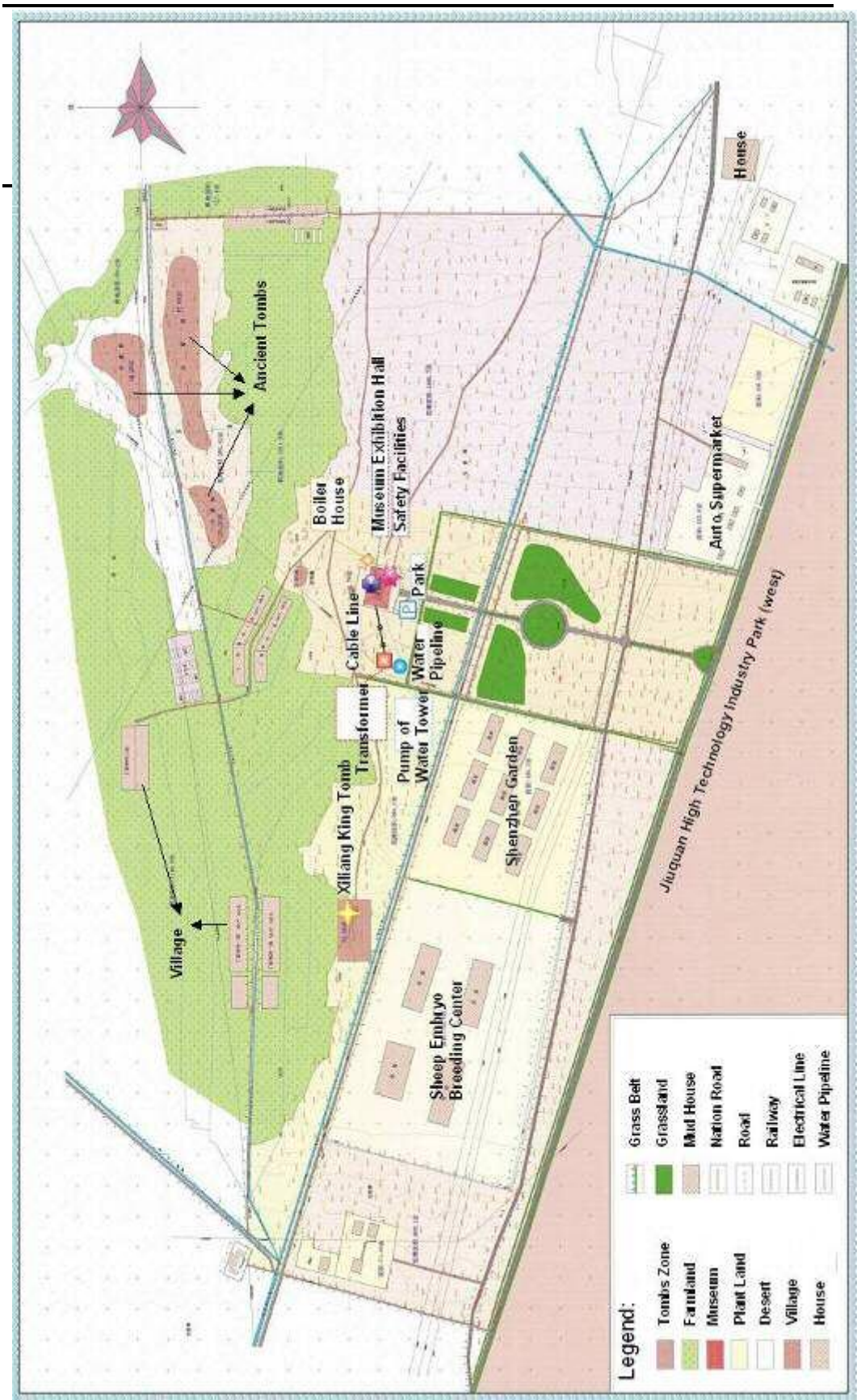


Figure.4 Map for Wei Jin Folk Culture Park

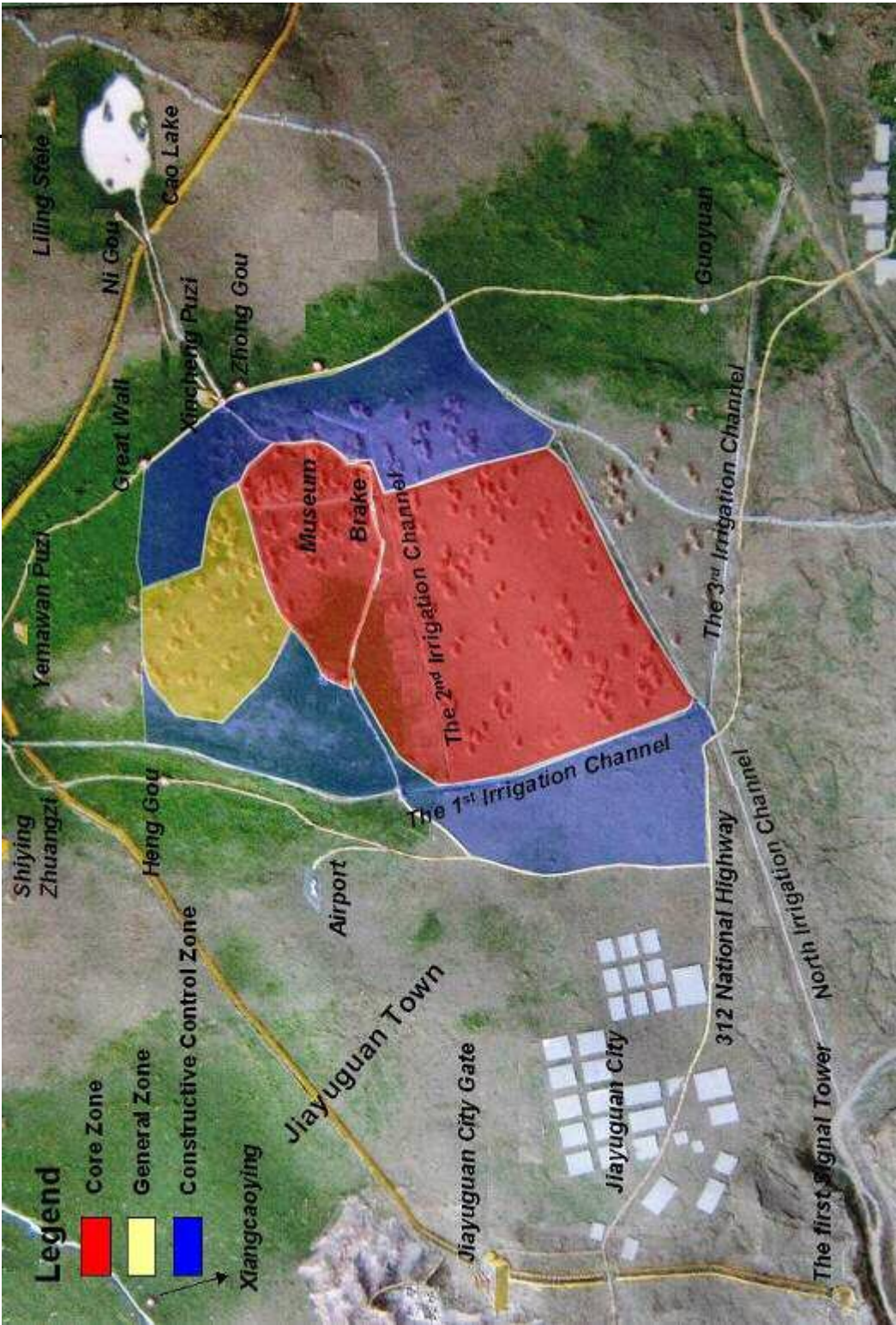


Figure.5 Map for Jiayuguan Great Wall

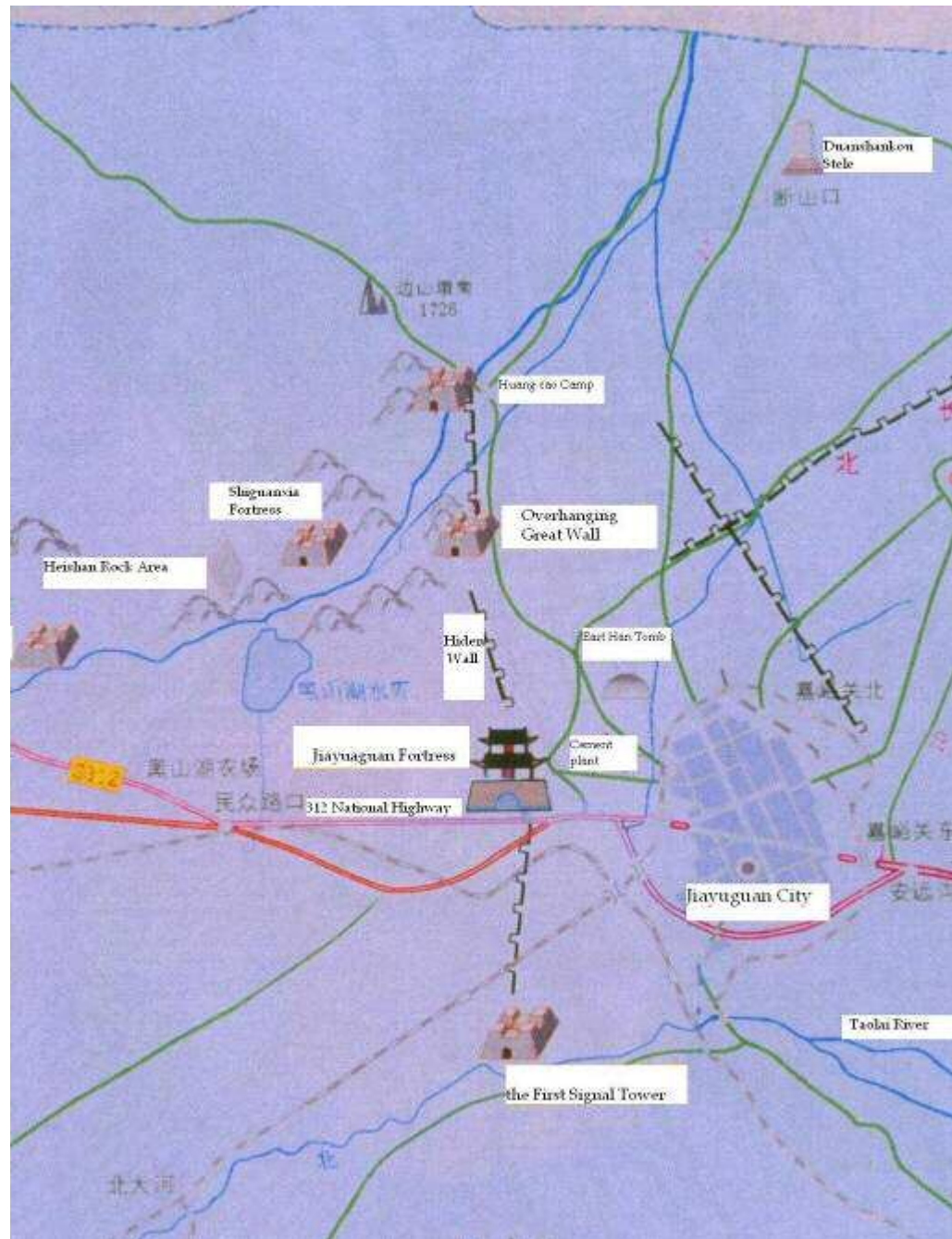


Figure.6 Map for Majishan Scenic Area

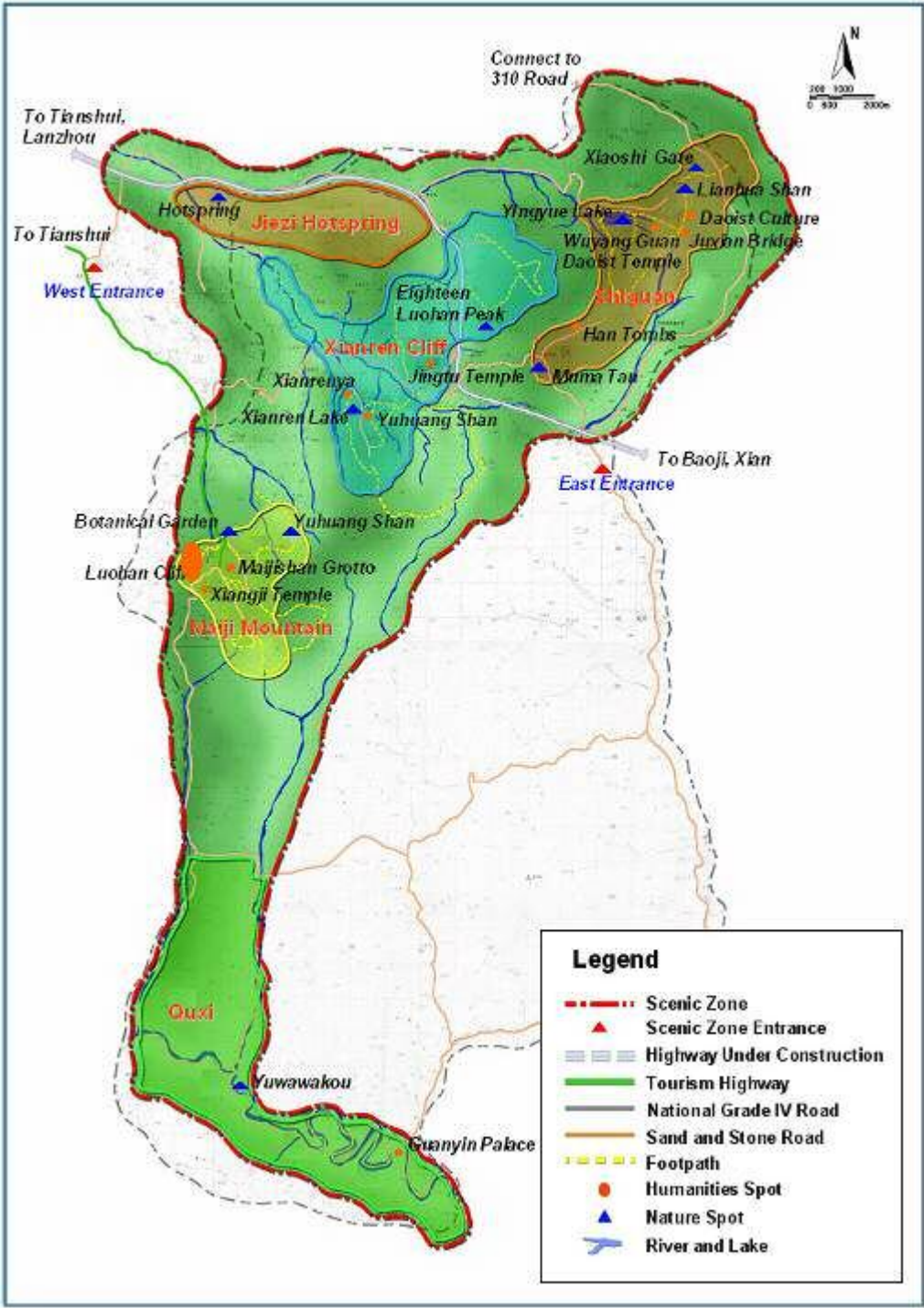


Figure.7 Map for Lutusi Ancient Government Centre

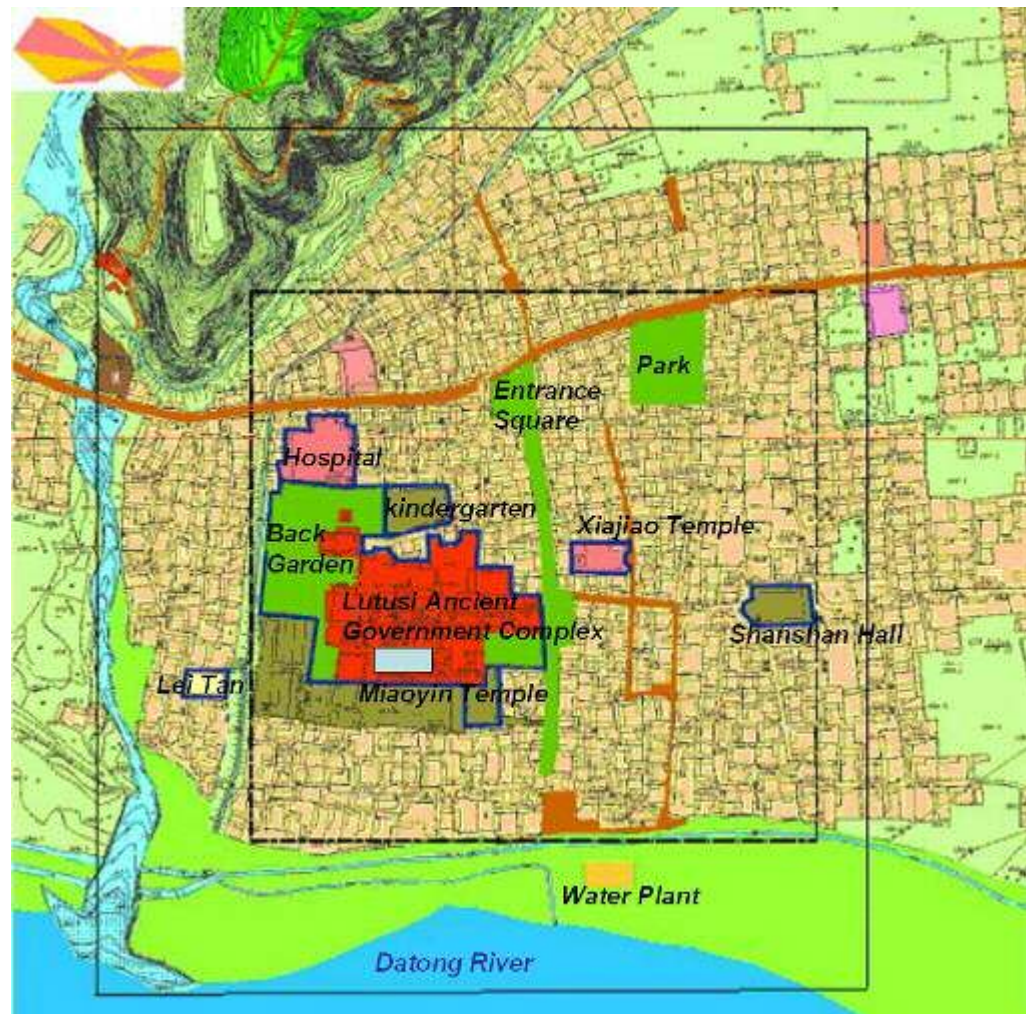


Figure.8 Map for Shi Chuan Ancient Pear Orchard

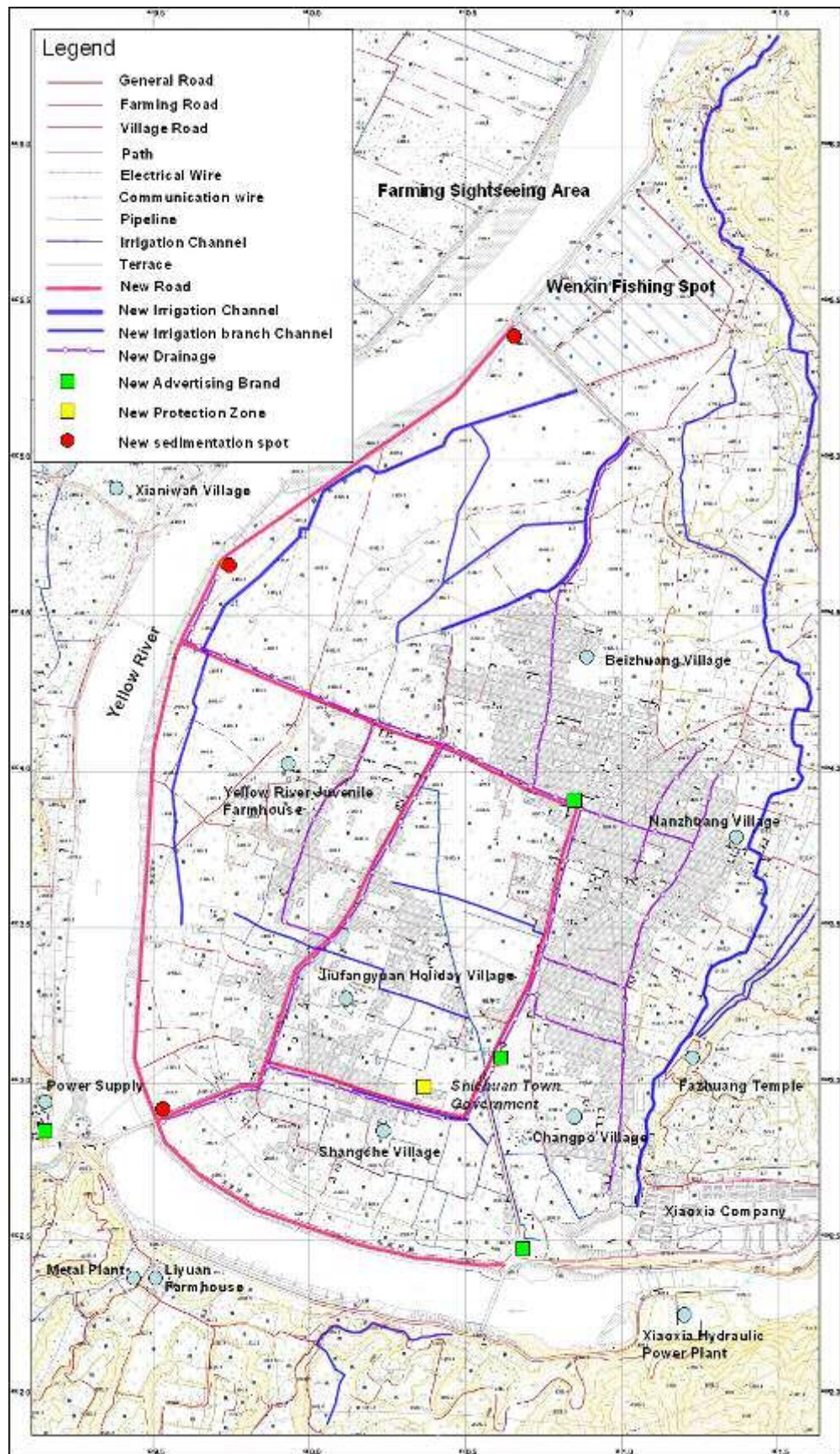


Figure.9 Map for Qingcheng Ancient Town

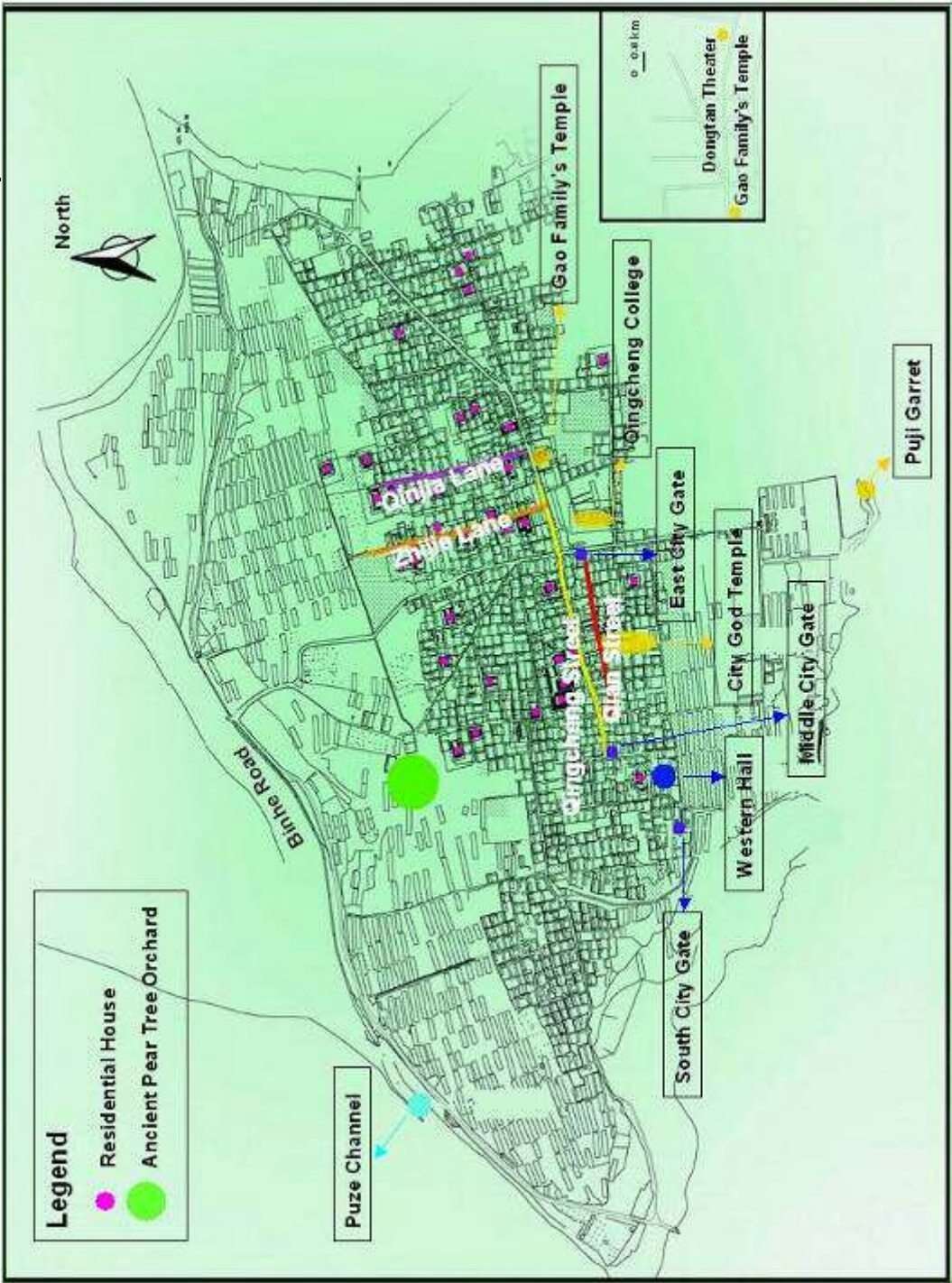


Figure.10 Map for Yellow River Stone Forest National Park

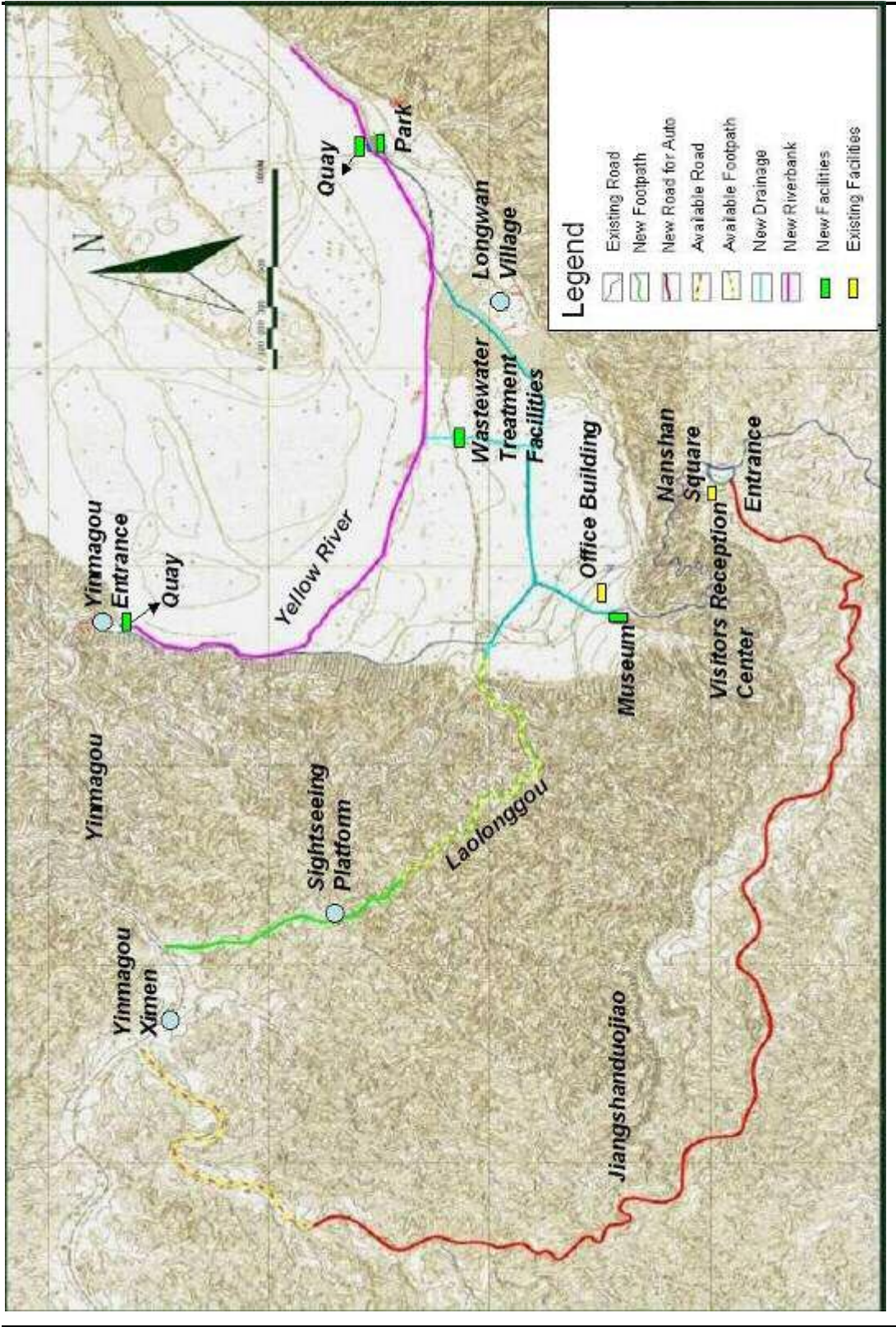
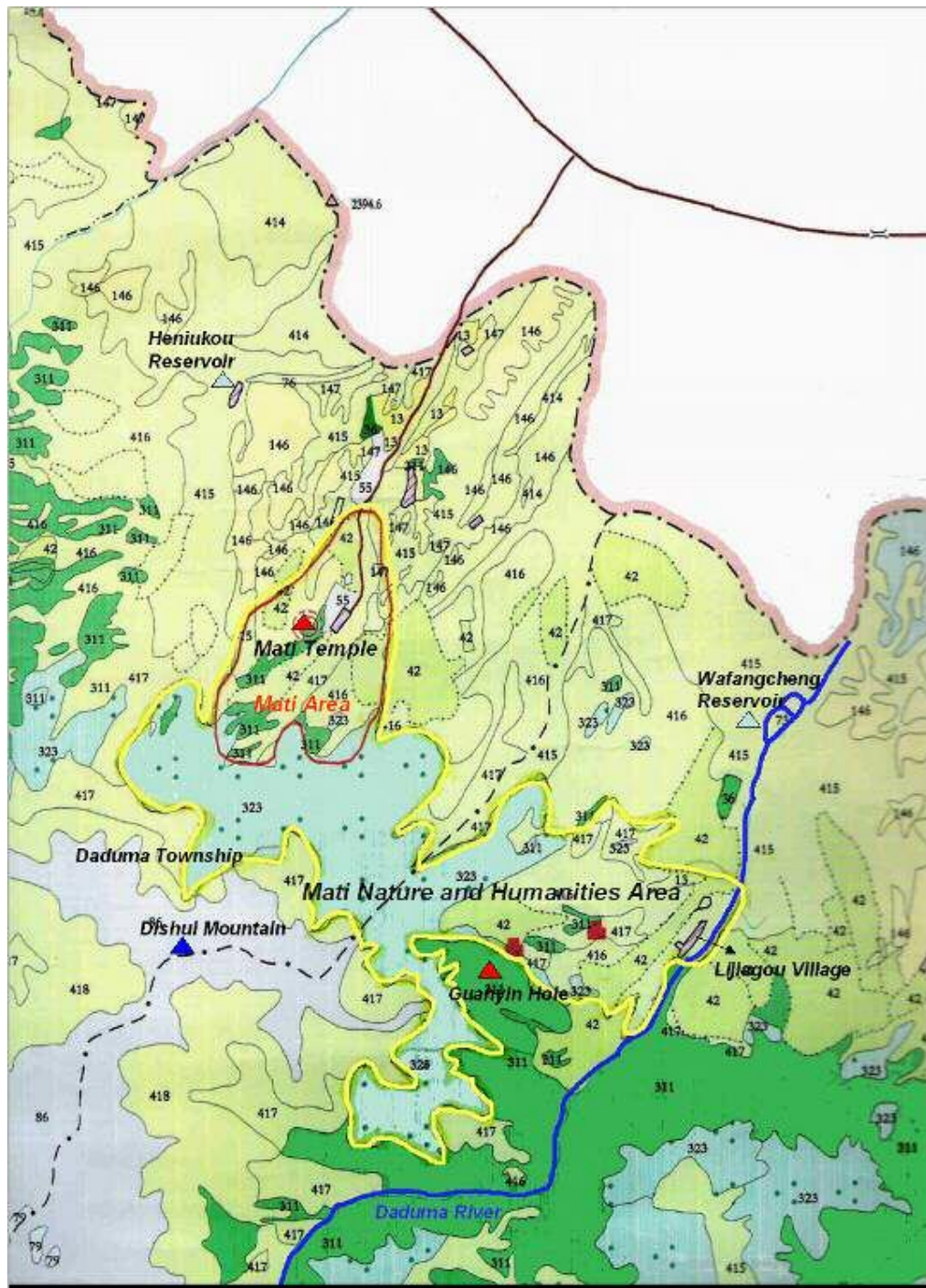


Figure.11 Map for Mati Temple Scenic Park



Annex B

Further Information on Baseline Conditions at the Eleven Priority Sites

Yardang National Geological Park

Topography and Physiography

Yardang National Geological Park located at 180 kilometres northwest to Dunhuang City, Gansu province. Yardang National Geological Park situated in the west extension of Anxi-Duanhuang basin, and connected with Luobupo which located at west of Yardang National Geological Park. Yardang National Geological Park belongs to plain area with high to the east and low to the west. Yardang National Geological Park has an area of about 398.4 square kilometres with a length about 15-25 km of from east to west and the width about 15-20 km from north to south. The elevation of Gansu is decrease from 1050 metres in east to 860 metres in west. North part of Gansu is bedrock area and mountains range from east to west with elevation decreasing from 1500 metres in east to 1100 metres in west. South part of Gansu is mainly desert, which belongs to west extension of Kumtag desert, with a series of crescent dunes and beehive dunes and the levitation is decreased from 1200 metres to 900 metres. Yardang relief remnant is mainly distributed to the north part, south part and southeast part of the park and concentrated in the north part and south part. The overall range of remnants in north part are from south to north while the overall range of remnants in south part are from east to west. The scenes in the north part of the geological park are broad black Gobi composed with black gravels, and are shown as alluvial fans and alluvial groups which distributed in front of mountains. Many wandering dunes distribute from the southwest to the northeast in the geological park.

Heritage Significance

The site is classified as a Geological Park under State level protection. The site is of natural heritage significance, being the largest known area of yardan formation in the world. Legal protection is provided under the Site Master Plan which details plans for future development of the site and includes measures for the restriction of vehicle and pedestrian access to sensitive areas. The site is not classified as a cultural heritage site.

Geology

Based on the site investigation and deep well drilling log, the stratum in this site is mainly composed of thick silty clay, fine and medium sand of Pleistocene in Quaternary. The lithology from upper to lower of this site could be described as follows:

- ⌘ fine sand: $Q_2^{al.1}$, khaki, dry, medium density, the granule with main components of feldspar and quartz, good granule separation, medium rounding degree, partially with 5-10 centimetre layer of medium and course sands; thick layer, semi-cementation, difficult to dig, drilling thickness 2.80-2.90 metres.
- ⌘ silty clay: snuff color, dry, medium density, with caliche nodule and horizontal stratification; drilling thickness 1.00-1.50 metres without drilling through.

Climate

Yardang National Geological Park lies in middle temperate and high pressure and arid zone with typical continental climate. This site is windy in spring, hot in summer, dry and cold in winter, lack of raining and plenty in sunlight. The annual precipitation is only 39.9 millimetres. The precipitation is mainly in June, July and August during which the precipitation could reach 70% of the whole year and often falls down as drencher and rainstorm. The annual evaporation reaches 2486 millimetres which is 62.3 times of annual precipitation.

In winter, the west wind prevails with a wind frequency of 15%. In spring, the east wind prevails with a wind frequency of 14%. In summer and autumn, the northeast wind prevails with a wind frequency of 11% and also there are many static wind days. The windy period is from March to May with a monthly average wind speed of 2.1-2.3 meter per second. The monthly average wind speed during the other months is less than 2 meter per second. The wind force is normally between level 3 and level 4. The strongest wind force can reach beyond level 12. The frequent and strong wind is the main reason for the formation of wind-erosion landform.

The annual average temperature is 9.3℃ with the highest value of 43.6℃ and the lowest value of -28.5℃. The daily temperature variation during summer is between 20℃ and 25℃. The annual average value of relative humidity is 40% with the highest value of 53% in December and the lowest value of 33% in April. Commonly, the ice period begins in October and ends in April or May of next year. The frost usually falls down in October or early to in mid-September. The longest frost period could reach 241 days.

Surface Water

Shule River is an inland river and the main water system in Dunhuang city. Dang River is a main branch of Shule River and it rises in Shule South Mountain of Qilian Mountain. Dang River collects the melted water from glacier and the rain water and flows to north and discharge into Shule River. There is no surface water in Yardang National Geological Park. The ancient pathway of Shule River goes through at the south of Yardang National Geological Park.

Groundwater

The groundwater under this site is mainly Quaternary pore phreatic water. The lithology of the water contain layer is medium and fine sand. The water level is lower than 30 meters under ground. It's mainly replenished from south mountain area and raining. The groundwater is in poor flow condition and is depleted in evaporation and transpiration.

Fauna and Flora

The vegetation in Yardang National Geological Park is shrub and semi-shrub desert type. The main plants include *Alhagi sparsifolia*, *Nitraria sphaerocarpa* Maxim., *Haloxylon ammodendron*, *Phragmites*, *Cynomorium songaricum* Rupr., *Tamarix chinensis* Lour., etc.. These plants mostly distributed in the central part of the Park and formed various grass based sand piles scene.

Animals in this site are mainly a few of wild yellow goats and rabbits.

Suoyang Town

Geographical location

Suoyang Town relic site is located at 96°12' east longitude 40°15' north latitude in geographical coordinates, standing at 1358 metre above sea level. Located in Gobi desert exactly south of Qiaozi Nanba Village, Suoyang Town town, anxi County, it is about 7 km away from Qiaoze Nanba Village, 68 km away northwest of Anxi county seat, about 25 km west of Tashi township and about 7 km south of Jianquanzi River mouth, northern foot of Changshanzi.

Heritage Significance

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 Dunhuang prefecture in the Han Dynasty and was made a prefecture during the Tang Dynasty.

Suoyang City is a State Level protected cultural heritage site. There is a need for archaeological investigation at the site.

Climatic

Suoyang Town relic is deeply seated in the hinterland, under typical continental temperate desert climate. Climatic subdivision under south temperate droughty zone, characterized by basic features of scanty precipitation, voluminous evaporation, long sunshine, large gaps in temperature day and night, hot summers and cold winters, windy and sandy weathers.

- Temperature: Average annual temperature 9.8℃–10.48℃; highest 35.8℃–37.78℃, lowest minus10.48℃-30.58℃, average daily gap 16.18℃.
- Sunshine Average annual sunshine 3230.0h, daily sunshine rate 73%, longest between may and August, average daily sunshine over 10 h.
- Precipitation: Annual rainfall 45.7mm – 104mm, average number of precipitation days 22.1 days, 6.1% of the whole year; rainfall mainly concentrate in June to August, with no downpours from 1951 – 1990 year end (>30mm =downpour); dryness K=16.01(>4.00 =very droughty), belonging to very droughty area, annual evaporation 2889mm – 3028mm, thickest snow accumulation 15cm, deepest frozen earth 150cm.
- Wind: Average annual wind speed 2.2m/s – 3.7m/s, maximum speed 30m/s, prevalent wind east and west, mostly east wind at frequency 36. Average annual windy days: 70.1, 19.2% of whole year.

Geology

Anxi County is located in a Miocene basin between the belt in front of Beilu Mountain of Qilian mountain and the south belt of Beishan in Tianshan – Inner Mongolian fold, while Suoyang Town is located in the lowland between the Shule river proluvial fan and Yulin river proluvial fan, high in the southeast and low in the northwest.

Geomorphology

- ☞ In geomorphic terms, Suoyang Town consists of sandy wilderness (desert) and wind-eroded land.
- ☞ Sandy desert --- Enduring wind action has caused many sand dunes in new moon shape. Almost no plant grows on the moving dunes. In the low-lying lands in between there are occasionally some plants, usually bush and semi-bush, and perennial plants on fixed and half fixed dunes, covering about 2% to 5%.
- ☞ Wind-eroded land --- belonging to wild desert type of land. Under enduring wind erosion, there form many mounds and troughs with occasional scanty plants with less than 1% of plant coverage.

Soil

Suoyang Town was once an oasis in the Tang Dynasty. It had a cultivated area of about 34000 hectares. After the mid-Tang Dynasty, due to chaos of war and northeastward change of the river course, irrigation water source went dry and the oasis became a desert and abandoned. Irrigated soil evolved into cracked and sandy earth.

The soil of Suoyang Town is now sandy earth.

Water source

Suoyang Town relic has rich underground water resources, mainly replenished by Shule and Yulin rivers and their tributary seeping. The underground water is of good quality, an ideal water source for human, animal and irrigation supply. There are two mechanical wells and one human drinking water well, basically enough for drinking water and greening of flowers, grass and trees at the present movement.

Vegetation

Suoyang Town vegetation falls under wild desert vegetation. Among plants that comply with local and historical conditions in Suoyang Town relic, those suitable to oasis sights are white elms, small leaves, poplars, northern poplars, silvery white poplars, drought willows, sandy willows, purple Chinese scholar trees, weeds and stems or leaves of cattails; those suitable to desert sights are lemon tree branches, dates, sea buckthorn, as for reference to greening and sights design.

Xiliang King Tomb and Jiuquan Museum

Geographical location

Jiuquan city located at the joint of Arkin Mountain, Qilian Mountain and Mazong Mountain, west end of Hexi corridor, northwest of Gansu Province. It is neighbouring Zhangye to east and inner-Mongolia Autonomous region, linking Qinghai Province to south, connecting Xinjiang Autonomous region to west and meeting Mongolia to north. Jiuquan city is about 680 kilometres from east to west and 550 kilometres from north to south. Its area is about 191,200 square kilometres and about 42% of Gansu Province area.

Heritage Significance

The Xiliang King City Scenic Area includes the Wei-Jin ancient tombs and Xiliang King-Li Hao's tomb, both of which are State level protected cultural relics.

Climate

Located in a semi-desert arid region, the climate characteristics of Jiuquan city are dry with little precipitation, strong evaporation, long sunlit period, cold in winter and hot in summer, cool in autumn and dry and windy in spring. The annual average temperature is between 3.9-9.3℃. The annual predominant wind is southwest wind. The maximum wind speed is 26 meters per second and the average wind speed is 2.3 meters per second. The annual average precipitation is 84 millimetres. The annual raining days are 62 days and mainly between June and October. The annual average evaporation is 2141.4 millimetres, and 27.3 times surpassed the annual average precipitation. The maximum relative humidity is 56% and the annual average relative humidity is 46%. The maximum snow depth is 14 millimetres and the frozen earth depth in the coldest period is 1.32 metres. The frozen period starts in November and ends in the next April. The annual average sunlit period is 3056.4 hours.

Hydrology

The rivers in Jiuquan city belong to three main water system including Shule River water system, Heihe River water system and Haerteng River water system. All of the three rivers rise from glacier snow area of Nanshan Mountain.

Wei Jin Folk Culture Park

Geographic Location

The Wei Jin Folk Cultural Park is within the boundaries of the Xincheng Town, or some 18 km to the northeast of the Jiayuguan city, neighboring to the Guoyuan Town of the Jiuquan city on the east and west ends, northwestern part of Gansu Province. More than 1600 tombs of the Wei and Jin dynasties scatter around an areas of 30 square kilometres.

Heritage Significance

The Wei-Jin tomb complex comprises over 1,600 tombs constructed during the Wei and Jin dynasties (220-420). Between 1972 and 1979, an archaeological research team from Gansu Province unearthed 18 tombs in the area and found more than 700 colourful murals.

The tombs are known as the largest subterranean art gallery in the world, housing a great deal of colourful mural. Most tombs are of families, housing bodies of three or four generations. Painted realistically and earlier than the Mogao Grottoes, the Wei-Jin murals provide an example of pure Chinese realism, before the influences that came with Buddhism. They fill historic gaps in painting styles

between the Wei and Jin periods and are considered highly valuable for historic research.

Together with tombs located in Jiuquan City, the Guoyuan-Xincheng Tombs Complex is classified as a National level cultural relic.

Topography and geology

The topography of the Wei-Jin Folk Cultural Park is typical of the deserts in Western China. Looking in all directions you will find only the Gobi desert. The park is an extension of flat lands with an altitude ranging from 1475m in the northwest to 1486m in the southeast above the sea level. From the tectonic point of view, it is part of Qilianshan stratum. The gravel stratum, normally found between the surface of the ground and 100m underground, is more than 300m thick for most part of the tomb area. The boulder and gravel stratum consists chiefly of quartzite and some other forms of metamorphic rock. The boulders are oval, 60 to 70 percent of which is 3-8cm in diameter while the biggest ones may attain 60cm in diameter. Around 15 percent of the stratum is gravel, the remaining component being mainly clay soil in addition to a very thin layer of boulder cemented by calcium. Three meters down the ground there is a density of gravel cemented by calcium.

Climate

The Wei-Jin Folk Culture Park is located in an area with typical temperate continental desert climate. The basic climatical features are: long and strong sunshine, little rainfall and much evaporation, many windy days, large day-night temperature difference. The annual sunshine ratio is 69%. The annual average temperature is between 6.7 and 7.70 degrees centigrade. Highest temperature in summer is 38.70 degrees centigrade; the lowest temperature in winter is -31.60 degrees centigrade. The day-night temperature difference is somewhere around 10 and 15 degrees centigrade. The average depth of frozen ground in winter is 108cm and the maximum is 132cm. The annual relative moisture is 46 percent. The yearly average natural rainfall is 85.3mm and there is a rainy year every three years. The yearly average wind speed is 2.4m/s, wind force normally 3-4 level with very rare occurrence of wind above 12. There are about 130 frostless days all the year round.

Hydrology

There is very little rainfall in the tomb area. However, in the south lies an irrigation aqueduct with rich water supply in the summer. The source is Taolai River in Jiayuguan city. The actual amount of water supply is subject to rainfall and the amount of melting ice blocks at the waterheads. So during the freezing season from December to next March the water supply is short while the water supply is ample from April to August. Otherwise, numerous fountains in this region provide the area water. Besides, the underground water, normally found 10-25m down the surface of the ground, is also plentiful.

Jiayuguan Great Wall

Geographic Location

Jiayuguan Great Wall located in Yuquan County, the mid of Hexi Corridor and 5 kilometres to Jiayuguan city.

Climate

With a temperate continental climate, the Great Wall scenic area has such characteristics as abundant sunlight, little precipitation, high evaporation, more wind and big temperature difference. The total annual sunlit time is about 3000 hours and the sunlit rate is close to 78%. The annual temperature average is between 6.7℃ and 7.7℃. The coldest time is in January, and the hottest time is in July. The annual maximum temperature is near 39℃. The annual minimum temperature is near -32℃. The daily temperature difference is between 10℃ and 15℃. The annual precipitation is about 82 millimetres while the annual evaporation is about 2114 millimetres. The evaporation is about 25 times of precipitation. The southeast wind prevails during summer and autumn and the northwest wind prevails during spring and winter. The annual wind speed is about 2.5 metres per second. The annual frostless time is only 130 days.

Heritage Significance

This section of the Great wall finished at Yumen (about 90 km West from Jiayuguan), before the pass was abandoned during Ming Dynasty. The walls in the northwest region were originally constructed under the Han Dynasty, and remains of the Han wall have been found near Dunhuang. The portions of the wall standing at Jiayuguan date from about 600 years ago. Today, Jiayuguan Pass is the most intact ancient military building preserved of all the passes on the Great Wall and is therefore of immense heritage conservation significance.

All sections of the Great Wall are National Level Cultural Relics and UNESCO World Heritage sites.

Topography and Physiography

The Great Wall scenic area is long in east-west direction and short in north- south direction. The elevation of this site is between 1400 and 2200 metres. The land is inclined from east to west and from south to north, with a natural gradient of 13.3. The topography of this site is mainly Gobi and gravels. The thickness of the gravel layer is above 300 metres.

Vegetation

The scenic view of the Great Wall site is desert landscape without natural woods. The main plant around this site is mainly desert vegetation and artificial woods. The main woods include pagodatrees, willows, *Elaeagnus angustifolia*, and white poplars.

Hydrology

The main surface water in this site is Taolai River, which is a seasonal river. The maximum flux of this river can reach 500 cubic metres per second while the minimum flux is only 1.9 cubic metres per second. The average flux of this river is 19 cubic metres per second.

Majishan Scenic Area

Geographic Location

Majishan Scenic Area located southeast part of Tianshui city, Gansu province. The Geographical coordinates of it are 34°07'- 34°28' of north latitude and 105°56'- 106°10' of east longitude. It is 350 kilometres east to Xi'an city, 320 kilometres west to Lanzhou city, 1300 kilometres west to Dunhuang city and 500 kilometres south to Jiuzhaigou Valley, Sichuan Province.

Heritage Significance

The site is one of the four largest Buddhist cave complexes in China with a total of 194 grottoes, 7,200 clay and stone statues and 1,300 square meters of murals. The earliest carvings within the grottoes date to 384 (Qin Dynasty), and continued over 1,500 years. The grotto sanctuaries played an important role in the development and dissemination of Buddhism into China and are therefore of great heritage conservation and religious (Buddhism, Confucianism, Taoism) significance.

There is an ongoing project to classify documents from the Majishan Grottoes in Tianshui City. The documents cover a large range of topics, including, medicine, divination, music, education, art, history and philosophy.

Natural landscape (mainly forest but also including a botanical garden) is also considered as a part of the scenic area.

The grottoes are classified as National level cultural relics while the surrounding area is classified as a National Class AAAA Key Scenic Area.

Climate

Majishan Scenic Area belongs to temperate monsoon climate zone and has a nice climate. The highest temperature in this area is 33℃ while the lowest is -15℃ with a common low temperature of -8℃. The period of daily average temperature of the whole scenic area above 10℃ is from April to October. The frostless period is 230 days. The annual sunlit duration is about 2307 hours. The relative humidity is around 85%. The annual precipitation is 800-1000 millimetres.

Topography and geology

The elevation of Majishan Scenic Area is normally ranged from 1400 metres to 1800 metres. The peak can attain to beyond 2200 metres, in which the area with an elevation during 1140-1500 metres is loess hilly zone and the area with an elevation during 1500-2197 metres is cinnamon soil type stony mountain area. The rufous rocks in mountain with horizontal stratification formed numerous splendid

Danxia landforms for the wind erosion. The terrane structure of the whole scenic area is composed of red grit stratum and tinged metamorphic rocks.

Lutusi Ancient Government Centre

Geographic Location

Lutusi Ancient Government Centre located in the Liancheng Town, Yongdeng County, Gansu Province.

Heritage Significance

Lutusi Ancient Government Centre 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 in the 14th Century. 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.

One building contains a wall mural from the Cultural Revolution, showing yet another aspect of this site's long and varied history.

The site is a National level cultural relic.

Topography

Liancheng Town situates at the northeast piedmont of Halagu Mountain, a branch range of Qilian Mountain, the joint of east end of Tibet Plateau and the west end of the Loess Plateau. The northwest part of Liancheng Town belongs to the extension area of Qilian Mountain and the south east part of Liancheng Town is a hilly & gully area in the Loess Plateau. Basically, the area governed by Liancheng Town is the basin and gorge formed by Datong River, and extended from north to south.

Geology

Liancheng Town located in the Qilian-Luliang-Helan epsilon structural system. The north range of Laji Mountain anticline in west part of Qilian-Luliang arc drape zone grew based on proterozoic era geological structure, and the main structure line is stretched in east-west direction. The new tectonic movement in this area is intense. The appearances of the new tectonic movement are shown as terrace growth, deep valley drenching, thick alluviums in valleys and basins and so on. The geology of this area belongs to the third level terrace of Upper-Pleistocene, Quaternary, and the second level terrace of Holocene. The lower part of this area is mainly alluvial grits and pebbles stratum and the alluvial soil layer is 6-15 metres in thickness on the upper part of this area.

Climate

Liancheng Town located at the southwest part of Yongdeng County, and is typically temperate semi-arid continental climate. The climate characteristics are: hot in summer, big temperature difference between day and night, many

rainstorms during the shift period from summer to autumn, cold and less snow in winter, and one crop per year. The annual average temperature is 7.4℃, the annual average precipitation is 419 millimetres, the annual sunlit duration is 2500 hours, the highest temperature is 33℃, the lowest temperature is -20.5℃, the annual average wind speed is 1.5 m/s, the maximum wind speed is 12 m/s, the annual predominant wind direction is west by northwest, the frostless period is 139 days, and average maximum depth of frozen earth is 80 centimetres.

Surface water

Datong River is the main surface water in this region. It is the second level branch of Yellow River and the biggest branch of Huangshui River. Datong River, rising from Shaguolinnamujimu Mountain in Qilian County, Qinghai Province, runs through Menyuan County and Huzhu County, enters Tianzhu County of Gansu Province, and flows towards northeast to Liancheng and Yaojie, then turns to south through Xiangtang gorge, and discharges into Huangshui River eventually. The length of Datong River is 561 kilometres. In Gansu Province, there are 104 kilometres and the valley area is 15,100 square kilometres with annual average flux volume of 150 cubic metres per second. Its water level is about 1681.8 metres, and its annual runoff volume is about 2.854 billion cubic metres.

Groundwater

There are two types of groundwater reservoirs in this region.

- One is Quaternary phreatic water which mainly distributes in the gravel and pebble layers under the bottom of the first and second level terrace at both sides of Datong River and grit and scree layers below the trenches. The thickness of the Quaternary phreatic water layer can rarely be more than 1 metre. The water output of single well is below 100 cubic metres per day. The mineral degree of this kind of groundwater is between 1 gram per litre and 3 gram per litre. The groundwater is weakly alkaline water and can be used by human and livestock.
- The other is fissure water in base rock which mainly distributes in the Sinian System stratum and the faultages and fissures in Caledonian Granodiorites. The surface of groundwater varies approximately with topography and seasons and is 10-40 metres below the ground. The water output of single well can attain 500-1000 cubic metres per day and with good water quality. The mineral degree of this kind of groundwater is below 1 gram per litre and could be used as drinking water resource.

The replenishment of the groundwater is from precipitation and the groundwater will replenish rivers.

Soil

The soil in Liancheng is mainly grey cinnamon soil and comprises leaf litter layer, humus layer and clay layer. The humus layer is brown and 30-70 centimetres thick, and contains 3-17% organic matters. The upper layer is crumbled structure while the lower layer is shiver structure. The value of pH is about 8.

Fauna and Flora

The forest area in Liancheng Town scope is 5.52 square kilometres and the grass

hill area is 3 square kilometres. The animal and plant resources is abundant. There is a virgin forest 3 kilometres away from Liancheng Township. In the virgin forest, grow 1614 kinds of plant including *Pinus tabulaeformis* Carr., *Populus davidiana* Dode, *Lonicera*, clove, spruce, birch and *ippophae* etc. Otherwise, there are more than ten kinds of rare animals, like *Capreolus capreolus*, blue sheep and lynxes living in this forest.

Shi Chuan Ancient Pear Orchard

Topography

Shichuan Town located at 20 kilometres southeast to Gaolan County and 20 kilometres northeast to Lanzhou city and centre of Gansu Province. The topography in this place is mountains alternative with rivers and characterized by a declination from northwest to southeast. The average elevation is from 1500 metres to 2300 metres.

Heritage Significance

The site is of considerable natural heritage value as these pear trees are thought be the oldest in China. Ancient trees over 300 years old are Lanzhou City level protected historic relics.

Geology

From the geotectonics point of view, Gaolan County belongs to Kunlun-Qinling geosyncline drape system. From the Geo-Mechanical point of view, this area developed Qilian-Luliang-Helan epsilon structural system, Longxi roll-up structural system and Hexi structural system. The concealed fault structure and active fault are not found.

Hydrology

The main surface water in this region is the Yellow River. After flows through Lanzhou city, the Yellow River enters into Gaolan county from Daheping, Yuzhong county, and discharges into Xiaoxia Reservoir at the upstream of Baolan bridge. Then, the Yellow River flows through 21.4 kilometres gorge sect and reaches the exit dam of the reservoir. Thereafter, it comes into Shichuan Basin in Gaolan county and toward northeast into Daxia. The length of Xiaoxia Reservoir is 23.8kilometres with an average depth of 21.92 metres and an area of 3.9 aquare kilometres. It is a typical Canyon-Reservoir with strong turbulence and the water exchanges of it can reach 706-976 times a year.

The groundwater includes phreatic water and feeble confined water and is mainly replenished by precipitation and irrigation water. The replenishment is greater than drainage. Generally, the groundwater is 30-40 metres in depth and has good quality for drink.

Climate

Gaolan County is a kind of continental arid climate with many winds during winter and spring, low temperature and short sunlight. The annual average precipitation is 263.4 millimetres. The maximum daily precipitation is 65 millimetres. The annual average evaporation is 1785 millimetres. The maximum temperature is 38.9℃. The annual average temperature is 7.0℃. The uttermost lowest temperature is -25℃. The annual average humidity is 54%. The predominant wind is north wind. The highest wind speed is 24metres per second. The annual average sunlit period is 2768 hours. The maximum depth of frozen earth is 119 centimetres.

Qincheng Ancient Town

Geographical Location

Qingcheng Ancient Town located at the north part of Yuzhong county, Langzhou city. It is 110 kilometres to Lanzhou city, 30 kilometres to Baiyin city and 90 kilometres to Yuzhong county.

Heritage Significance

Today, the wooden courtyard houses are the main cultural asset of the town. Unfortunately, many of the courtyard houses were destroyed in the 1960s and 1970s and some have since been rebuilt. Other heritage sites of interest include the Gao Family Ancestral Temple, City Academy, the Chenghuang Temple, an exhibition hall of traditional rural and agricultural equipment, and the ancient ferry crossing. The town is also famous for its special folk culture, including local “Xixiang Song”, “Hero Drum Dance” and “Happiness Paper-cutting”.

Forty-nine of the courtyard houses are County level cultural relics and the Gao Ancestral temple is a Provincial level cultural relic.

Topography

With a kind of hilly and gully topography in Loess Plateau, Qingcheng Ancient Town is high in south and low in north. Its elevation is between 1450 metres and 2219 metres. The town urban area located in the Yellow River valley and with three kinds of relieves including hill, valley and mesa.

Climate

With a typical temperate semi-arid continental monsoon climate, Qingcheng Ancient Town is dry and plentiful of sunlight. It has evidently four seasons with high temperature but not very hot in summer and cool climate in spring and autumn. The annual average temperature is 9.3℃. The temperature differences during a year and a day are both big.

Hydrology

Yellow River comes into the Qingcheng city from Xixiakou, flows toward north along Weiziwan, and turns east at Yanjiadikou, then diverges into two rivers. The south river named Xiaohetan flows toward east to Heilvxuanzi. The north river flows toward east to Maozizui from Yinggewan and Hongwan, and converges with Jia River, then runs toward east about 1.5 kilometers to reach Ziyatou, then turns to northwest and diverges into two rivers again at Lameizui. The latter two rivers converge at Jiangjiawan and flow toward east to enter Jingyuan County.

Yellow River Stone Forest National Park

Geographic Location

Yellow River Stone Forest National Park located at the Longwan village, Zhongquan Township, southeast to Jingtai county, Baiyin city, Gansu Province. It is 60 kilometres to Jingtai county and 70kilometres to Baiyin city. It has an area about 50 square kilometres and neighbouring the Longwan River meander to east and meeting the continuous hills to west. Its geographical coordinates are 35°52'04"- 36°56'17"of north latitude and 104°15'51"-104°21'54"of east longitude.

Heritage Significance

The site is of considerable natural heritage values owing to its unique combination of landscapes including the Yellow River, stone forest, dryland and riverine oasis.

The site is a National level Geological Park.

Climate

With a typical temperate continental arid climate, the overall climate characteristics of this area include: high annual temperature difference, significant season changes, sparse and uneven precipitation, dry and windy days. The annual average temperature is 8.2℃, while the average temperature in January is -7.7℃ and the average temperature in July is 22.0℃. The annual average sunlit time is 2725.5 hours. The frostless period is 141 days. The annual average relative humidity is 46%. The precipitation is 184.8 millimetres while the evaporation is 3038.5 millimetres. The annual average wind speed is 3.5 metres per second. The annual number of strong wind days is 27.9. The highest wind speed is 25 metres per second. The season wind direction is influenced strongly by monsoon. The northwest wind predominates in winter and the northeast wind frequency increases in summer and turns into the predominant wind or sub-predominant wind. The annual average number of sandstorm days is 21.9, with the maximum of 47.

Hydrology

Yellow River flows through this area, and it is the main water resource for drinking and agriculture and industry. At the same time, Yellow River is the only pollutant receiving water body.

The Longwan section of Yellow River flows steady and its width is 250 meters normally. The annual runoff of it is 32.8 billion cubic meters and average flux is 1040 cubic meters per second. Its maximum flux is 6100 cubic meters per second while the minimum flux is 67.9 cubic meters per second. The annual average sand concentration is 5 kilogram per cubic meter and the maximum value can reach 382 kilogram per cubic meter.

The groundwater in Longwan valley is generally from 3 meters to 10 meters below ground. The water volume yielded by single well is between 100 and 500 cubic meters per day.

Geology

From geotectonic point of view, this area belongs to North Qilian Drape Zone of Qilian Drape System. The structure is composed of a series of faults and drapes, in west by northwest direction mainly and in east by northeast direction secondly.

Topography

The overall topography of this site is high in southwest and northeast and low in center space. Mijia Mountain and Song Mountain at north part and Hunan Mountain and Songjialiang Mountain at south part are all branches of Qilian Mountain. The middle area is Naoquan sunken area.

Soil and vegetation

The main soil types in this area are sierozem and irrigation-silting soil. The sierozem mainly distributed in the hilly area and is transition soil from grassland to desert. So the vegetation on the sierozem is desert grassland type with sparse plants. The irrigation-silting soil mainly distributed in Longwan. This kind of soil contains high concentration of nutrient and has good aerate condition. So the vegetation on the irrigation-silting soil includes artificial woods, crops, fruits and vegetables.

Health

There is no locally infectious disease this site. The top infectious diseases here are hepatitis and dysentery, etc. The human health condition here is good.

Mati Temple Scenic Park

Geographical Location

Mati Temple Scenic Park located in Daduma township, Sunan county, Zhangye city, the middle sect of Hexi corridor and north foot of Qilian Mountain. It is 60 kilometres to Zhangye city and 165 kilometres to Sunan County. It lies between 38°10'- 38°50'of north latitude and 99°54'-100°45'of east longitude and with an area of 68 square kilometres.

Heritage Significance

The Buddhist cave complex comprises grotto art, mountain views and folk customs of the Yugur minority group. The site was an important location on the Buddhist route from India to North East Asia.

Jinta, Temple, contains a mummified body that has been decorated in the form of Asparas, a Chinese flying goddess and is kept in good condition by the dry climate of Gansu. The grottoes in this area have bas-relief Apsaras, which are only seen in frescos at Dunhuang and Maijishan.

The site is a National level cultural relic and the adjacent Qilinshan is a National level Nature Conservation Area.

Topography and geology

The geology of Mati Temple Scenic Park is mainly complicated arch structure. Rock pieces stratum alternates with basic rocks stratum. The main stratum in the scenic area is Middle Cambrian stratum. The lithologies at east and west ends of this site are similar. But the lithology at the middle of this site mainly contains conglomerate, igneous rocks and phyllite. The south and north sides of the site are mainly faults connected with Silurian Period.

Hydrology

There are two main rivers, Mati River and Xiaoling River, in this area. Mati River, originated from the east of Lingsong Mountain, is a typical seasonal river formed by alpine snow thawing. The water yield by Mati River itself is 8.5 million cubic meters. The Xiaoling River, originated from north of Lingsong Mountain, flows from southeast to northwest and meets the Mati River at the Longzongfu.

Climate

With a continental climate, the annual average temperature of Mati temple area is between 1 and 3°C. The frostless time is between 90 and 120 days. The annual sunlit time is 2683 hours. The annual precipitation is between 360 and 550 millimeters, which mainly fall down in June, July, August and September. The depth of frozen earth is normally 2 meters. The valley wind prevails here in whole year.

Fauna and Flora

Mati Temple located at the boundary of Qilian National Natural Reserve Zone. There are plenty of plants in this Natural Reserve Zone. And the Natural Reserve Zone is an important area for biodiversity conservation in China and in world. In this Natural Reserve Zone, there are 1020 kinds of angiosperm, 10 kinds of gymnosperm, and 14 kinds of fern. Thereinto, 3 kinds of plants are national level protected, in which one is in the first level and the other two are in the second level. There are 11 kinds of *Orchidaceae* plants in 9 categories listed in *Convention*

on International Trade in Endangered Species of Wild Fauna and Flora in this Natural Reserve Zone.

The wild animals living in the Natural Reserve Zone include 229 kinds of wild animals, in which there are 47 kinds of beasts, 169 kinds of birds, 13 kinds of amphibians. Thereinto, 49 kinds of them are national level protected, in which 11 kinds are in the first level and the other 38 kinds are in the second level.







Soil








The soil types in this area mainly include kastanozem, grey-cinnamon soil, alpine steppe soil and alpine meadow soil etc. At the elevation between 2300 and 2600 meters, the soil is mainly kastanozem; at the elevation between 2600 and 3200 meters, the soil is mainly grey-cinnamon forest soil; at the elevation between 3200 and 3400 is mainly cinnamon soil; at the elevation between 400 and 3600m is mainly subalpine meadow soil; at the elevation between 3600 and 3900 meters is mainly alpine meadow soil; at the elevation between 3900 and 4200 meters, the soil is mainly alpine frost desert soil; above the elevation of 4200, the soil is covered by glacier and permanent snow.




Annex C




Inventory of Physical Heritage Resources








Site Name: Qingcheng Ancient Town	Location: Yuzhong County, Lanzhou City	Coordinates: N.36°32'95.38" E.104°19'02.60"	Bank Screening Assessment Rank= 5 th
Description: Located 100 km from Lanzhou, 23km from Baiyin City. Qingcheng town has a population of 22,600, of which some 5,600 live within the historical protection area. Qingcheng Town is known as “The First Ancient Town on the Yellow River”. The town is a “living museum” of fine dwellings with exceptional woodcarving and highly decorated walls. The majority of the courtyard houses are homes for the residents of Qingcheng. Most of the courtyard houses are located in Chenghe Village, Qingcheng Village and Xinmin Village. One courtyard was built in the Ming Dynasty (1368-1644), 33 were built in the Qing Dynasty (1644-1911), and 15 were built during the Republic of China period. (1912-1949). 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, but is not included in current Qingcheng plans because it lies in Baiyin Municipality.		 <i>Qingcheng is a “living museum” where visitors can wander through the town and observe ancient village life</i>  <i>Wooden courtyard houses are the cultural fabric of Qingcheng.</i>	
Existing condition, restoration and maintenance: The structural integrity of many of the courtyard houses is poor and several are in urgent need of restoration. Five courtyard houses are being prioritized for restoration by local government due to the immediate threat of structural failure and their heritage significance. Many of the renovations proposed under the project proposal are currently underway, including renovation and reconstruction of courtyards, renovation of the Ancient Qingcheng Academy, and restoration of the Gao Ancestral temple. Courtyard houses are supplied with piped water supply from the Yellow River. There is a treatment plant in the village however it is unclear what level of treatment is provided. The water supply is metered and residents are charged for it. There is no sewerage system in the village; communal toilets along the laneways are used by local residents.		 <i>Both restored (top left) and unrestored houses (top right) are open to visitors</i> 	
Cultural or Natural Heritage Significance: In its early days, the town was primarily a cargo collection and distribution center, where many merchants established themselves on the banks of the Yellow River. They built themselves ornately decorated courtyard houses throughout the Ming and Qing Dynasty. Many of these courtyard houses were destroyed in the 1960s and 1970s and some have since been rebuilt. The town authorities are collecting antique furniture from residents and displaying them in restored buildings. Today, the wooden courtyard houses are the main cultural asset of the town. Other heritage sites of interest include the Gao Family Ancestral Temple, City Academy, the Chenghuang Temple, an exhibition hall of traditional rural and agricultural equipment, and the ancient ferry crossing. The town is also famous for its special folk culture, including local “Xixiang Song”, “Hero Drum Dance” and “Happiness Paper-cutting”.			
Classification: <ul style="list-style-type: none">49 of the courtyard houses are under county level protection.The Gao Ancestral temple is under Provincial level protection.		Tourist Numbers: In 2004, there were 22,000 visitors to Qingcheng, generating RMB 380,000 in tourism revenue.	
Threats: It is unclear what technical standards are being adopted for restoration works.		 <i>It is unclear whether the restoration works underway are adopting appropriate technical standards</i>	





Site Name: Yellow River Stone Forest Park	Location: Jintai county, Baiyin city	Coordinates: N.36°91'17.22" E.104°28'71.60"	Bank Screening Assessment Rank= 10 th
Description: Located 60 km from Jintai County, Baiyin City, 170 km from Lanzhou, this geological formation was created over a period of more than a million years and covers 50 square km. The site remained beyond tourist's reach until a road was completed in 2003. The main attraction is a scenic gravel road along the valley floor (about 2 km) with views of near-vertical eroded cliffs on both sides. Horses and donkeys are available for hire to carry visitors into the gorge.		  <i>View of the Nanshan square (left) Part of gorge wall(right)</i>	
Existing condition, restoration and maintenance: At the moment the conservation of the site is good, as well as it has been opened to the public during 2003. A main gate, the Nanshan square, a museum and a viewing platform are under construction. Newly installed informative panels along the valley road seem to be difficult to maintain. A major investment has been made in an interpretative visitor centre overlooking the Yellow River. It has comprehensive educational display panels in Chinese and English, although the quality of the English wording is extremely poor.		  <i>Entrance to the Museum (left) Inside the Museum (right)</i>	
Cultural or Natural Heritage Significance: It is a singular combination of landscapes including the Yellow River, stone forest, dryland and riverine oasis.			
Classification: National Geological Park		Tourist Numbers: Site management reports that in 2004, there were 60,000 visitors to the site, generating RMB 600,000 in tourism revenue.	
Threats: Lack of control of visitor numbers. Unrestricted vehicle access along the valley road. Possibility of speculative building in Longwan village leading to lowered aesthetic value. Speculative building on upper plateau level to south of the visitor centre in dryland area, possibly without supporting waste/wastewater infrastructure.		  <i>Left: interpretative panels inside the gorge Right: rubbish bins are integrated with the environment</i>	




Site Name: Lutusi Ancient Government Centre	Location: Yongden county, Lanzhou City	Coordinates: N 36°35'20.86" E 102°50'11.16"	Bank Screening Assessment
Description: Oldest, largest and most complete example of an administrative building complex used by local leaders under the Minority Rule System in late 14 th Century. The complex is located in the middle of the city centre next to the main commercial street. It is composed of an administrative and residential ancient building and a series of Buddhist temples.		  <i>Restoration of woodwork column (left) and paintings (right)</i>	
Existing condition, restoration and maintenance: Lutusi Ancient Government Centre is currently under restoration s. These works include an integrated restoration of the complex, and the removal of some modern buildings in the complex. Some restoration works are focused on wood materials (structures and paintings), as well as restoration of other elements (roofs and walls). The programme of restoration and maintenance is designed to keep the cultural relic's original status, maintaining the old constructions, original structures and is being performed using traditional techniques. The works are being conducted by craftsmen and technicians with specialist Cultural Heritage training. However, it has been noticed that in places the wood being used to fill cracks appears not to be the same kind of wood and is already being forced out of position. Some of the ancilliary equipment in the complex, such as fire extinguishers, signposts and litter bins are either positioned inappropriately or are simply of an inappropriate and insensitive design. The project includes the renovation and widening of the commercial street that gets access to the equipment. In this way, only one of the houses will be respected due its cultural interest.		  <i>Almost finished restoration works (left) and building under restoration</i>  <i>Sample of mural paintings in the temple area that are not accessible to the public</i>	
Cultural or Natural Heritage Significance: Lutusi Ancient Government Centre 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. One building contains a wall mural from the Cultural Revolution, showing yet another aspect of this site's long and varied history.			
Classification: National Cultural Heritage Protection		Tourist Numbers: Not verified.	
Threats: There is a risk of unsympathetic or overenthusiastic restoration, and there is already some evidence of inappropriate material use. The restoration works should be monitored.		  <i>Left: more recent evidence of Lutusi's history Right: House708 on the commercial street that will be maintained and restored</i>	




Site Name: Maijishan Scenic Area	Location: Tianshui city	Coordinates: N.34°28'25.02" E.106°04'88.33"	Bank Screening Assessment Rank= 2 nd
Description: Located in the southeast of Tianshui City, Majishan (Wheat-stack Mountain) is an area of wooded slopes, ancient Buddhist grottoes, and large statues. The Mountain, which is southeast of Tianshui, is reached via 30-40 km of winding road. It is among the four largest Buddhist cave complexes in China with a total of 194 grottoes, 7,200 clay and stone statues and 1,300 square meters of murals. The site covers the area of 142 square km as its core protection area and includes Maijishan Grottoes, the Xianren Cliff, the Stone Gate, Quxi Stream and Jieting hot spring		 <i>Views of Majishan Grotto (left)</i> <i>Inside the Grotto Cave (right)</i>	
Existing condition, restoration and maintenance: The severe, extensive deterioration of the Maijishan grottoes is the result of natural weathering, cracking caused by stress relief, and seismic activity. Various types of damage include cracking, collapse, flaking, and spoiling due to moisture seepage, as well as repeated excavation of grottoes, have left the cliff surface with many weathered, overhanging rocks that appear unstable. In 1983, consolidation works were undertaken: concrete spraying, grouting, rock bolting, and construction of structural support; all without substantially changing the appearance of the caves The safety of visitors is an issue when it has been raining as the stairways are covered in smooth, slippery sheet rubber. Despite these consolidation works, paintwork, wood structures, and sculptures are in need of urgent restoration. It is also necessary to design carrying capacity and visitor flow controls for the site.		 <i>Informative panel of localization of the grottoes (left)</i> <i>Local vendors in the scenic area (right)</i>	
Cultural or Natural Heritage Significance: The earliest carvings date to 384 (Qin Dynasty), and continued over 1,500 years. The cave sanctuaries played an important role in the development and dissemination of Buddhism into China. There is an ongoing project to classify documents from the Maijishan Grottoes in Tianshui City. The documents cover a large range of topics, including Buddhism, Confucianism, Taoism, medicine, divination, music, education, art, history and philosophy. Natural landscape (mainly forest but also including a botanical garden) is also considered as a part of the scenic area.			
Classification: Natural Cultural Heritage Protection (Grottoes) National Class AAAA Key Scenic Area		Tourist Numbers: In 2004, there were reportedly 310,000 visitors to the site, generating RMB 6,960,000 in tourism revenue.	
Threats: The Maijishan documents are threatened by mold and rot caused by the moist climate and damage done by moths and mice. Overflow of visitors. Upon completion of the project, visitor numbers are expected to increase from about 400,000 in 2005 to 1,000,000 in 2008. Without appropriate visitor flow controls, this increase in visitor numbers may lead to a deterioration in elements of the scenic area and compromise visitor safety. Further deterioration of valuable documentation may occur without urgent protective action.		 <i>Restoration works (left)</i> <i>Problems with the light wire conduction (right)</i>	

Site Name: Mati Temple Scenic Area	Location: Sunan County, Zhangye City	Coordinates: N.36°28'41.02" E.100°25'05.05"	Bank Screening Assessment rank=
Description: Buddhist cave complex located 65 km south of Zangye city in Sunnan Yugur-Tibetan Autonomous Prefecture. The whole area has multiple cave complexes, some of which are connected by series of passageways, tunnels, balconies and stairways. Others are many kilometres away in different valleys. It is also known as The Horseshoe Temple, because of a legend that a Chinese Pegasus landed here, leaving a horseshoe imprint that can still be seen within the Mati Hall. Southeast of the main centre is Jintasi, a very small double-grotto with extremely valuable frescos and statues on a cliffside above the site of a former Tibetan lamsery (now vanished). This site cannot praticably be opened to the public because of the limited space in the caves. This scenic area is integrated by grottoes art, mountain views and folk customs of the Yugur minority group		 <i>Constructed heritage: Buddha statue (left) and mural paintings</i>	
Existing condition, restoration and maintenance: Elements related with constructed heritage are being restored by specialist teams. Some of the small grottoes and temples need urgent restoration, and preventive measures to protect the cultural heritage. There has already been damage, vandalism and theft in the last 40 years, and some of the caves were used to keep animals. Efforts should be made to protect the intangible cultural heritage, and encourage local communities to record and preserve their traditions, especially the gastronomy, costume, song and dance. A small heritage centre is well designed and laid out, but hidden away above a local shop. There is already evidence that recent building construction has resulted in overcapacity of retail space that could become aesthetically unpleasant.		 <i>Intangible heritage: Tibetan food (left), and lifestyle objects presented in the heritage interpretation centre</i>	
Cultural or Natural Heritage Significance: Important site on the Buddhist route from India to North East Asia, and potentially an important site both for pilgrims and tourists. Other than a modern temple (sympathetically designed and constructed), there is little feel for the spirituality of the area. Jinta si, Temple, contains a mummified body that has been decorated in the form of Asparas, a Chinese flying goddess, kept in good condition by the dry climate of Gansu. The grottoes in this area have bas-relief Apsaras, which are only seen in frescos at Dunhuang and Maijishan. The area contains natural resources that have not yet developed for tourism. There is the possibility to consider the whole area as a cultural landscape			
Classification: National Level Cultural Heritage Protection Qilinshan is a National level Nature Conservation Area		Tourist Numbers: 150,000 visitors during 2004; RMB15 entry fee and additional RMB9 for most of the sights within.	
Threats: Increased deterioration of some of the caves and temples that form the complex. The management should include aspects as better security to reduce the risk of vandalism and theft. Risk of exploitation of local traditions for tourist shows. This aspect should be carefully managed, as the intangible heritage here may be more fragile and sensitive to exploitation than the constructed heritage.		 <i>Left: state of maintenance of some of the grottoes. Right, folk show based on traditional dances</i>	



Site Name: Jiayuguan Great Wall	Location: Jiayuguan city	Coordinates: N.39°48'05.07" E.098°13'04.04"	Bank Screening Assessment Rank= 1 st
Description: Jiayuguan Pass is the first pass at the west end of the Great Wall of China. Construction at Jiayuguan began in 1372, during the Ming Dynasty. It is located 4 km west of Jiayuguan City . The Overhanging Great Wall is an extended part of the Jiayuguan Pass, located some 8.5 km from the pass itself, and was once an important component in the medieval military defence system. Winding through the Gobi dessert to the steep Black Mountain (Hei Shan), the wall appears to hang over the cliff and block the vital pass of Shiguan Xiakou, which is how it got its name. The first signal tower of the Great wall is located 7.5 km from the pass, on the edge of a 56 m high cliff that rises from the Taolai River. It was built in 1539. A tourism Centre is located underground at this location, which reduces landscape and visual impacts.		  <i>Example of restoration needs</i>  <i>View from the west gate, were is proposed to construct a car park (left)</i>	
Existing condition, restoration and maintenance: Jiayuguan Pass: Adequate conservation of the structures themselves, however wooden materials and paintwork is in need of restoration. The lighting system should be modified as it contrasts strongly with the architecture (see right), and better integration of other facilities including portable toilets and plastic chairs is recommended. Overhanging Great Wall: Entirely reconstructed on the original basements between 1985 and 1992. It is a re-invention emulating the Badaling Great Wall in Beijing. The first signal tower: The original rammed-earth structure remains and is surrounded by a low fence to restrict visitor access.		  <i>The first signal tower (left)</i> <i>Visible lighting system on the wall (right)</i>	
Cultural or Natural Heritage Significance: This section of the Great wall finished at Yumen (about 90 km West from Jiayuguan), before the pass was abandoned during Ming Dynasty. The walls in the northwest region were originally constructed under the Han Dynasty, and remains of the Han wall have been found near Dunhuang. The portions of the wall standing at Jiayuguan date from about 600 years ago. Today Jiayuguan Pass is the most intact ancient military building preserved of all the passes on the Great Wall.			
Classification: UNESCO World Heritage site National Level Cultural Heritage		Tourist Numbers: Jiayuguan Pass: 350,000 visitors per year, entry fee 60 RMB/person Overhanging Great Wall: 150,000 visitors per year, entry fee 21 RMB/person First Signal Tower: entry fee 21RMB/person	
Threats: Jiayuguan: Construction of a car park, 2 km from the west gate threatens to intrude on the cultural landscape of the site. Overhanging Great Wall: Since the wall has been absolutely recreated and reconstructed, there is little threat to heritage significance at this site. First Signal Tower: The stability of the cliff immediately behind the signal tower requires geotechnical study. The location of the cable cart detracts from the visual amenity of the site.		  <i>Overhanging Great wall: New building of main entrance and detail of the new reconstruction of</i>	

Site Name: Wei Jin folk Culture park	Location: Xincheng Town, Jiayuguan City	Coordinates: N.39°51'05.09" E.098°26'04.08"	Bank Screening Assessment Rank= 7 th
Description: Located in about 18 kilometres northeast of Jiayuguan city, the Wei-Jin Mural Brick Tomb is a large tomb complex with over 1,600 tombs covering an area of about 30 km2 of gobi desert. The tombs were constructed during the Wei and Jin dynasties (220-420). Between 1972 and 1979, an archaeological research team from Gansu Province unearthed 18 tombs in the area and found more than 700 colourful murals.		<div></div> <p><i>Some details of paint decoration of the tombs</i></p>	
Existing condition, restoration and maintenance: Of the 18 studied tombs, only two of them are opened to the public. The conservation state is excellent. The management of the tombs includes measures such as visitor flow controls and climate control devices. An exhibition hall has been established near the main gate of the site and is implementing good educational function.		<div></div> <p><i>Left: Brick construction inside the tomb</i> <i>Right: Scale model of a tomb located in the museum</i></p>	
Cultural or Natural Heritage Significance: The tombs are known as the largest subterranean art gallery in the world, housing a great deal of colourful mural. Most tombs are of families, housing bodies of three or four generations. Painted realistically and earlier than the Mogao Grottoes, the Wei-Jin murals provide an example of pure Chinese realism, before the influences that came with Buddhism. They fill historic gaps in painting styles between the Wei and Jin periods, and so they are considered highly valuable for historic research.			
Classification: National Level Cultural Heritage Together with tombs located in Jiuquan City, the official name of the site is Guoyuan-Xincheng Tombs Complex.		Tourist Numbers: 14,000 visitors in 2004, entry fee 35 RMB/person generating RMB 406,300 in tourism revenue. <i>Note:</i> There is a discrepancy in the number of visitors reported by site management (100,000) and that contained in the Master Plan (14,000)	
Threats: None detected. The research programme for the site could be strengthened.			

Site Name: Yardang National Geological Park	Location: Dunhuang, Jiuquan City	Coordinates: N.40°25'00" E.092°59'30"	Bank Screening Assessment Rank= 8 th
Description: Located 165 km northwest of Dunhuang and 70 km northwest of Yumen Gate, the park is the east end of the Kumutage Desert. It covers an area of 25 x 18 km and is the largest “yardang” scenery known, formed by weathering action of sand-laden winds. Yardang landscape comprises an area of soft, poorly consolidated rock and bedrock surfaces that have been extensively grooved, fluted, and pitted by wind erosion. The rock is eroded into alternating ridges and furrows essentially parallel to the dominant wind direction. The relief may range from one to several metres, and there may be unconnected hollows and other irregular shapes.		<div><i>The Museum (Left)</i></div> <div>Yardang landscape (right and below)</div> <div></div>	
Existing condition, restoration and maintenance: In order to prevent landscape and visual impacts within the Park, visitors are restricted to the existing black top road, which visually blends with the surrounding gobi landscape. Vehicle access is restricted to minibuses operated by Park management.			
Cultural or Natural Heritage Significance: It is the world largest known “yardang” landscape.			
Classification: National Geological Park		Tourist Numbers: 136,000 tourists in 2004; entry fee 60RMB/person, generating RMB 8,320,000 in tourism revenue.	
Threats: Risk of alteration of natural landscape due to vehicle movements that can disturb the graver layer of Gobi Desert surface. However site management has been successful in restriction of vehicles access to a single back-top road to date.			

Site Name: Souyang Town	Location: Anxi County, Jiuquan	Coordinates: N.40°15'10.08" E.096°11'57.07"	Bank Screening Assessment Rank= 13 th
Description: Suoyang Town is located 68 km southeast of Anxi City. The ancient town dates back to the Han Dynasty and the fortress was constructed in 295 AD. During the Tang Dynasty the town had strategic military importance. Legend has it that a Tang Dynasty General, Xue Rengui, and his forces were once besieged in the City without food. The general found the cynomorium growing around the City to be edible and ordered the soldiers to dig cynomorium (In Chinese, <i>Suoyang</i>) for food. The City therefore became known as "Suoyang City". The site comprises two parts: 1) the West City covers an area of 165,000 square meters; 2) the East City covers 17,000 square meters. The city wall is 9 meters in height and 5 meters in width. The total suburban area covers 800,000 square meters. Outside the city, beacon towers, arrow towers and watch towers extend for several km.		  	Watch tower relic (left) <

Site Name: Xiliang King City Scenic Area	Location: Suzhou District, Jiuquan	Coordinates: N.39°46'11.8" E.098°25'58.3"	Bank Screening Assessment Rank= 11 th
Description: The Xiliang King City Scenic Area is located 7 km from Suzhou District, Jiuquan. The area consists of three parts, namely the Wei-Jin ancient tombs (described separately in this annex), Xiliang King-Li Hao's tomb and the Jiuquan museum. The tombs are a State level protected cultural relics, together with the Wei-Jin tombs in Xincheng, Jiayuguan. Jiuquan Museum: Covering an area of 6.4 square kilometres, the museum comprises 27 tombs filled with both imitation and real burial objects excavated from tombs between the Han and Jin Dynasties (206 B.C.- 420). Construction of the museum began 5-6 years ago, but remains unfinished due to lack of funding.			
Existing condition, restoration and maintenance: Jiuquan Museum is new and remains empty.			
Cultural or Natural Heritage Significance: The Wei-Jin tombs are under national level cultural heritage protection. The Dingjiazha Tomb is famous for its wall paintings.			
Classification: The Wei-Jin tombs are under national level cultural heritage protection.		Tourist Numbers: Undeveloped site	
Threats: In need of academic research.			

Site Name: Shi Chuan Ancient Pear Orchard	Location: Gaolan County, Lanzhou City	Coordinates: N.36°15'21.70" E.104°00'46.23"	Bank Screening Assessment Rank= 4 th
Description: 800 hectare orchard of pear and other fruit trees. Around one-third of these trees are said to be over 300 years old and at least one winter fruit pear tree is estimated to be over 450 years old.			
Existing condition, restoration and maintenance: Pear tress are owned by the county Tourism Management Company and managed by farmers. All revenue form fruit sales goes to farmers. Trees and land are contracted to farmers for 50 years. This management system guarantees good conservation and maintenance of the trees.			
Cultural or Natural Heritage Significance: It is thought to be amongst the first Chinese pear orchards. A "Pear Flower" Festival is celebrated in Shi Chuan during the Spring.			
Classification: Ancient trees over 300 years old are city level protected historic relics		Tourist Numbers: Site management reports 200,000 visitors per year. Master Plan reports 62,000 visitors in 2004	
Threats: None identified. Local farmers reported that there were no problems with insects or diseases.			

Annex D

Examples of Reviews of Heritage Site Plans

Jiayuguan Great Wall

Status and Issues		Recommendations
Management Structures		
Management	The Jiayuguan Tourism Bureau is not represented in the JGWCHSAAB or the two tourism development companies set up by the JGWCHSAAB.	It would be appropriate for a Scenic Area Bureau to include directors and managers from different bureau including the Tourism Bureau, the Construction Bureau, Finance Bureau and the DRC.
Financing	<p>Financing of the Scenic Area is effectively managed on the traditional local government model of “budget + extra-budgetary” system, with effective management by the Finance Bureau.</p> <p>This means that capital funding is achieved through applications to specific funds or pools of money. The risk to directors and managers does not exist which can lead to unnecessary expenditure, especially on fixed asset investment, and tends to under-fund critical activities such as marketing, promotion, human resources management, training, knowledge management and heritage management activities such as documentation, research, interpretation.</p>	<p>Consider the reconstitution of the JGWSAAB as an entity that has a complete Profit & Loss system of accounting that includes responsibility for capital as well as operational funding, with set objectives in terms of profitability, return on investment and long term performance.</p> <p>It is critical that such a P&L system recognises the true intrinsic value of the cultural and natural heritage, as it is unlikely that major heritage sites can be totally self-sustaining.</p> <p>It would be advisable to set a minimum budget percentage for marketing (7%), maintenance (12%), heritage research/documentation and interpretation (4%), training (3%) and knowledge management (0.5%).</p>
Local Capacity	JGWCHSAAB directors, managers and personnel are passionate, diligent, and eager to improve and enhance the opportunities for heritage management and tourism development. However, there is a lack of experience, knowledge and skills of techniques, methodologies and practices elsewhere in China, Asia or elsewhere.	<p>Create a management library of books and papers covering all areas of business management, accounting, tourism marketing, heritage site management, conservation techniques, landscaping, environmental management and local history. It may be necessary to arrange translation of key foreign works into the Chinese language.</p> <p>Fund a study tour for key managers to visit and gain experience of practices used at Luang Prabang (Laos), Hoi An and Hue (Vietnam) and Suwon (South Korea).</p>
Tourism Marketing and Promotion		
Marketing Capacity	Existing surveys are insufficient for fully understanding visitor demands and expectations.	Develop a methodology for expanding current visitor surveys to use internationally accepted (UNWTO) methodologies.
	Recent visitor numbers suggest that high ticket prices may be depressing demand, especially from the local market.	Urgently conduct studies into the price elasticity of ticket pricing at all sites and for different assets to confirm optimal pricing strategy.
Revenues	Sources of alternative revenues for Jiayuguan’s heritage and tourism assets do not exist, except for management fees and small-scale concessions.	Investigate the very wide variety of alternative and potentially lucrative forms of alternative indirect revenue for the assets and sites.
Training	Insufficient marketing skills	Provide specific training for personnel employed to conduct marketing that

		includes a full range of marketing activities, not just advertising and promotion.
Cultural Heritage Protection		
CH Protection Plan	Cultural Heritage Protection Plan (Conservation Master Plan) being developed April and May 2006	Plan to be reviewed for integration with FSR, EA, SA and Tourism Master Plan and Scenic Areas
		Government approval process should be monitored to avoid lack of alignment with objectives of all stakeholders.
	Heritage Core and Buffer Zones currently being mapped	Need to be attached to all existing and future plans. Need to be attached to EA, SA and FSR.
	Scale of proposed heritage documentation and research as stated in Jiayuguan Tourism Master Plan, requires clarification. (Component 5)	The PMO should clarify the type and scale of research planned and the institutes who will be commissioned to conduct the work.
Vision	It is good practice to create a real Vision and Strategy for heritage and tourism sites.	Hold a one-day workshop to include at least 30% of all staff to create a Vision and Strategy under the title “Jiayuguan in 2050” that starts with the question “How do we want Jiayuguan’s heritage and tourism to look like in 2050?” and then asks “Exactly what do we need to do and when, to get to that target?”
Finalisation of Plans	Heritage Protection elements of current plans are not clear, especially in Shiguan Gorge	Clarification required for Heritage Protection Plans
Delineation of Core Zone	Investigation during 2006 suggests that many potential relics related to the Great Wall and the Silk Road in Jiayuguan lie outside the current protected area.	Request extension of the core and buffer zones to specifically protect the Han Great Wall (and its line to the north-east of Jiayuguan) and the area for 2km to the west of the Ming Great Wall in the Jiayuguan area.
Great Wall	The purpose, methods and scale of proposed restoration, rebuilding and conservation of the Great Wall is not clear.	Further clarification is required on the rationale and techniques to be used for any restoration work in the area. Leaving the “ruined” Great Wall un-restored until further research is done on best methods of for protection is suggested. Evidence from early 20 th Century photographs suggests that the forces of natural erosion may be overstated, especially in the short-term.
	There are numerous other fortresses, beacon towers and stretches of the Great Wall near to Jiayuguan, but these are not included in the responsibilities of the JGWCHSAAB. [This recommendation is also partly addressed for the immediate area above]	Consider including additional assets under the mandate of the JGWCHSAAB to extend the range of tourism possibilities.
Standards	Plans for the removal of obsolete, derelict and partly constructed infrastructure not clear.	Clarification is still needed. Discussions during 2006 suggest that there are no plans other than to leave former infrastructure.
	Extent, type and use of proposed lighting, together with its purpose and impact on heritage not clear. (Component 5)	Clarification is still needed.
	Status of actions planned in UNESCO	PMO is recommended to provide a briefing update.

	2003 Asia-Pacific Periodical Reporting Exercise for Jiayuguan is unknown.	It would be prudent for the JGWCHSAAB to arrange external assessment for the 2007 Asia-Pacific Periodic Reporting Exercise, as both the original UNESCO nomination and the 2003 Reporting was self-conducted.
Fortress	Keeping part of the inner fortress wall in its original decayed state is recommended as an effective way to present the history of the fortress.	Consider ways to present more of the cultural heritage in an authentic state. Both domestic and foreign tourists have an increasing desire to see built heritage in its original form, even if ruined or damaged, as can be evidenced by the decisions elsewhere in the world to preserve, not rebuild (e.g. Angkor Wat, Stonehenge, the Acropolis, the Coliseum, etc). There are now plans to remove certain structures inside the fortress walls, but the exact details are still to be confirmed.
	Part of the outer fortress wall is suffering from scouring at the base (far south-west corner of the fortress) and a nearby section is showing signs of subsidence and possible bowing out.	Building engineers should urgently assess the state of the walls to determine what remedial action should be taken and when both for the security of the heritage and also for the safety of visitors.
Shiguan Gorge	Current approval status of plans for Shiguan Gorge Resort not clear	Clarification is still needed.
	There are numerous inscriptions and rock carvings, both Chinese and Tibetan, in the Shiguan Gorge. There also appear to be a number of symbols that could represent far older inhabitation of the area.	Ensure that inscriptions are recorded and documented, and provide suitable interpretation and access for visitors. It would be prudent to engage a leading cave art specialist to assess the possibilities and the nature of the existing carvings.
	The rationale for the construction of a new old temple and pagoda, where none existed before in the Shiguan Gorge is unclear.	Place a moratorium on new buildings in the Shiguan Gorge until such time as a Conservation Management Plan provides objectives and a strategy for the management of the gorge and the Heishan area.
Cultural Heritage Interpretation		
Museums	The Jiayuguan Great Wall Museum is a fine museum, which uses models, dioramas, photographs, maps and sketches to educate (and importantly to entertain!) visitors.	Link exhibits about the Silk Road and the Great Wall to promote other sites, especially those at the Wei Jin Tombs, the Overhanging Great Wall, the First Signal Tower, so using interpretation to encourage visitors to stay longer and visit other sites.
	There are various ways to build on the success of the museum to further enhance visit experience.	Provide audio tours of the museum as used in the Imperial Palace in Beijing. Provide information in other languages, especially Japanese, Korean, French and German.
Tour Guides	Tour guides provide a rather static interpretation which does not resonate with the quality and style of interpretation used at sites around the world.	Provide education for tour guides to create a more dynamic interpretation that includes more legends, more stories and “tells the story” of Jiayuguan.
	There are no self-guide tour books in any language, which are common at other sites around the world. As well as being essential for self-guiding visitors, this is a loss of substantial revenue and integrated marketing opportunity.	Commission self-guide books for each site (or one book for all three sites), using sponsorship or advertising to cover the costs of writing and printing. Consider providing an audio tour of the fortress similar to that used at the Imperial Museum in Beijing.

	There is no information in key foreign languages such as Japanese, Korean, French and German. This is not helpful to those who do not speak or read Chinese or English.	Commission maps and information in these foreign languages both as interpretation and as a source of income.
Visitor Centre	The underground Visitor Centre at the First Signal Tower is an example of best practice in creating an unobtrusive heritage centre at a major heritage site. However, there is no interpretation provided in this centre and it is used for commercial purposes only as a shop, café, viewing platform and as a starting point for the 'Flying Fox' zip-wire across the Gorge.	Create display panels, possibly sharing some of those at the Great Wall Museum to provide interpretation of the gorge and the First Signal Tower. Access to the underground visitor centre should be free of charge until more substantive interpretation is provided as currently the charge is merely for visiting a café and a shop. This lack of value for money will surely anger visitors.
Awareness Activities	Many sites around the world use events and activities to provide more awareness of cultural heritage and the environment. These events and activities also provide opportunities for additional revenue.	Consider holding an event twice a day in which one of the historical characters associated with the area is ceremoniously evicted from "China" into exile through the west gateway. Consider holding employing several musicians to play traditional music in the fortress courtyard. Consider working with farmers in the Shiguan Gorge to demonstrate methods of farming "then and now" and demonstrate how the irrigation works. Consider installing a webcam at Jiayuguan to show activity at the fortress for internet users. Consider using the old stage at the eastern gateway of the fortress to put on traditional shows two or three times a day. Consider arranging activities in the Resort Area to explain the trees and vegetation, the old customs of the desert, the features of the native animals and plants. Consider using the Resort Area to also explore and explain the modern heritage of Jiayuguan, including the space launching station, the role of modern desert farming, mining and the iron and steel industry. Actively pursue opportunities to "bring the heritage to life again"
Tourism Infrastructure		
Economic and Heritage Impact of Tourism	The economic and heritage impacts of existing tourism infrastructure is not analysed on an individual basis, so it is not known whether assets contribute to economic or heritage objectives or are a drain on resources.	Introduce a variety of international practices to determine the true net value of existing and new tourism assets to ensure that focus is kept on the economic and heritage objectives, and avoid unnecessary or wasteful investment.
Specific Infrastructure	Some existing infrastructure is under-utilised, including car-parks, older buildings (e.g.	Develop plans to reuse buildings wherever possible to reduce under use of fixed asset investments.

	Earthquake Bureau villas, hotel, old entrance and ticket office at Jiayuguan Resort).	
	It was reported during 2006 that there are now plans to move the current commercial street away from its present location to a new location on the east side of the road outside the fortress. It is not clear how this will be done, when or how. It is also not clear how this will impact the business and residential community already on the eastern side of the road.	Further clarification is urgently needed.
Access Roads	It was suggested that there are ideas to create a completely new entrance road leading into the Jiayuguan Resort Area from the south. This would be the third entrance route created in the last few years.	Ensure that Tourism and other Master Plans are robust such that major design and infrastructure changes do not result in wasted fixed asset investment.
Car Park	Sufficient car parking exists to meet at least the projected future visitor demand.	Coach parking should be redirected to the existing large overspill parking to the south of the Jiayuguan Resort area after drop-off, with a “call forward” system used (by cellphone) to recall coaches to the pick-up point.
		Future car-parking should utilise the natural hard desert surface. Concrete surfaces are expensive, cause solar radiation (and so affect the micro-climate) and cause excessive localised rain run-off (especially in arid areas).
Tourist Service Centre	It is not clear where the 1,000 sq m tourist service centre is to be constructed.	Clarification is needed both as to why a new service centre is needed – given the existing empty buildings in the scenic area – and the purpose of such a tourist service centre.
Architectural Designs	Efforts to develop a fusion of traditional Gansu architecture with modern designs is highly commended, but the effect is damaged by poor management of surroundings by vendors, shopkeepers and restaurant owners.	Develop formal regulations for design and construction standards in Core and Buffer Zone.
Retail	Existing privately-owned retail and commercial outlets in the immediate vicinity of the Jiayuguan Resort are in poor condition and visually detract from the majestic scenery.	Work with and educate local businesses to emphasise the importance of first impressions and the importance of the visual aspects at Jiayuguan. Consider using part of the World Bank funding to provide loans and grants to improve the look and condition of local businesses in the immediate vicinity of Jiayuguan Resort Area.
Power Transmission Infrastructures	It is important to start taking action to remove low-voltage power transmission lines, as already agreed in the 2003 UNESCO Periodic Reporting Exercise.	Action plans should be developed to identify the scale and cost of resolution.

	The low-voltage power transmission line that crosses the Jiayuguan Fortress site, immediately to the north of the lower gateway, is particularly obtrusive and should be prioritised for removal.	Consider plans for rerouting or burying this particular power line.
	The telephone cable line that runs South-East to North-West passing to the west of the Jiayuguan Fortress is especially obtrusive to the views of the desert.	Consider plans to remove, reroute or bury this telephone line as an urgent priority.
	The lighting at Jiayuguan Fortress is obtrusive and damages the cultural heritage significantly.	The large lighting gantries should be removed at the earliest opportunity, and the strip lighting removed from installations and other cultural heritage.
Site Operations and Management		
Street furniture	Identify under-utilised, unused and obsolete street furniture (benches, toilets, fencing, walling, pathways) which degrades the visual sights and integrity of the heritage.	Remove unnecessary street furniture.
Information Signposts	Large information hoarding opposite lower entrance gateway to Jiayuguan Fortress is extremely obtrusive to the views of the fortress from the Resort Area.	Re-site informational hoarding to side of nearby restaurant and shop, or replace with smaller map board.
Inappropriate Materials	Extensive use of bright plastic ‘bucket’ seating and seating benches is extremely obtrusive visually throughout the fortress and at the Overhanging Great Wall.	Replace with stone or wooden benches over time, and in the short-term consider repainting the benches a less intrusive colour to reduce the visual impact.
	Iced drink chillers and drink cabinets and dispensers are covered in bright and inappropriate commercial advertising which is visually intrusive.	Remove chillers from outside areas and re-site in discreet locations indoors. Negotiate with commercial equipment providers to arrange sponsorship of equipment so that JGWCHSAAB gains revenue from this advertising.
	Commercial parasols, advertising drinks, food and film products, decorated in bright colours, are visually intrusive.	Remove parasols and provide parasols that are a less intrusive colour that blends with the architecture and desert.
Shops	Shop and ticket office inside the western gateway of the fortress is out of character with the architecture and atmosphere of the heritage.	Investigate alternatives to house the shop and ticket office in more discreet buildings, possibly in one of the buildings of the General’s Complex in the main courtyard.
Fencing	The use of indigenous thorny shrubs as a fence (a “living fence”) in the inner courtyard is commended as an environmentally-friendly and sustainable method of fencing.	Plant similar “living fences” as fences throughout the site in future instead of concrete walls or steel railings, and consider replacing existing fencing with this kind of “living fence”.
	The use of wooden fencing in the nature reserve/zoo is commended as good practice.	Use similar wooden fencing elsewhere in the Resort Area.
Paths	The use of concrete paths inset with cobbles throughout the Jiayuguan fortress is an improvement on plain concrete, but there is too much of all artificial hard surfacing.	Investigate ways to return paths to a more natural surface. Natural desert gravel and sand is hard-wearing, costs less, requires much less maintenance and repair, and is often preferred by visitors.
Other Tourist Services	There are many useful commercial facilities in the fortress, the resort area and at the other sites. These include post-boxes and telephone booths. Often these are spread around and use bright, inappropriate colours as decoration.	Plan to cluster these commercial facilities together at the earliest opportunity and screen them, using standard site signposts to advertise their presence.
Concessions	The dune buggy (go kart) concession	This dune buggy concession should be moved out of

	outside the western gateway of the fortress is inappropriate, noisy and intrusive.	sight and out of hearing of the fortress.
Economic Development and Commercial Issues		
Retail	Most of the commercial retail outlets stock the same range of items, without identifying and “interpreting” unique local products.	<p>Create a brand logo and slogan for Jiayuguan with a sticker that can be used to certify products as either relevant to Jiayuguan’s heritage or relevant to Jiayuguan’s heritage and made in Jiayuguan (or made in Jiayuguan or Jiuquan).</p> <p>Encourage retail outlets to display “Jiayuguan relevant” products separately, using the logo and the stickers.</p> <p>Work with local retailers and manufacturers to develop written information about the products and souvenirs they sell. Most foreigners and many Chinese visitors may be totally unaware of the unique features of many souvenirs and objects. This technique has been shown to be very successful for selling handicrafts.</p>
	Many visitors (especially foreigners) prefer not to be shouted at and pestered by shopkeepers. Visitors are aware of the shops and objects and will buy if they want.	<p>Encourage retailers and retail staff not to shout at visitors.</p> <p>Educate retailers that more attractive displays, more information about the objects and a tidy, clean environment are much more successful as sales techniques.</p>
	There is a tendency in China to grant more concessions and allow more stalls as visitor numbers increase, usually using a fixed management fee to earn revenue for the site. However, this can create excessive supply and reduced income for the retailers, especially those that have invested in buildings and furnishings. It can also detract from the visitor experience.	Evaluate the commercial operations and viability of retail outlets to establish a reasonable level of retail opportunities for both retailers and visitors.
Handicrafts	Local handicrafts are supported actively by the Jiayuguan Tourism Bureau and the Ministry of Science and Technology through tax relief on new designs.	Provide additional support for local manufacturers and small businesses looking to create new handicrafts.
Community Consultation and Participation		
Shared Vision and Strategies	A significant change in community relationships from a situation where the community is passive and reactive to external interventions should be changed to a situation where there is a partnership with shared vision, strategies and objectives.	Start the process of education of local management to help create understanding of the advantages of the shared approach to local development.
General planning and inventories of heritage and tourism assets	Heritage and tourism assets are planned in isolation from each other and from local society.	<p>It is important to hold occasional structured workshops with the local community to ensure that all the heritage (physical cultural, natural, intangible and oral) are inventorised and that plans for all aspects can be carried over into plans for the conservation and heritage development, but also into tourism planning.</p> <p>This provides a balance of views, allows input and</p>

		participation by local communities across a broad range of subjects.
Linkage to heritage and developments	<p>The community is largely isolated from the developments at Jiayuguan. Sustainability of tourism development would seem to depend on the relationship of the community with the heritage, as there is a symbiotic relationship between heritage and current society.</p> <p>Tourism developments are optimised when they fit with the objectives of the local communities and people. The tourism assets, specifically, need to be fully aligned with local economic activity.</p> <p>As part of the same process of establishing the background for community involvement, it is equally important that tourism and other economic activities are aligned. Most local economic activity is tertiary services with a fair amount of small-scale catering businesses.</p>	<p>Ensure that local communities and especially local businesses are engaged with the development process not just as passive actors, but also in shaping the objectives and strategies.</p> <p>Circulate information about Jiayuguan (all the assets) to local people and encourage input to current and future planning exercises. This should be stimulated by the use of some form of community heritage association which encourages education and learning and also some form of representation. There is no fixed format for this, but would need to be a set-up that is appropriate to local community structures.</p> <p>The process is one of mutual understanding between the heritage sector, the tourism sector, residents and businesses.</p>
Representation	There is no formalised representation of local stakeholders and communities.	Establish a formal body to allow discussion and develop mutual understanding and the development of local social capital.
Developing options	<p>Currently, planning is a technocratic approach based upon scientific (conservation/heritage) or economic (tourism) principles, resulting in a long-term work-plan.</p> <p>It is more common practice now, around the world, for options to be developed which can then be discussed and assessed by different stakeholders.</p>	Start a process of identifying and discussing different development options as an alternative to linear, technocratic planning, so allowing communities to determine the future of their heritage and local economic activity.
Development Guidelines	The role for the private sector should be established very clearly, with a set of guidelines for the tourism and heritage sector and also local people.	Develop simple guidelines that explain how the private sector can develop with the heritage and tourism sector, with guidance for managers and local people.
Community Skills	The realisation of local economic opportunities requires specific skills to be available in the community, so starting the process of community skills and capacity assessment is necessary.	Provide information and advice to local officials on the importance of social capital locally, and the development of community skills and capacity.

Majishan

Status and Issues	Recommendations/Options
Management Structures	

Management	<p>The Maijishan Scenic Area Administrative Bureau (MSAAB) operates much of the Scenic Area, although the Maijishan Grotto Protection Institute (MGPI) and the Xiaolangshan Forestry Bureau (XFB) plan and operate important parts of scenic area completely independently (XFB owns 90% of the land/forest)</p> <p>The Maijishan Scenic Area Commission, chaired by Tianshui Executive Vice-Mayor, and convened by the Director of the MSAAB, with representation from the XFB and the MGPI is at present the only unitary body that theoretically provides avenues for cooperation and coordination. It is not clear how this operates, its remit or its role.</p>	<p>Establish an independent single unitary management organisation: The existing Maijishan Scenic Area Commission can provide the basis for this unitary body whose aim would be to manage the strategy of the site and represent the park in the future, with a structure that represents the interests of all three direct parties and the municipal Construction Bureau. This body would be responsible for all strategy, planning, marketing and promotion, and would approve all major expenditure.</p> <p>Operationally, all cultural assets would fall under the daily control and management of the Cultural Heritage Bureau (MGPI), the tourism development under the Tourism Bureau (MSAAB) and all environmental management under the Forestry Bureau. Collectively owned land within the park boundaries would be subject to usage controls agreed at the local level between village committees and the Maijishan Scenic Area Commission, using best practice guidelines. Both revenues and costs would be on a shareholder basis by the direct parties.</p> <p>The integration of the planning, management, operations and political representation of the Maijishan can create a more effective park, and make planning, decision-making and the development of the revenue generating activities easier.</p>
		<p>The creation of an independent panel of external advisors (The Maijishan Advisory Panel) including impartial experts in Cultural Heritage, environment, tourism, the DRC, and the private sector (to meet three times a year) to advise the Board of Directors.</p>
Financing	<p>Financing of the Scenic Area is effectively managed on the traditional local government model of “budget + extra budgetary” system, with effective management by the various bodies managing the assets.</p> <p>This means that capital funding is by means of campaigns for access to specific funds or pools of money. The risk to directors and managers does not exist which can lead to unnecessary expenditure, especially on fixed asset investment, and tends to under-fund critical activities such as marketing, promotion, human resources management, training, knowledge management and heritage management activities such as documentation, research, interpretation.</p>	<p>Consider the reconstitution of the Maijishan Scenic Area Bureau as an entity that has a complete Profit & Loss system of accounting that includes responsibility for capital as well as operational funding, with set objectives in terms of profitability, return on investment and long term performance.</p> <p>It is critical that such a P&L system recognises the true intrinsic value of the cultural and natural heritage, as it is unlikely that major heritage sites can be totally self-sustaining.</p>
Capacity	MSAAB directors, managers and personnel are passionate, diligent, and eager to improve and enhance the opportunities for heritage management and tourism development.	Create a management library of books and papers covering all areas of business management, accounting, tourism marketing, heritage site management, conservation

	However, there is a lack of experience, knowledge and skills about techniques, methodologies and practices elsewhere in China, Asia or elsewhere.	<p>techniques, landscaping, environmental management and local history. It may be necessary to arrange translation of key foreign works into the Chinese language.</p> <p>Fund a study tour for key managers to visit and gain experience of practices used at Luang Prabang (Laos), Hoi An and Hue (Vietnam) and Suwon (South Korea).</p>
Tourism Marketing and Promotion		
Marketing capacity	Marketing and promotion is seen as a 'special activity' rather than a basic budgeted cost.	Ensure that future budgets include specific elements for marketing, promotion, IT, training and staff development, visitor surveys (in addition to the NSB annual statistical return), and business surveys.
	There is no in-depth understanding of the concept of marketing.	Provide specific training for personnel employed to conduct marketing that includes the full range of marketing activities, not just advertising and promotion.
Visitors expectations	There is insufficient knowledge of the tourism market and visitor expectations and there have been no business surveys to understand the true state of the supply side of the tourism sector.	<p>As a first step Tianshui and Maijishan authorities should conduct a statistically significant, stratified survey of tourism in the city and at Maijishan to get an accurate understanding of the market and tourism drivers.</p> <p>Develop methodology for expanding current visitor surveys, to use internationally accepted (UNWTO) methodologies. This ideally would be conducted with neighbouring counties and municipalities.</p>
Revenue	Sources of alternative revenues for Maijishan's heritage and tourism assets do not exist, except for management fees and small-scale concessions.	Investigate the very wide variety of alternative and potentially lucrative forms of alternative indirect revenue for the assets and sites.
	The Scenic Area has no integrated ticketing system. (4 different tickets/prices). High ticket prices may eventually depress demand, especially from the local market.	MSAAB to develop a strategy to implement integrated ticketing system and conduct studies into the price elasticity of ticket pricing at all sites and for different assets to confirm optimal pricing strategy.

Market sectors	Tourism in Tianshui is perceived entirely as cultural heritage tourists and ‘sightseers’, which is only a small part of the overall tourism market (i.e. only 1 in 10 are deliberate cultural tourist) . To the authorities, the categories of adventure or eco-tourism, religious tourism, Visiting Friends and Relatives (VFR), Meetings, Incentive Travel, Conventions and Events (MICE) and business travel are entirely new and are not currently considered in planning documentation.	Attention should be given to strengthening these market sectors . In order to do so it is necessary to involve professionals in the private sector.
	New infrastructure developments like the Baoji-Tianshui highway will provide an opportunity to join forces with other provinces and enhance Maijishan’s resource attractiveness for new market segments.	Tianshui Municipal Tourism Bureau should include all attractions in the municipality and consider combining forces with Dingxi and possibly Baoji in Shaanxi Province to develop an “Upper Wei River” destination as a natural follow on for visitors to Xi’an. This Upper Wei River concept could be managed as one destination grouping.
Accommodation capacity	Currently, most tourists (as opposed to local resident leisure visitors) do not stay in Tianshui, so there is substantial revenue leakage to Lanzhou. There is substantial accommodation already in place in Tianshui which indicates that it is not a question of accommodation but of developing reasons for visitors to stay (e.g. routes, adventure activities, appropriate accommodation).	Revise existing plans, including master plans, to build more accommodation in the scenic area and in Tianshui, especially at the top end of the market because of risk of over capacity and avoidable maintenance costs. Identify market preferences with regards to accommodation and plan accordingly.
Heritage Protection		
Tourism Vision	It is good practice to create a real Vision and Strategy for heritage and tourism sites.	Hold a one-day workshop to include at least 30% of all staff to create a Vision and Strategy under the title “Maijishan in 2050” that starts with the question “How do we want Maijishan’s heritage and tourism to look like in 2050?” and then asks “Exactly what do we need to do and when, to get to that target?”
Cultural Heritage Management	Cultural Heritage Protection Plan developed only for Maijishan Grottos (Maiji Mountain Grotto Protection Plan) – although this needs further clarification as the coverage is unclear.	Develop a protection and management plan for all cultural heritage assets in the five sub-scenic areas. Plan to be reviewed for integration with FSR, EA, SA and Tourism Master Plan.
	Conservation work at Maijishan, at the Grottos, has generally been of very high quality and executed carefully. However, at the other areas, conservation appears haphazard and executed to varying standards.	Ensure that all heritage in the Scenic Area is under the auspices of the MSAAB. Facilitate the involvement of the Maijishan Grotto conservation centre in enhancing the conservation work in all areas

	The Cultural Heritage Protection Stations in Shimen and Xianrenya have developed their own heritage asset inventory recording system and protection program that includes the unregistered and unprotected lesser assets. This is excellent heritage practice.	Their work should be strengthened with assistance from the Maijishan Grotto conservation centre, the Provincial Heritage Bureau and the MSAAB. Their inventory should be incorporated in the Conservation Master Plan for Maijishan.
	Heritage Core and Buffer Zones currently being mapped	Need to be attached to all existing and future plans. Need to be attached to EA, SA and FSR.
	The preservation of historic and natural resources should remain the primary objective in core areas.	<p>The addition of any non-historic features is minimized to ensure the protection of the natural and cultural heritage assets.</p> <p>Develop formal regulations for design and construction standards in Core and Buffer Zone to ensure a certain level consistency and compatibility of infrastructure development within the scenic area.</p>
Natural Heritage Management	The Maijishan Scenic Area is a mixed cultural and natural site, consisting of attractive upland mixed forested valleys and farming communities, with very considerable promise for Adventure and Ecotourism as a means to protect natural heritage.	MSAAB and other agencies should identify other activities that could be offered at Maijishan to expand the product offering . This would include adventure, ecotourism and sports tourism as well as the possibilities for educational and religious tourism.
	The addition of recreational or other visitor facilities within the five core resource zones should be minimized to ensure protection of the prime resources and their natural settings.	New development should be located outside the core resource zones.
	The objectives and scale of proposed development of Quxi not clear. The XFB has already started the construction of a man-made lake for leisure purposes within the core zone and apparently without a full environmental assessment.	The XFB in close coordination with the MSAAB should ensure compatibility of the proposed development at Quxi with the objectives and requirements of new Scenic Area Master Plan to ensure environmental impacts are properly understood and mitigated. An environmental assessment is recommended (particularly of the lake).
Heritage Interpretation		

Products	<p>There are a great number of additional tourism sites and potential activities in the Tianshui area that are not included in any guidebooks, brochures, leaflets or in any tours offered locally. While some are awaiting investment plans and, in several cases, access, by not providing any information at all, Tianshui is hiding tourist destinations that could make the difference between visitors making the trip to Tianshui in the first place.</p> <p>There are multiple sites at Maijishan, but the key focus is the Maijishan Grottos. The inventory of heritage in Tianshui includes a total of no less than 164 named items. Of these, guidebooks generally cover Maijishan, Dadiwan and several sites linked to the first Chinese emperor, Fuxi. There are multiple other sites of cultural heritage interest, especially at Xianrenya but there is little information provided and the absence of a true visitor centre does not help guide visitors to other areas.</p>	<p>Develop information materials on unknown natural and cultural assets like Dadiwan, Yunfengshan, Shuilian Dong, Wushan and Qingshui hot springs, the tomb of Liguang, Zhuge fortress, Nangupo temple, Zhao Chongguo Gardens, Yuquan temple, Gangu Daxian Shan, Qinan Jifengshan and Xingguo Temple).</p>
	<p>The mountain valleys around Quxi are beautiful. There are opportunities to develop paths, walking routes, horse treks and guided tours with botanists and geologists.</p> <p>This could extend Maijishan's product offer dramatically and earn substantial additional revenue.</p>	<p>Prepare plans for opening up walking trails and developing opportunities for horse treks.</p> <p>This would require providing/selling proper large-scale topographical maps, and investing in some signposts. This is one of the most common uses of Scenic Areas in most parts of the world.</p>
	<p>Many sites around the world use events and activities to provide more awareness of cultural heritage and the environment. These events and activities can also increase revenue.</p>	<p>Consider holding educational events on peak days to educate local people and visitors on the ecology, landscape, geology, history, agriculture, religious customs, art history, the Silk Road, the history of the struggles between mountain tribes and the people in the Hexi Corridor.</p> <p>Consider working with farmers to demonstrate methods of farming "then and now".</p> <p>Consider arranging activities in the Scenic Area to explain the trees and vegetation, the old customs of the mountains, the features of the native animals and plants.</p> <p>Actively pursue opportunities to "bring the heritage to life again"</p>

Tour Guides	The quality of the tour guides at Maijishan (Grottos) is generally high, but comments by one Korean tourist (in September 2005) suggested that he believed the interpretation to be unsympathetic to the site as a spiritual place of Buddhism, and saw it treated as an art gallery and a tourism spectacle.	Provide education for tour guides to create a more dynamic interpretation that includes more legends, more stories and “tells the story” of Maijishan.
	Self-guiding tours are novel in China and the lack of interpretative displays, common elsewhere in the world, remains almost unknown in Gansu. The few signs that exist provide only the most basic information.	Commission self-guide books for the Scenic Area using sponsorship or advertising to cover the costs of writing and printing. Whilst it is not possible to allow self-guided tours of the Grottos themselves, it would be advisable to provide clear explanatory information at the Grottos about the extremely advanced and complicated protective measures taken both for the sake of visitors and the heritage itself.
Interpretation Materials	There are no quality guidebooks for Tianshui or Maijishan in any foreign language, other than picture books which are not particularly popular with visitors, especially foreigners. No maps are available at all for hiking or exploring. There is no information at any individual site about any of the other sites in the Maijishan Scenic Area, or any leaflets about outlying minor assets (or indeed the asset itself).	Commission books, maps and information leaflets both as interpretation and as a source of income. Ensure that these are available in foreign languages (English, Japanese, Korean, etc.)
Tourism Infrastructure		
Market Segments	The authorities are expecting a dramatic increase in tourism at Maijishan, partly as a result of general tourism growth in China and partly from a proposal to add Maijishan (and other Chinese sites) to the UNESCO World Heritage List as a named site in the “ <i>Silk Road in China</i> ” cultural landscape. However, a persistent threat to a proactive demand-led and sustainable development of tourism is if the local leisure market comes to dominate planning and infrastructure development. In this situation, facilities in a place with significant tourism potential are aimed at the low-end mass market. In China, this local leisure sector has very low spend-per-head and consequently economic development opportunities are very low. The Maijishan Scenic Area is big enough to be managed on a sector basis, rather than filling all the most picturesque or asset-rich	Tianshui Municipality should, with the Provincial and Municipal Cultural Heritage and Forestry Bureau, consider, as a realistic alternative, the use of different zones within the Scenic Area for different purposes and sectors . <ol style="list-style-type: none"> 1. Religious Cultural Heritage (The Grottos, The Immortals’ Cliff and Temples), 2. Leisure and Entertainment (The Hot Springs Area), 3. Environmental Education (The Botanical Gardens/ Arboretum) 4. Wilderness and Adventure (Quxi). ‘Hot spots’ could be developed, with minimal built-environment impact, at key road and trail junctions to focus attention for visitor centres, toilets, water, commercial outlets. Planning objectives and goals should be provided and linked to the justification of tourism facilities, activities and infrastructure (existing and proposed) that

	areas with buildings and infrastructure to cater for the needs of all market segments.	surrounds the vicinity of the Scenic Area Boundary to provide a broader context for the assessment of any proposed planning activities within the boundary.
New Infrastructure	The economic and heritage impacts of existing tourism infrastructure is not analysed on an individual basis, so it is not known whether assets contribute to economic or heritage objectives or are a drain on resources.	Introduce a variety of international practices to determine the true net value of existing and new tourism assets to ensure that focus is kept on the economic and heritage objectives, and avoid unnecessary or wasteful investment.
	Cursory observation suggests the additional resort facilities suffer from poor quality construction, poor or insufficient maintenance, decay and degeneration. There are surplus buildings lying empty close to both the Grottos and Xianrenya.	Develop plans to reuse buildings wherever possible to reduce future unoptimised fixed asset investments.
	Size and architectonic style of new constructions in core and buffer zone (hotel, villas...) is not harmonious with the need to protect heritage and environment.	Develop formal regulations for design and construction standards in Core and Buffer Zone.
Transportation	The provision of intra-park transportation is an issue that needs to be resolved. While shuttle buses have been suggested, there may be a real problem getting car-borne visitors to leave their vehicles in China. Independent travellers face a challenge getting to and from the various areas in the park, but the size of this sector is simply unknown at present. The issue does not appear to have been fully assessed in terms of cost, visitor impact, visitor expectations and general viability. The ultimate intention to reduce transit of vehicles from the Scenic Area is commended and admirable.	Prepare full, detailed plan including objectives, strategies, fixed investments and costs of establishing an intra-park transportation system to establish viability and avoid reducing the attractiveness of Maijishan for certain market segments. MAASB and the XFB are asked to consider dropping the concept of a circular route as this will actively encourage people to simply drive around the park, so bringing noise and pollution to unspoilt, beautiful areas with no apparent benefit.
Car park Capacity	Develop infrastructure on a phased approach. This would allow parking, for example, to be phased in based on actual need rather than an anticipated maximum visitation estimates. The new car park at the entrance of the grottos (9000 sq km car par) seems disproportionate.	Existing car park facilities are likely to be perfectly adequate for up to 1 million visitors annually, possibly with the creation of a dropping off point and appropriate turning circle for coaches close to the Grottos. Major tourist attractions around the world use similar on-street parking for access
Roads	The upgrading of the 30 km road between the Grottos and Quxi (Bank financed) will require substantial land acquisition and some resettlement.	Consider revising the appropriateness plans for widening road. An environmental assessment is recommended
Site Operations and Management		
Street Furniture	Identify under-utilised, unused and obsolete street furniture (benches, toilets, fencing, walling, pathways, etc.) which degrades the visual sights and integrity of the heritage.	Remove unnecessary street furniture.
	Street furniture constructed from concrete and plastic is out of keeping with the landscape. Although very little exists currently, it is hoped that future purchases and investments focus on using wooden and local stone as materials for street furniture.	Use wood and stone as much as possible for street furniture.

	Large advertising billboards advertising facilities such as restaurants are entirely unnecessary, especially when they are so close to the entrance to the building.	Remove inappropriate advertising billboards.
	The use of concrete paths throughout the Maijishan scenic area (Shimen and Xianrenya) is not recommended.	Investigate ways to return paths to a more natural surface like stone or gravel.
Local Economic Development Public/Private Tourism Initiatives		
Handicraft Production and Retail	The commercial retail outlets stock the same range of items, often without identifying or “interpreting” local products.	<p>Encourage retailers to identify handicrafts and souvenirs relevant to the area and especially those that are made locally.</p> <p>Create small fact-sheets about local products in Chinese and English to encourage visitors to purchase local produce. Experience all around the world suggests that this is a very successful method of selling local handicrafts.</p> <p>MSAAB and Tianshui Tourism Bureau to provide support for local manufacturers and small businesses looking to create new handicrafts. In Jiayuguan local handicrafts are supported by the Tourism Bureau and the Ministry of Science and Technology through tax relief on new designs.</p>
Development	Business development in the community is very reactive, and does not actively involve the community in planning and business development. The opportunities are those allowed by the MSAAB and focus on very low-income retail.	Encourage the creation of Community-based Business Development Groups in each Sub-Scenic Area.
	There is good micro-scale community business development with the development and promotion of the home-stay accommodation sector.	Encourage the creation of a Home-Stay Association to act as interlocutor on planning matters with the MSAAB.
	There have been plans for the Forestry Bureau to set up and operate white-water rafting activities in the Scenic Area, despite having no previous experience in operating successful commercial activities. Experience in China and elsewhere suggests that these activities are best managed by the private sector. In addition, the operation of such commercial activities could result in a conflict of interest between decision-making on conservation, environmental pollution and commercial activities.	Actively encourage private sector development by ensuring that all commercial activities planned or suggested for the park are externally tendered with the tourism/heritage authorities remaining concentrated on the management of the core resources.
Community Consultation and Development		

Shared Vision and Strategies	A significant change in community relationships from a situation where the community is passive and reactive to external interventions should be changed to a situation where there is a partnership with shared vision, strategies and objectives.	Start the process of education of local management to help create understanding of the advantages of the shared approach to local development.
General planning and inventories of heritage and tourism assets	Heritage and tourism assets are planned in isolation from each other and from local society.	It is important to hold occasional structured workshops with the local community to ensure that all the heritage (physical cultural, natural, intangible and oral) are inventorised and that plans for all aspects can be carried over into plans for the conservation and heritage development, but also into tourism planning. This provides a balance of views, allows input and participation by local communities across a broad range of subjects.
Linkage to heritage and developments	<p>The community is largely isolated from the developments at Maijishan; this isolation is total when considering the heritage aspects. Sustainability of tourism development would seem to depend on the relationship of the community with the heritage, as there is a symbiotic relationship between heritage and current society.</p> <p>Tourism developments are optimised when they fit with the objectives of the local communities and people. The tourism assets, specifically, need to be fully aligned with local economic activity. As part of the same process of establishing the background for community involvement, it is equally important that tourism and other economic activities are aligned. Most economic activity around Maijishan is based upon household farming and small-scale tertiary industry.</p>	<p>Ensure that local communities are engaged with the development process not just as passive actors, but also in shaping the objectives and strategies. This would include defining the significance of the heritage and its meaning to local people: Maijishan is more their heritage than that of anyone else.</p> <p>Circulate information about Maijishan (all the assets) to local people and encourage input to current and future planning exercises. This should be stimulated by the use of some form of community heritage association which encourages education and learning and also some form of representation. There is no fixed format for this, but would need to be a set-up that is appropriate to local community structures.</p> <p>The process is one of mutual understanding between the heritage sector, the tourism sector, residents and businesses I(including farmers).</p>
Representation	There is no formalised representation of local stakeholders and communities.	Establish a formal body to allow discussion and develop mutual understanding and the development of local social capital.
Developing options	Currently, planning is a technocratic approach based upon scientific (conservation/heritage) or economic (tourism) principles, resulting in a long-term work-plan.	Start a process of identifying and discussing different development options as an alternative to linear, technocratic planning, so allowing communities to determine the future of their heritage and local economic activity.

	<p>It is more common practice now, around the world, for options to be developed which can then be discussed and assessed by different stakeholders.</p>	
Development Guidelines	<p>The role for the private sector should be established very clearly, with a set of guidelines for the tourism and heritage sector and also local people.</p>	<p>Develop simple guidelines that explain how the private sector can develop with the heritage and tourism sector, with guidance for managers and local people.</p>
Intangible and oral heritage	<p>The role of intangible and oral heritage is important even in the context of heritage that is generally considered ‘ancient’ as at Maijishan.</p> <p>At Maijishan, this would also include issues connected with the spiritual nature of the place as a religious site.</p> <p>The full scale of heritage inputs needs to be discussed in the context of local society as this helps to develop a harmonious long-term relationship between the community and asset managers, and can also help to identify new economic opportunities.</p>	<p>Include local intangible and oral heritage in the overall inventory of cultural heritage and tourism planning, remembering that many aspects of local society are considered ‘heritage’ by outsiders and visitors even if they are not considered as such by local people.</p>
Resettlement	<p>MSAAB is believed to be planning to move up to 1,200 households from the Scenic Area as they understand this will be required by UNESCO for the planned World Heritage Listing.</p>	<p>MSAAB and the PMO should confirm issues surrounding the resettlement of people for the UNESCO World Heritage Listing.</p>
Community Skills	<p>The realisation of local economic opportunities requires specific skills to be available in the community, so starting the process of community skills and capacity assessment is necessary.</p>	<p>Provide information and advice to local officials on the importance of social capital locally, and the development of community skills and capacity.</p>

Annex E

Yinyue Lake Dam Safety Review Report

The World Bank

**Yinyue Lake
Dam Safety Review Report**

May 11, 2007

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A	<i>References</i>
B	<i>Yinyue Lake Dam Safety Review and Inspection Agenda</i>
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D	<i>Sample of EPP Contents</i>
E	<i>Sample of OMS Manuals contents</i>
F	<i>Site Photos</i>

Dam Safety Review Report for Yinyue Lake

• Introduction

The Yinyue Lake dam safety review report is prepared by Mr. Shenjinbao, a dam safety expert from Dam Safety Management Centre of the Ministry of Water Resources. The review process involved site inspection, meeting and discussion, examination of available documents (Appendix B), and safety assessment. The review agenda is included in Appendix A.

• Background

The Yinyue Lake Dam is located on the upper Dongke river, approximately 50km south east of Tianshui city, Gangsu province. The catchment area at the site is 5.75km^2 with an average annual rainfall of 700mm, average annual runoff of $1,006,000\text{m}^3$, and an average annual sediment load of 3700t.

The dam is sit in the west Qingling Maintain area including the steep sloping v-shaped valley, which slope material is bare rocks composed of biotite quartzite, marble, and granite. The elevation difference between two hills of the valley is approximately 250m.

According to the China Earthquake Intensity Zoning Map, the peak ground acceleration of the dam site should be 0.3, corresponding to a damage intensity of VIII.

Yingyue Lake Dam was built in the late 1950s. As no information of survey or design available, it is said the dam was originally designed as a 30m high composite earth dam, but the construction was ceased when the dam rose to 10m high. The spillway structure designed at the right bank was never constructed and the dam has never operated or contained water. Flood discharges from the construction diversion tunnel.

Due to a lack of basic information, dam characteristics including design functions, dam profile, construction quality, feature of outlet structure, and design flood standard cannot be identified.

For the development of Shimen scenic area, the Maijishan Scenic Area Administration Bureau intends to commission the existing water retaining structure to form lake beauty for scenic purpose.

• Site Inspection

A site visit of Yinyue Lake dam was carried out on April 25, 2007 by the World Bank Experts and local representatives from Maijishan Scenic Area Administration Bureau and Maijishan Water Resources Bureau. The name list is included in Appendix C. The site photos are shown in Appendix F.

The following observations were made during the site inspection.

- The dam body constructed 50 years ago appears in good condition. The herbaceous covered dam crest is about 50m in width. The upstream slope is 1:3 covered by grass with several local rain erosion scars. The downstream slope is covered with dry-laid stone and a rock-fill layer of 3. 5m to 4m underneath.
- Both the left and the right abutment are founded on bare rock, which composed of fresh coarse marble, appears favourable geology condition.

- A rough hole plays a role of discharge tunnel, which used to be diversion work during construction. The tunnel base is at same elevation as the reservoir bottom. Trees are massed along both banks of the approach channel; several rocks have blocked the channel inlet. Follow the outlet is a rough channel with rock on left bank and earthfill on right bank. No energy dissipater device has been found.
- There exists reservoir sediment deposition, which was mainly caused by large flood happened in July of 2005.
- It is said a 1 in 50 years flood happened upstream the reservoir area on July 1, 2005, which didn't cause any failures of dam or discharge tunnel but reservoir sedimentation. From the remained collapse evidence of reservoir rim slope, it supposed that the flood didn't cause high backwater level.
- The dam has been in natural condition from construction completion, it has never been contained water for any purposes, neither personnel nor company at dam site responsible for operation, management and maintenance.
- No EPP document has been prepared as nobody manages the dam.
- **Dam Safety Assessment**
 - Because of enough size of dam cross section, as well as favourable geology foundation, the structure can be considered as safe with planed necessary treatment, and at limited storage water level of 1.20m.
 - Although detail information of size and capacity of the discharge tunnel is not available, it can be judged from the experience of 2005's large flood that the discharge capacity is big enough to pass flood and meets the flood control requirement.
 - Based on geology condition and the 50 year's natural operation, the structure of discharge tunnel can be also considered as safe with necessary lining treatment.
- **Conclusions and Recommendations**
 - Carry out necessary boring test and survey to get the following information:
 - ③ Dam site geology information.
 - ③ Foundation treatment and dam construction quality.
 - ③ Dam section profile.
 - ③ Location of discharge tunnel, size and elevation of approach channel, tunnel, and outlet channel.
 - ③ Reservoir topography and reservoir level during 2005's 1 in 50 years frequency flood.
 - (2) Calculate the discharge capacity of the discharge tunnel based on the above mention investigation.
 - (3) Built a masonry open weir in the front of approach channel of the discharge tunnel, the height of the weir can be selected as same as the planed water storage depth.

(4) Although the planed storage volume of Yinyue Lake is only $10 \times 10^4 \text{ m}^3$, which scale is smaller than small dam according the Chinese dam classification, considering its importance for Shimen Scenic Area development, it suggests review the design flood with the standard of small (2) dam in mountain and hill region, in which design flood should be 1 in 20 years ($P=5\%$) and check flood be 1 in 200 years ($P=0.5\%$).

(5) Conduct flood rating analysis based on planed weir elevation (start level) and discharge capacity of the tunnel to review the flood control capacity of the existing structures.

(6) Make a decision about slope scaling treatment based on the review of seepage stability of dam body, and both static and dynamic anti-sliding stability of slopes. To protect dam crest and slopes from tourist's treading on the grass with environmental material.

(7) Make a decision about lining treatment for discharge tunnel based on the investigation of geology condition.

(8) Clean and fence both the approach and outlet channel, especially to make protection of the right bank earth slope with masonry stone.

(9) Install reservoir level instrument, set up additional rain gage station upstream the dam.

(10) Assign dam operation and management personnel and prepare OMS manuals. A proposed content of OMS Manual is included in Appendix D.

(11) Prepare EPP to ensure safety of tourists and protect ecological environment of the scenic area. A proposed content of EPP is included in Appendix E.

Appendix A

Yinyue Lake Dam Safety Review and Inspection Agenda

Date	Time	Activity
April 25	8:30~10:00	Filed Visit to Yinyue Lake Dam
	14:30~18:00	Meeting and Discussion with Maijishan Scenic Area Administration Bureau and Tianshui Water Resources Bureau
April 26	8:30~12:00	Review available document, prepare draft dam safety review report
	12:00~13:00	Exchange opinions with Maijishan Scenic Area Administration Bureau
April 27	9:00~10:00	Report draft review conclusion to the World Bank's Task Team leader Ms. Mara Warwick and Mr. You Ji)
	10:00~11:30	Exchange opinions with Gansu PMO
April 28 to May 11		Prepare Yinyue Lake dam safety review report

References

1. Preliminary Design Report of Yinyue Lake, July 2004, Design Team of Maijishan Regional Water Resources Bureau, Tianshui City.
2. Yinyue Lake structure recovery program, April 2004, Maijishan Scenic Area Administration Bureau

Appendix C

List of Local Participants

Mr. Li Long, vice Director, Maijishan Scenic Area Administration Bureau

Mr. Sun Yajun, Deputy Section Chief, Construction Section, Maijishan Scenic Area Administration Bureau

Yan Zhigang, Chief, Design Team of Maijishan Regional Water Resources Bureau

Appendix D

Proposed OMS Manual Contents

General – purpose, qualification and responsibility of personnel, project description, consequence category, key data, essential drawing, documentation required

Operation – operation requirement, normal operation, flood forecasting and flood operation, emergency operation procedures

Maintenance – all equipment related to dam safety maintained, inspected and tested

- maintenance policies, procedure, records and responsibilities
- equipment inspection and tests

Surveillance – regular inspection

- regular inspection
- special inspection and increased levels of surveillance
- instrumentation monitoring, maintenance and testing

Instrumentation – instruments calibration regularly, calibration requirement documented in OMS Manual

- instrumentation data evaluated and assessed promptly and stored permanently
- instrumentation data checked against design expectations and historical trends,

Performance bounds established for all key instruments (key performance indicator)

Appendices – EPP, Inspection Checklist, Enhanced Surveillance and Response Plan (if applicable), Operation Orders (System and Local)

List of Revision

Distribution list

Proposed EPP Contents

- Distribution list, list of revision
- Purpose, description of dam
- Personnel authority, responsibilities and duties
- Emergency identification and evaluation process
- Preventative actions (where applicable)
- Notification procedures and flowcharts
- Communication systems, access to site
- Emergency sources of equipment, materials and power
- Inundation maps and tables
- Warning system (if applicable)
- Testing and upgrading EPP
- Training

Site Photos



Fig.1 The long shot of Yinyue Lake dam upstream face



Fig.2 The close shot of Yinyue Lake dam upstream face



Fig.3 The close shot of Yinyue Lake dam downstream slope



Fig.4 The approach channel of the discharge tunnel



Fig.5 The outlet of the discharge tunnel



Fig.6 The upstream landscape of Yinyue Lake

Annex F

Xianren Lake
Dam Site
Visit Report

The World Bank

**Xianren Lake
Dam Site Visit Report**

May 11, 2007

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D	<i>Sample of OMS Manuals contents</i>
E	<i>Sample of EPP Contents</i>
F	<i>Site Photos</i>

Site Visit Report for Xianren Lake

• Introduction

The Xianren Lake site visit report is prepared by Mr. Shenjinbao, a dam safety expert from dam safety Management Centre of the Ministry of Water Resources. The visit process involved site inspection, meeting and discussion, examination of available documents (Appendix B), and safety recommendations. The site visit agenda is included in Appendix A.

• Background

The Xianren Lake is located on the Qianchuan river, which is a sub- tributary of the Wei River and is approximately 12km from Maijishan, 48 km from Tianshui city in Gangsu province. The catchment area at the site is 2.38km^2 with an average annual rainfall of 750mm, and average annual runoff of $476,000\text{m}^3$. It is classified as small (2) reservoir with the capacity of $242,000\text{m}^3$.

The normal operation level of the reservoir is 1401.80m, which corresponds to a storage volume of $175,000\text{m}^3$. The chosen design flood is 1:20 years frequency, which corresponds to flood level of 1402.80m. The check flood is 1:200 years frequency, corresponding to flood level of 1403.70m. Main features of the dam:

- Type of dam: stone masonry dam with reinforced concrete facing
- Crest elevation of dam: 1404.90m
- Crest length of dam: 88.0m
- Crest width of dam: 3.0m
- Maximum hight of dam:20.0m
- Spillway: overflow open weir on dam, ski-jump energy dissipator
- Length of weir: 10.0m
- Crest elevation of weir: 1401.80m
- Longitudinal drainage gallery: $1.20\text{m} \times 1.80\text{m}$, bottom elevation 1388.60m
- Water release conduit for waterfalls at right horizontal gallery $\phi 40\text{cm}$
- Water release conduit at right abutment slope $\phi 20\text{cm}$, entrance elevation 1398.80m
- Year of design: 1986
- Year of construction: 1987
- Year of storage start: 1988
- Year of completion: 1989
- Primary function: tourism
- Secondary function: aquiculture, irrigation for farmland 800mu
- Secondary dam downstream Xianren Lake Dam: Xianren Pool Dam

The Xianren Lake dam is sat in the west Qingling Maintain area including precipitous scarps and round mountain peaks.

The geology of the dam area consists of 0.7 to 1.5m of quaternary deposit layer and tertiary deposit underneath.

According to the China Earthquake Intensity Zoning Map, the peak ground acceleration of the dam area should be 0.3, corresponding to a damage intensity of VIII.

- **Site Inspection**

A site visit of Xianren Lake dam was carried out on April 25, 2007 by the World Bank Expert and local personnel from Maijishan Scenic Area Administration Bureau and Maijishan Water Resources Bureau. The name list is included in Appendix C. The water level was at normal reservoir operation level.

The following observations were made during the site inspection.

- Many cracks were observed on reinforced concrete facing of the overflow weir.
- Freezing damage was observed on variable water level region of upstream reinforced facing.
- Tree and brush growth on the dam downstream facing which obscures the visual inspection of seepage or deformation. Tree root system can damage dam structure and provide seepage paths for water.
- Because of high water table from downstream Xianren pool, dam drainage galleries and water release conduit were submerged, which caused failure of foundation drainage and can affect dam stability.
- The wire cables which function is to control the gate of water release conduit have been fallen down. The opening of the gate had to be done by a diver.
- Neither safety monitoring instrument, nor reservoir level gauge has been installed in dam and reservoir area.
- Neither dam management agency nor personnel at dam site responsible for operation, maintenance and surveillance. Neither OMS manual nor dam maintenance record is available.
- It is said the Maijishan Water Resources Bureau carried out inspection before every flood season, but no inspection record is available.
- The Xianren Pool Scenic Administration Office and tourist entrance is only 1.7km downstream the Xianren Lake dam. Although a failure of the secondary Xianren pool dam happened during the big flood of July 2005, EPP document hasn't been prepared yet.

- **Conclusions and Recommendations**

- Carry out a comprehensive dam safety appraisal according to “The Method of Dam Safety Appraisal” and “Guidelines on Dam Safety Evaluation” to clear the safety situation and to make recommendations for dam operation.
- Repair the cracks on overflow weir facing and freezing damage area of the upstream reinforced concrete facing.
- Remove the secondary Xianren pool dam or lower the water level of Xianren pool as soon as possible to ensure effective drainage from the gallery, reduce the high uplift, ensure dam stability, as well as enable the operation of control valve of water release conduit.
- Check and make maintenance for gallery drainage system and control valve of the water release conduit after the water level of Xianren Pool lower than elevation of gallery bottom.
- Replace the wire cable of the conduit gate to ensure gate operation safety.
- Remove tree, brush and soil on downstream facing.
- Install reservoir level gauge, additional rain gauge station upstream the dam, and necessary dam safety monitoring instrument.
- Assign dam operation and management personnel and prepare OMS manuals. A proposed content of OMS Manual is included in Appendix D.
- Prepare EPP to ensure safety of tourists and protect ecological environment of the scenic area. A proposed content of EPP is included in Appendix E.

Appendix A

Xianren Lake Site Visit Agenda

Date	Time	Activity
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	10:00~11:30	Exchange opinions with Gansu PMO
April 28 to May 11		Prepare Xianren Lake dam safety inspection report

Appendix B

References

1. Design report of Xiarenya dam, maijishan Scenic Area, Beidao Regional Hydroelectric Engineering Society , Tianshui City

Appendix C

List of Local Participants

Mr. Li Long, vice Director, Maijishan Scenic Area Administration Bureau

Mr. Sun Yajun, Deputy Section Chief, Construction Section, Maijishan Scenic Area Administration Bureau

Yan Zhigang, Chief, Design Team of Maijishan Regional Water Resources Bureau

Appendix D

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- equipment inspection and tests

Surveillance – regular inspection

- regular inspection
- special inspection and increased levels of surveillance
- instrumentation monitoring, maintenance and testing

Instrumentation – instruments calibration regularly, calibration requirement documented in OMS Manual

- instrumentation data evaluated and assessed promptly and stored permanently
- instrumentation data checked against design expectations and historical trends,

Performance bounds established for all key instruments (key performance indicator)

Appendices – EPP, Inspection Checklist, Enhanced Surveillance and Response Plan (if applicable), Operation Orders (System and Local)

List of Revision

Distribution list

Proposed EPP Contents

- Distribution list, list of revision
- Purpose, description of dam
- Personnel authority, responsibilities and duties
- Emergency identification and evaluation process
- Preventative actions (where applicable)
- Notification procedures and flowcharts
- Communication systems, access to site
- Emergency sources of equipment, materials and power
- Inundation maps and tables
- Warning system (if applicable)
- Testing and upgrading EPP
- Training

Site Photos



Fig.1 The close shot of Xianren Lake dam downstream face and Xianren Pool



Fig.2 Xianren Pool



Fig.3 The close shot of Xianren Lake dam upstream face



Fig.3 The long shot of Xianren Lake dam upstream face

Annex G

Sample Archaeological Chance Find Policy

INTRODUCTION

The *Archaeological Chance-find Policy* is applicable to construction activities that may result in the unintended unearthing of archaeological/paleontological (fossils) resources. This is most likely to occur during land clearance, earth works and trenching (for pipelines and utilities) during construction.

It is important to ensure that the construction workforce is properly trained in the importance of recognising and reporting archaeological/paleontological finds. The construction workforce should receive a short, basic “toolbox talk” on finds and procedures prior to the commencement of construction works.

It is recommended that an individual with appropriate training be retained at the construction site to act as a “Cultural Heritage Supervisor” (CHS) by maintaining an archaeological watching brief. The likelihood is that such persons will be drawn from the local Cultural Relics Bureau (CRB), which has already undertaken initial archaeology/cultural relics surveys at some sites. The CHS would be responsible for ensuring compliance with the *Archaeological Chance-find Policy*, including pre-construction “tool box” briefings, recording of chance finds as they arise and would act as the principal point of contact between the construction contractor and the CRB.

PROCEDURE

Construction workers discovering or suspecting that they have discovered unexpected archaeological or paleontological remains shall:

- Immediately stop work;
- Not disturb or remove the finds; and
- Inform the CHS of the discovery immediately, and formalise the suspension of excavation work.

Subsequent actions shall then be determined by the CHS in accordance with the decision tree detailed in *Figure 1*. All archaeological finds shall be documented by the CHS.

SUBSEQUENT ACTIONS

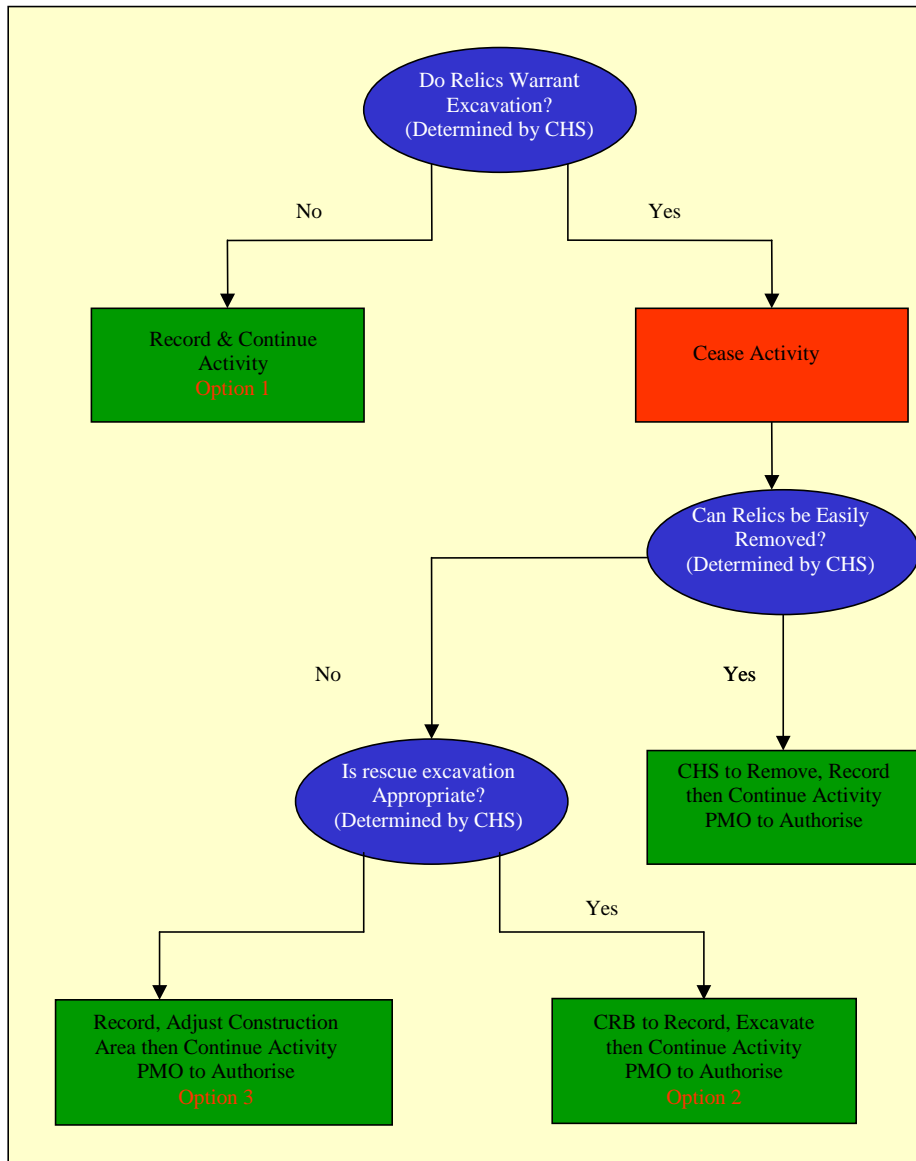
Where rescue excavation is deemed necessary, the following shall occur:

- The CHS (or CRB) will inspect the site and formulate a salvage plan if deemed necessary. This may include site surveying and the removal of remains, according to guidelines established by the CRB.
- In order to proceed with major rescue excavation works (to be determined by the CHS), it will be necessary to have prior authorisation by the CRB. In order to receive this, it may be necessary to submit a work plan, including a map of the area to be investigated.

- Upon completion of the rescue excavation, a report with an inventory and description of the finds shall be prepared, and the finds delivered to the CRB. Construction may then continue in that area.

Figure 1

Archaeological Chance-find Decision Tree



Annex H

Template Construction Management Plan

CONSTRUCTION MANAGEMENT GUIDELINES FOR CONTRACTORS –AN EXAMPLE

INTRODUCTION

The following text is an example of a set of construction management guidelines from a World Bank-financed project. A similar set of construction management guidelines will be prepared by the Project contractor.

PURPOSE

The purpose of these environmental management guidelines (EMG) for contractors is to define minimum standards of construction practice acceptable to the Project Implementation Unit (PIU).

Applicable Standards and Legislation

There are various environmental regulations and standards which cover environmental and related matters and these are referred to as applicable in this EMG. Notwithstanding those references, compliance with them shall not discharge the Contractor from complying with any other legislative requirements applicable at the time of construction activities.

The Site

The Site, for the purposes of these EMG, is defined as any land which lies within the project scheme, as defined on the PIU plans and sections which have been provided to the contractor.

Site Environmental Management Plan (SEMP)

Prior to the start of construction activities, the Contractor should, on the basis of these guidelines, draw up a *Site Environmental Management Plan* (SEMP), which must be approved by the PIU before construction or rehabilitation activities can commence. This plan should cover each of the sections dealt with by these guidelines, and also take into account any other specific recommendations which have been made as part of the environmental management plan (EMP) for the scheme(3). Any sections of these guidelines that are not relevant to individual projects should be justified in the SEMP and agreed with the PIU.

When the SEMP has been prepared, the Contractor should also undertake training of their workforce to ensure that every member of the workforce is aware of the SEMP prior to going on site, and adheres to it at all time. The PIU's Environmental Specialist will advise and assist the contractor in this matter as necessary.

(3) The EMP should be made available by the PIU to each contractor upon award of the project.

ROADS AND FOOTPATHS

Temporary and Permanent Closures and Diversions

In order to carry out the rehabilitation works, it may be necessary to close or divert certain specified roads and footpaths, either permanently or temporarily during the construction period. It is the Contractor's responsibility to finalise the arrangements for these closures and diversions with the PIU.

After breaking up, closing or otherwise interfering with any road or footpath to which the public has access, the Contractor shall make such arrangements with the PIU as may be reasonably necessary so as to cause as little interference with the traffic in that street or footpath during construction or rehabilitation works as shall be reasonably practicable.

Wherever the construction or rehabilitation works interfere with existing public or private roads or other ways over which there is a public or private right of way for any traffic, the Contractor shall construct diversion ways wherever possible. The standard of construction and lighting shall be suitable in all respects for the class or classes of traffic using the existing ways, and the widths of the diversions shall not be less than that of the existing way unless otherwise agreed with the PIU.

Diversion ways shall be constructed in advance of any interference with the existing ways and shall be maintained to provide adequately for the traffic flows.

The Contractor shall be responsible for supplying, erecting and maintaining for the requisite periods all statutory and public information notices. The nature and location of such notices shall also comply with the requirements of the PIU.

The provisions of this Clause shall not apply to any temporary access or accommodation works, which the Contractor may construct for his sole use in the execution of the construction and rehabilitation works.

Pedestrian Routes

The Contractor shall ensure that reasonable pedestrian routes are provided throughout the construction period and in relation thereto shall meet the following requirements, where practicable:

1. Any temporary footways and carriageways shall have uniform surfaces and should have no steps.
2. All temporary footways and ramps must be surfaced in non-slip material and kept free of mud and debris.
3. The existing pavement width along the main roads shall be maintained.
4. All openings or obstructions on the carriageways and footway shall be barricaded with a continuous rail.
5. All pedestrian routes diverted onto the carriageway shall be clearly defined by continuous barriers.

Maintenance and Repair of the Highway

The Contractor shall take every possible precaution to prevent its operations, whether by carting or otherwise, from damaging the roads and footpaths in the vicinity of the rehabilitation works.

The Contractor shall carry out all such maintenance works as are necessary to maintain the roads and footpaths in the vicinity of the works in a serviceable condition to the approval of the PIU.

Lorry Movements

The Contractor, its sub-contractors and suppliers moving large and/or heavy loads, construction plant, materials and spoil (including vehicles used for carrying such when running empty) shall limit the use of public highways as far as is reasonably practicable.

Routes will be agreed with the PIU in advance. Vehicles arriving or leaving the Site shall do so during normal working hours, unless otherwise agreed with the PIU.

The Contractor shall take all reasonable measures to ensure that delivery vehicles do not park on the highways prior to entering the Site.

The Contractor when entering into any sub-contract for the execution of any part of the construction works or the supply or transport of heavy loads, construction plant, materials or spoil shall incorporate in any such subcontract provisions requiring the sub-contractor or supplier to comply with the requirements of this Clause.

Mud on Roads

The Contractor shall take strict measures to minimise the spillage of mud on roads arising from excavation works.

These will include, but not necessarily be limited to:

1. The provision of wheel washing facilities.
2. Regular cleaning to remove any mud or debris deposited by site vehicles on roads, footpaths, gullies or drains in the vicinity of the site.
3. The complete sheeting of the sides and tops of all vehicles carrying mud or debris.
4. The Contractor shall ensure that vehicles are loaded in such a manner as to prevent spoil falling off during their journey.

The Contractor shall also comply with the requirements regarding dust outlined in this EMG.

Traffic Safety and Control (Traffic Safety Measures)

The Contractor shall provide, erect and maintain such traffic signs, road markings, lamps, barriers and traffic control signals and such other measures as may be necessitated by the construction works to the approval of the PIU.

The Contractor shall not commence any work that affects the public highway until all traffic safety measures necessitated by the work are fully operational.

The Contractor shall keep clean and legible at all times all traffic signs, road markings, lamps, barriers and traffic control signals and he shall position, reposition, cover or remove them as required by the progress of the works and to the approval of the PIU.

Site Access

All access from the Site onto the highway shall be of sufficient width to accommodate two-way traffic wherever practicable. Traffic signs shall be provided for each access as follows:

- As advance warning of the approach.
- “Give Way” signs for control of traffic leaving the Site.

The precise location of each sign shall be determined by the Contractor to the satisfaction of the PIU.

Access Across Site and to Frontages

In carrying out the construction works, the Contractor shall take all reasonable precautions to prevent or reduce any disturbance or inconvenience to the owners, tenants or occupiers of adjacent properties, and to the public generally.

Subject to the provisions of these guidelines, the Contractor shall maintain any existing right of way across the whole or part of the Site and public and private access to adjoining frontages in a safe condition and to a standard not less than that pertaining at the commencement of the contract.

Alternatively, the Contractor shall provide acceptable alternative means of passage or access to the satisfaction of the persons affected. The Contractor shall provide and maintain any guard rails, fences, gates, lights, bridges, pavings, steps etc. needed and they shall be of such size, strength and construction as will be adequate for their purpose.

In carrying out the work immediately adjacent to occupied premises outside the Site, the Contractor shall proceed with minimum inconvenience and disturbance to occupiers and users. Access to and from such premises shall be maintained at all times, except as may be essential.

The Contractor shall render every assistance to occupiers of premises affected by the construction works to enable them to get materials or goods into or out of their premises.

Access to Agricultural Lands

The Contractor must liaise with local farmers (eg through the relevant Bureau of Agriculture) to ensure that construction plans are scheduled to minimise disturbance (eg through reducing access or interrupting irrigation water supply) to existing agricultural lands during key periods in the crop timetable, such as sowing and harvest. These schedules must be agreed with the PIU as part of the SEMP before construction commences.

WATER AND SOIL PROTECTION

Waste Water and Groundwater

Provisions for construction site drainage along the route of the Rehabilitation works will be achieved via the development and implementation of an appropriate site drainage plan. The plan will include measures to ensure that surface water runoff is contained and managed appropriately, as described below. Such provisions will also prevent washout from temporary construction laydown and storage areas into local watercourses.

All waste water and site discharges shall only be permitted where the effluent quality and discharge location is acceptable to the PIU. Effluent will pass through treatment facilities such as sediment traps and/or settlement lagoons, as appropriate, before being discharged. The Contractor will ensure that all treatment facilities are regularly inspected and maintained.

Construction wastewater should be collected and treated by sedimentary tanks for general reuse in priority in construction activities such as flushing ground.

The Contractor shall make provisions to ensure that oil drums and containers or other potential contaminants stored on the Site are properly isolated and banded and that no oil or other contaminants are allowed to reach watercourses or groundwater, including aquifers. In particular, soil bunds should be constructed around fuel or chemical storage areas to isolate spillages; covers should be used to prevent erosion from exposed heaps, which should themselves be positioned away from watercourses; and adequate sanitation facilities (eg latrines) should be in place for the workforce. In addition, an appropriate fuel and chemical handling protocol and contingency planning to prevent and limit impact from spills should be in place prior to any construction taking place.

The Contractor will also have due regard for underlying aquifers, and wherever appropriate, measures to prevent groundwater contamination will be agreed with the PIU.

Control and Management of Foul Drainage

Temporary dry toilets should be established within or nearby the construction site.

The sewage should be collected separately with rainwater and must be treated before discharging. The sewage after treated by septic may be used for irrigation.

Water Supply Conflicts

The Contractor must ensure that the workforce have adequate access to a safe water supply, which is not provided to the detriment of services to the local population. If there is a risk of competition for limited water resources, then the Contractor must ensure that the local supply is not affected, and that workforce is provided with an alternative source if necessary (eg tankered and stored water).

Soil Conservation

The Contractor should implement soil conservation measures, which will include, but not necessarily be limited to:

- Reduce the soil excavation surface as small as possible, and avoid soil excavation on windy days.
- The soil excavation should avoid to be conducted at during blustery days and rainstorm days.
- Building ditches around the temporary stacks of soil to discharge rain waters.

The Contractor must also take every precaution to avoid unnecessary soil compaction, eg by minimising the use of heavy equipment.

NOISE AND WORKING HOURS

Working Hours

The normal working hours shall be 0700 – 1900.

These hours of work do not apply to equipment which is required to operate continuously (e.g. for safety reasons).

At certain sites, different working hours shall apply. These will be as agreed between the Contractor and the PIU.

In general, night-time working shall be kept to a minimum. However, for some sites where night-time working is required it shall be agreed with the PIU.

Additional or alternative working hours needed for emergency reasons shall be advised to the PIU.

Noise Control

The Contractor shall have a general duty to take all practicable measures to minimise nuisance from noise. This includes:

- Hire low noise and low vibration machines during construction and arrange their position reasonably according to their noise transporting characteristic, setting noise barrier if necessary.
- Regulate the construction activity orders and time reasonably, and the construction during night is prohibited unless the construction activities are permitted by relevant EPB and PMO.

- Use soft noise absorption screen instead of nylon side curtains at construction field.
- The construction materials transporting vehicles should be drive slow and the whistle should be prohibited.

FUGITIVE DUST AND AIR POLLUTION

Fugitive Dust

The Contractor shall take all necessary measures to avoid creating fugitive dust during construction.

Measures to prevent fugitive dust shall include the following practices:

- The construction area to be arranged to avoid fugitive dust (by covering stacks of cement/gravel materials etc, sprinkling the construction field and roads periodically during windy days, constructing enclosing barrier), etc.
- The construction materials to be located at the tailwind direction to residents with minimum distance of 100metres and should be covered and should be stacked at possible lee locations.
- Reduction of the area of excavation land and the excavation in disorder should be prohibited.
- The excavated ground should be filled in and levelled or tamped ASAP.
- The construction materials transporting vehicles should be drive slow and the construction materials should be covered or sealed.
- Use the cement prefabricating parts instead of cement during construction as much as possible.

Air Pollution

The Contractor shall take precautions to prevent the occurrence of smoke emissions or fumes from site plant or stored fuel oils. Plant shall be well maintained and measures shall be taken to ensure that it is not left running for long periods when not directly in use.

To reduce the impact of asphalt fume generated from paving new roads with asphalt, the Contractor need to sprinkle the roads with cold water right after the completion of paving activity.

DISPOSAL OF WASTE AND CONTAMINATED MATERIALS

Waste

As part of the SEMP, the Contractor will develop a management plan which will identify:

- the waste category and quantities of materials generated;
- opportunities for recycling and/or re-use; and
- disposal routes and licensing requirements.

The relevant measures to prevent waste shall include the following practices:

- Reuse the construction waste and soil as much as possible, for example, using some of them as the base material of roads.
- The excavated soil should be reused to fill as much as possible in priority. The residual should be disposed with construction waste.
- The useless construction waste and abandoned soil should be collected and transported with cover or sealed to eligible units or location for final disposal timely.
- The construction waste and domestic garbage should be collected separately.
- The collected domestic garbage should be transported with cover or sealed to landfill timely.

Spoil arising from the works which is classed as “acceptable fill” will wherever practicable be used in construction works.

Disposal sites will be identified by the Contractor in consultation with the PIU and EPB.

Contaminated Land and Materials

Any contaminated material encountered will be dealt with in compliance with relevant regulations and instructions from the PIU.

The PIU will identify those areas within the Site where contaminated land may be encountered. The Contractor will be required to:

- a. develop transportation and other management procedures to be followed;
- b. ensure that removal and disposal of contaminated materials complies with local environmental regulations.

ECOLOGY

Encroachment into Wildlife Areas

The Contractor shall comply with the provisions of relevant nature conservation legislation. The following general principles will be applied where practicable:

1. Standards of dust, noise and air pollution control, as set out in previous sections shall be applied to protect adjacent wildlife habitats.
2. Habitat loss will be minimised by restricting the working width to a necessary minimum, set barriers between construction field and natural habitats if possible.
3. Suitable precautions shall be taken to prevent the entry of pollutants into any bodies of water - adjacent habitat will be fenced off and staff given awareness training, where appropriate.
4. To ensure what kind of biology will be influenced by construction activities before construction and then make out protection plans.
5. The period of construction at the field located near the natural habitats should be arranged to avoid the breeding time of wild animals.
6. The vehicles should run at low speed and the whistle should be prohibited when they are near the natural habitats.

7. Any unauthorised felling or trees, clearance of fauna, or trapping or killing of any wildlife (excepting vermin) in the vicinity of the Site by members of the workforce is strictly prohibited, and could lead to termination of contract if not controlled. The Contractor must make sure that the workforce has adequate resources and fuel supplies on site at all times to prevent such an occurrence.

Vegetation Recovery

The Contractor has the responsibility to recover the destroyed vegetation after the completion of construction.

The following general principles will be applied where practicable:

1. Keep the original surface soil to cover the field after construction to rebuild vegetation.
2. Plant vegetation, landscape or recover the ecology at possible places right after construction.
3. The valuable plants under inevitable impacts should be transplanted, and the field should be recovered or planted complementarily after construction completed.

SITE BOUNDARIES/HOARDINGS

The Contractor shall liaise with the PIU to decide upon which (if any) areas of the site should be fenced from public ingress.

SITE ACTIVITIES

Good Housekeeping

The Contractor shall follow a “good housekeeping” policy at all times. This shall include, but not necessarily be limited to, the following requirements:

1. Open fires will be prohibited at all times;
2. Rubbish will be removed at frequent intervals and the site kept clean and tidy;
3. Hoardings shall be frequently inspected, repaired and re-painted as necessary;
4. Adequate toilet facilities shall be provided for all site staff. Toilets shall be kept clean;
5. Food waste shall be removed frequently;
6. The wheel washing facilities area shall be brushed clean frequently.
7. Lorries shall enter and exit the Site in a forward direction.
8. All loading and unloading of vehicles shall take place off the public highway wherever this is practicable.

Living Accommodation

No living accommodation will be permitted on the Site except with the approval of the PIU.

Clearance of Site on Completion

The Contractor shall clear up all working areas both within and outside the Site and accesses as work proceeds and when no longer required for the carrying out of the Rehabilitation works.

All surplus soil and materials, temporary roads, plant, sheds, offices and temporary fencing shall be removed, post holes filled and the surface of the ground restored as near as practicable to its original condition.

Pest Control

The Contractor shall ensure that the risk of infestation by pests or vermin is minimised by adequate arrangements for the disposal of food waste or other material attractive to pests. If infestation occurs he shall take the necessary action to deal with it.

Pest Control

The Contractor shall ensure that the risk of infestation by pests or vermin is minimised by adequate arrangements for the disposal of food waste or other material attractive to pests. If infestation occurs he shall take the necessary action to deal with it.

SAFETY

Emergency Contacts and Procedures

The Contractor shall prepare and maintain an Emergency Contacts Set of Procedures for each work site which shall be displayed prominently at each site. These Procedures shall be followed in any site emergency.

They shall contain emergency phone numbers and the method of notifying local authorities/services for action by the Contractor and the PIU. Copies of the Procedures will be issued to the PIU and the Police.

Emergency telephone numbers for the Contractor's key personnel shall also be included for the PIU's use in an emergency.

Use of Explosives

The use of explosives shall not be permitted except in exceptional circumstances. Prior approval from the PIU shall be obtained.

PROTECTION OF EXISTING INSTALLATIONS

Information

The Contractor will be required to make his own investigations and to take all appropriate actions concerning existing foundations, buildings, structures, walls, roadways, sewers cables and other services, apparatus and installations.

Safeguarding

The Contractor shall properly safeguard all buildings, structures, works, services or installations from harm, disturbance or deterioration during the concession period. The Contractor shall take all necessary measures required for the support and protection of all buildings, structures, pipes, cables, sewers, railways and other apparatus during the concession period.

Annex I

Template Site Environmental Policy

Environmental policy

AIR QUALITY MANAGEMENT

- Keep maintenance to the dust catcher on the existing boiler for a good condition.

WATER MANAGEMENT

- Water should be used economically and reuse water as much as possible.
- The illegal water extraction will be fined or punished.

WASTEWATER MANAGEMENT

- All sewage should be collected and treated by WWTP.
- The effluent of the WWTP should be subject to the Class I limit of the Integrated Wastewater Discharge Standard (GB8978-1996).
- Keep maintenance to the WWTP for a good condition.

WASTE MANAGEMENT STRATEGIES

- The action of littering around will be fined.
- All garbage should be collected and transported to landfill for final disposal.
- Supervise the contractors for ongoing solid waste collection.

VEHICLES MANAGEMENT:

- The vehicles running in this site must use clean power such as electric power or gas or solar power.
- The non-tourism purpose vehicles should not be permitted to enter this site.
- Vehicles should be drive slowly within sites and whistle must be prohibited.
- The marks for speed limit and whistle prohibition established at appropriate road sections should be maintained for good condition.

NOISE MANAGEMENT

- Keep maintenance to machines for good condition.
- The doors and windows of pump stations should keep close.

Annex J

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Annex B

Policy and Legislative Context

Authorities Responsible for Environmental, Health and Safety Management

These include the National Development and Reform Commission (NDRC), Provincial Environmental Protection Bureaus (EPBs), under the State Environmental Protection Administration (SEPA), Local EPBs responsible for the routine inspection of sites, the Ministry of Land and Resources (MOLAR), Water Resources Bureaus, the Yellow River Conservancy Commission (YRCC), the State Administration of Work Safety (SAWS) and Municipal Work Safety Bureaus, the Ministry of Health, and local Health Supervision Bureaux (HSB), the the Centre of Disease Prevention and Control (CDC), and local Fire Fighting Bureaus (FFB).

Authorities Responsible for Tourism Management, and Cultural and Natural Heritage

China National Tourism Administration (CNTA) is responsible for developing, promoting and regulating China's 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.

State Administration of Cultural Heritage (SACH) is responsible for developing, promoting and regulating China's cultural relics and museum industry. The Gansu Cultural relic bureau is 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

Key laws and regulations are:

- Regulation on the Management of Nature Reserves of the People's Republic of China (1994) regulates construction activities within nature reserves, according to core, buffer and experimental areas.
- The Cultural Heritage Protection Law of the People's Republic of China (1982), the Law of Cultural Relic Protection (2002) and associated regulations that provide the legal basis for protection of cultural relics in China.
- The Environmental Impact Assessment (EIA) Law, applicable to all construction projects that may cause negative impacts on the environment.
- The *Law on Water and Soil Conservation* promotes the sustainable use of water and soil resources.
- The *Water Law of the People's Republic of China (2002)* and *Implementation Regulations for Water Extraction Licence Policy (1993)*, requiring that 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.

- 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.
- The *Management Regulation on the Registration of Discharged Pollutants (1992)* setting out detailed requirements for pollutants discharge registration.

Presently, there are no specific laws concerning tourism development in China, rather a series of technical standards have been developed in recent years to provide technical guidance on tourism planning and facility development.

Environmental Impact Assessment (EIA) Law

According to the *Management Regulation on Environmental Protection for Construction Projects*, an EIA must be prepared during the project feasibility stage. EIA approval is a necessary prerequisite for securing a construction and operating permit. 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.

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

Environmental Quality and Discharging Standards

Environmental Emission and Discharging standards

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

Ambient Air Quality Standard (GB3095-1996)
Environmental Quality Standards for Surface Water (GB3838-2002)
Quality Standards for Ground Water (GB/T 14848-93)
Standard of Environmental Noise of Urban Area (GB3096-93)
Integrated Emission Standard of Air Pollutants (GB16297-1996)
Noise Limits for Construction Site (GB12523-90)
Integrated Wastewater Discharge Standard (GB8978-1996)
Standards of Irrigation Water Quality (GB5084-52)

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.

Civil works are to be carried out at all sites, requiring OP 4.01 Environmental Assessment. Although civil works at several sites are relatively insignificant, the works are to be carried out in areas of sensitive cultural and natural heritage, and therefore the project is Category A.

OP 4.11 Physical cultural resources applies at seven of the sites, where the sites are of profound, and sensitive cultural heritage value.

OP 4.04 Natural habitats is triggered by activities at three sites. Majishan Scenic Area and Mati Temple Scenic Area are sites of significant natural beauty, and Yardang National Geological Park has significant geological interest. Critical natural habitats will not be affected, but there are risks of impacts on each area's natural habitats.

A range of minority groups live in the area of Mati Temple Scenic Area, requiring the preparation and implementation of a separate Indigenous Peoples Plan, under OP 4.10 Indigenous Peoples, to consult with and engage minority groups effectively in the activities in the area.

There are limited land acquisition requirements at three sites, Lutusi Ancient Government Complex, Qincheng Ancient Town and Yellow River Stone Forest, triggering OP 4.12 Involuntary Resettlement.

Two existing dams will be rehabilitated at Majishan Scenic Area, triggering OP4.37 Dam Safety.

Annex C

Land Acquisition

Table 1 *Land Take and Affected Population in Qingcheng*

Project Activities	Permanent Land Take						Temporary Land Take				Note
	Area (mu)	Type of Land	Physically displaced people		Economically displaced people		Physically displaced people		Economically displaced people		
			HH	PP	HH	PP	HH	PP	HH	PP	
Road widening	6	Class II Irrigated Land	--	--	14	74	--	--	--	--	
Water supply	0.5	Class III Irrigated Land	--	--	91 *	382*	--	--	--	--	Collectively owned land
Wastewater treatment plant	2	Class I Irrigated Land	--	--	4	15	--	--	--	--	
Landfill	5	Class III Irrigated Land	--	--	120 *	446*	--	--	--	--	Collectively owned land
Road and bridge	--	--	--	--	--	--	6 mu within 7 villages				Collectively owned land
Rehabilitation of Ancient Street	--	--	--	--	--	--	--	--	1	1	Residential house
			--	--	--	--	--	--	28	104	Small businesses
			--	--	--	--	--	--	1	18	Collectively owned office building
			--	--	--	--	--	--	1	5	Collectively owned house
			--	--	--	--	--	--	1 unit	0	Taxation Office
			--	--	--	--	--	--	1 unit	5	Bank
			--	--	--	--	--	--	1 unit	4	Telecommunications Office
Total	13.5	--	0	0	18	89	--	--	34	137	--

Note: the data with * is the total household and population of the village group losing collectively owned land; these numbers are not included in the total of permanently economically displaced people.

Table 2 *Land Take and Affected Population in Lutusi*

Project Activities	Permanent Land Take						Temporary Land Take				Notes
	Area (mu)	Type of Land	Physically Displaced People		Economically Displaced People		Physically Displaced People		Economically Displaced People		
			HH	PP	HH	PP	HH	PP	HH	PP	
	2.73	House plots and farmland	7	30	1	5	--	--	--	--	Acquisition of land of 1.1 mu was taken from the house plots; 1.63 mu was taken from the land of yard around the houses
Parking Lot	0.3	Small businesses	--	--	8	27	--	--	-	-	This consists of: five households (9 people) that rent business premises in this area; and three households (18 people) that own these premises.
Host site for people displaced from parking lot area	5.5	Class III Irrigated Farmland	--	--	5	26	--	--	--	--	The land belongs to 5 households and will be taken for 7 households and the police station.
	--		--	--	--	--	--	--	5	19	Residential house
			--	--	--	--	--	--	15	72	Private business
Rehabilitation of Ancient Street	--		--	--	--	--	--	--	5	7	People that rent the house for small business
			--	--	--	--	--	--	4	6	Collectively owned business
			1 unit	6	--	--	--	--	--	--	A police station will be resettled.
Landfill site	1	Barren land	-	-	-	-	-	-	-	-	The land compensation will be given to the village
Waste water treatment plant	0.3	Class III Irrigated Farmland	-	-	1	3	-	-	-	-	The land belongs to 1 household of Langpai village
Total	9.83	--	7 hh and 1 police station	36	15	61	--	--	29	104	--

Note: 1 mu=667m²

Table 3 *Eligibility of PAPs at Qingcheng*

Project Activity	Impact	Description of Compensation for Permanent Land Acquisition	Eligibility
Road widening	Acquisition of land belonging to 5 households, 20 people	Land compensation	80% for the land user, and 20% for the rural collective organization (village committee)
		Resettlement allowance	Land user
		Cash compensation for land and standing crops	Land user
Waste water treatment plant	Acquisition of irrigated land class one 2 mu belonging to 4 HHs, 15 persons	Cash compensation for land	Land user
Water supply and Landfill	Acquisition of irrigated land class three 5.5	Cash compensation for land and standing crops	Land compensation for collective; standing crops compensation for land user
Rehabilitation of Ancient St	Reconstruction of walls along the Ancient St of two households / 5 people	Project developer is responsible for reconstruction of the walls	Property Owner
	Temporary displacement of business and collective units: 28 small businesses / 104 people; 1 collective business / 10 people; 4 collective units / 19 people.	Transition allowance and compensation to business loss as described in Table 7.8	Property Owner

Table 4 *Eligibility of PAPs at Lutusi*

Project Activity	Impact	Description of Compensation for Permanent Land Acquisition	Eligibility
Parking Lot	Demolition of 7 houses, 30 people affected	Relocation of houses, including cash compensation for demolition of old houses, provision of land of 200m ² maximum to reconstruct new houses.	Household
		Cash compensation for area of land above 200m ²	Household
		Compensation for standing crops	Household
		Compensation of attachments	Household
		Provision of infrastructure at replacement housing area	Household
		Moving allowance	Household
		Additional payment to vulnerable households	Identified Vulnerable households
	Loss of 1 household's house plots	Relocation of house plot land	Household
		Cash compensation for area of land above 200m ²	Household
		Compensation for standing crops	Household
	Loss of 3 households' small business premises	Relocation of small businesses at the same street after construction of the parking lot	Household
		Moving allowance	Household
	Displacement of 5 households renting the businesses premises	Moving allowance	Renter/Business Owner
Land of host site for people displaced from parking lot area	5 HH, 26 PP	Land compensation	80% for the land user, and 20% for the rural collective economic organization (village committee)
		Resettlement allowance	Land user
		Cash compensation to standing crops	Land user
Rehabilitation of Ancient Road	24 HH, 97 PP	Construct new houses/shops to the affected	House/shop Owner
		Transition Allowance	House/shop Owner
		Compensation to discontinuation business	House/shop Owner
	Relocation of a police station	Cash compensation for demolition of old houses, moving allowance and provision of land to reconstruct new building	Police station
		The attachments and infrastructure will be restored by the project developer.	Police station
	Landfill of the solid waste	Cash compensation for the land acquisition to Langpai village	Langpai villager
Waste water treatment plant	Collective land	Cash compensation for the land acquisition to the land user	Group 7, Liancheng village

Annex D

Further Details of the Environmen tal Managemen t Plan

Table1. 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 / Municipal 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 / Municipal Authorities	Following completion of construction works and	Nil (covered by ongoing operating costs)
Implementation of Site Health and Safety Plans	Site management / Municipal Authorities		
Ensure that a water abstraction permit has been obtained for continuing water extraction	Site management / Municipal Authorities		

Community engagement	Site management / Municipal Authorities	continuing through operation	
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Table 2. Additional Mitigation Measures Specific to Certain Sites

Measures	Responsibility	Timing	Incremental Cost (RMB)
Preparation			
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	Municipal PMO	YR 0	Nil
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
Measures Required Prior to Construction			
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
Majishan: Completion of full environmental assessment of proposed site for landfill, as part of procurement of a new landfill through contractors.	Municipal PMO	YR 1	Nil (included in cost of contracting landfill construction and operation)
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

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
<i>Measures Required During Construction</i>			
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

Table 3. Environmental Monitoring Plan - Construction Phase

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
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
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
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
Yadang 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
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
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
Lutusi Ancient Government Complex			
Ambient air	TSP	Backyard garden of <i>Lutusi</i> Yamun and <i>Liancheng</i> Middle School	Five days of successive monitoring, once during heating period.
Noise	Leq(A)	<ul style="list-style-type: none"> Screen wall in front of <i>Lutusi</i> Yamun; In front of <i>Liancheng</i> Kindergarten, <i>Liancheng</i> Primary School and Ancestor Hall of <i>Lutusi</i> Yamun; Car park entrance; Plaza boundaries; and In front of <i>Dengshan</i>. 	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
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Table 4. Monitoring Plan – Operational Phase

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
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
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
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
Yadang 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
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
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
Lutusi Ancient Government Complex			
Ambient air	TSP	Backyard garden of <i>Lutusi</i> Yamun and <i>Liancheng</i> 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

Table 5. Training Costs

Site Name	Phase	Personnel	Total No.	unit price (RMB Yuan/person)	cost (RMB Yuan)
Majishan Scenic Area	Construction period	Project Environment Managers	9	2250	20250
		Contractor	10	2550	25500
	Operation period	Project Environment Managers	9	2100	18900
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
Jiayuguan Great Wall	Construction period	Project Environment Managers	2	2050	4100
		Contractor	2	2250	4500
	Operation period	Project Environment Managers	2	1950	3900
Yadang 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
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
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
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
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
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
Total					176,000

Table 6. EMP Costs

Description	Rate	Unit	Number	Expenditure Classification	Base Cost (1 USD = 7.7 RMB)	
					Yuan	USD
Majishan Scenic Area						
Third Party supervision of construction works	2000	Days	360	Services	720,000	93,506
Preparation of O&M and EPP plans for dams	2000	Days	20	Services	40,000	5,195
Monitoring During Construction						
Ambient Air	40	Yuan	612	Services	24,480	3,179
Noise	75	Yuan	1326	Services	99,450	12,916
Water quality	366	Yuan	108	Services	39,528	5,134
Monitoring During Operation						
Ambient air	40	Yuan	240	Services	9,600	1,247
Noise	75	Yuan	240	Services	18,000	2,338
Water quality	234	Yuan	18	Services	4,212	547
TOTAL					955,270	124,061
Qingcheng						
Third party supervision of construction works	2000	Days	100	Services	200,000	25,974
Monitoring During Construction						
Air	40	Yuan	130	Services	5,200	675
Noise	75	Yuan	26	Services	1,950	253
Effluent from construction sites	1206	Yuan	676	Services	815,256	105,877
Monitoring During Operation						
WWTP discharge	326	Yuan	12	Services	3,912	508
Landfill leachate	241	Yuan	6	Services	1,446	188
Groundwater	1206	Yuan	3	Services	3,618	470
TOTAL					1,031,382	133,946
Jiayuguan Great Wall						

Third Party supervision of construction works	2000	Days	120	Services	240,000	31,169
<i>Monitoring During Construction</i>						
Ambient Air	172	Yuan	144	Services	24,768	3,217
Noise	300	Yuan	416	Services	124,800	16,208
Water quality	366	Yuan	48	Services	17,568	2,282
<i>Monitoring During Operation</i>					0	0
Ambient air	172	Yuan	144		24,768	3,217
Noise	300	Yuan	192		57,600	7,481
Water quality	366	Yuan	6		2,196	285
TOTAL					491,700	63,857
Yardang National Geological Park						
Third party supervision of construction works	2000	Days	100	Services	200,000	25,974
Measures to limit visual and odor impact of solid waste disposal site	100000	Lump sum	1	Civil works	100,000	12,987
<i>Monitoring During Construction</i>						
Ambient Air	40	Yuan	48	Services	1,920	249
TOTAL					301,920	39,210
Yellow River Stone Forest						
Third party supervision of construction works	2000	Days	100	Services	200,000	25,974
Measures to limit visual and odor impact of solid waste disposal site	100000	Lump sum	1	Civil works	100,000	12,987
<i>Monitoring During Construction</i>						
Ambient Air	40	Yuan	78	Services	3,120	405
Noise	75	Yuan	7	Services	488	63
<i>Monitoring During Operation</i>						

Ambient air	40	Yuan	48	Services	1,920	249
Wastewater Treatment Plant Discharge	326	Yuan	16	Services	5,216	677
TOTAL					310,744	40,356
Wei Jin						
Third party supervision of construction works	2000	Days	72	Services	144,000	18,701
<i>Monitoring During Construction</i>						
Ambient Air	184	Yuan	36	Services	6,624	860
<i>Monitoring During Operation</i>						
Humidity and Temperature in Tombs	10000	Lump sum	1	Services	10,000	1,299
TOTAL					160,624	20,860
Suoyang						
Third party supervision of construction works	2000	Days	72	Services	144,000	18,701
<i>Monitoring During Construction</i>						
Ambient Air	120	Yuan	1	Services	120	16
Noise	225	Yuan	1	Services	225	29
TOTAL					144,345	18,746
Mati Temple Scenic Area						
Third party supervision of construction works	2000	Days	180	Services	360,000	46,753
<i>Monitoring During Construction</i>						
Air	40	Yuan	192	Services	7,680	997
Noise	75	Yuan	416	Services	31,200	4,052
Water quality	1206	Yuan	36	Services	43,416	5,638
<i>Monitoring During Operation</i>						
Air	40	Yuan	6	Services	240	31
Noise	75	Yuan	6	Services	450	58

Surface water	1206	Yuan	6	Services	7,236	940
Landfill leachate	241	Yuan	6	Services	1,446	188
Groundwater	1206	Yuan	3	Services	3,618	470
TOTAL					455,286	59,128
Lutusi						
Third party supervision of construction works	2000	Days	72	Services	144,000	18,701
<i>Monitoring During Construction</i>						
Air	40	Yuan	30	Services	1,200	156
Noise	75	Yuan	21	Services	1,575	205
<i>Monitoring During Operation</i>						
Air	40	Yuan	30	Services	1,200	156
Noise	75	Yuan	9	Services	675	88
Discharge from WWTP	326	Yuan	12	Services	3,912	508
TOTAL					152,562	19,813
Provincial						
PPMO Environmental Manager	20000	Annual Salary	6	Services	120,000	15,584
PIU Environmental Managers	20000	Annual Salary	54	Services	1,080,000	140,260
Lump for transport etc	20000	Annual lump per employee	42	Services	840,000	109,091
Annual independent audit of environmental performance	20000	Expert fees plus expenses	6	Services	120,000	15,584
TOTAL					2,160,000	280,519
TRAINING					167,000	21,688
GRAND TOTAL					6,330,833	822,186

