

Gansu Cultural and Natural  
Heritage  
Protection and  
Development Project

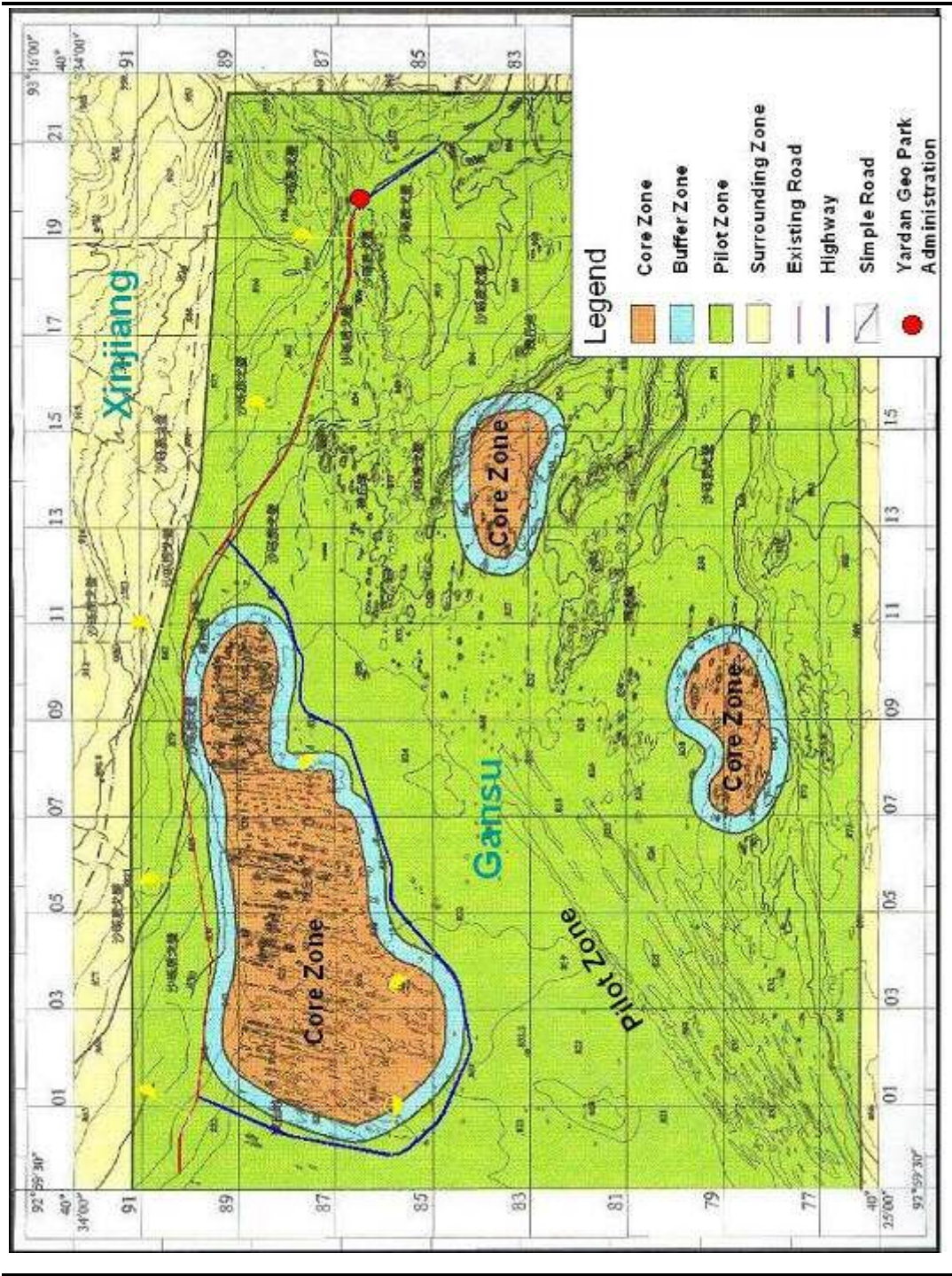
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& Environmental  
Management Plan  
**Volume III**

World Bank Financed Gansu  
Cultural and Natural Heritage  
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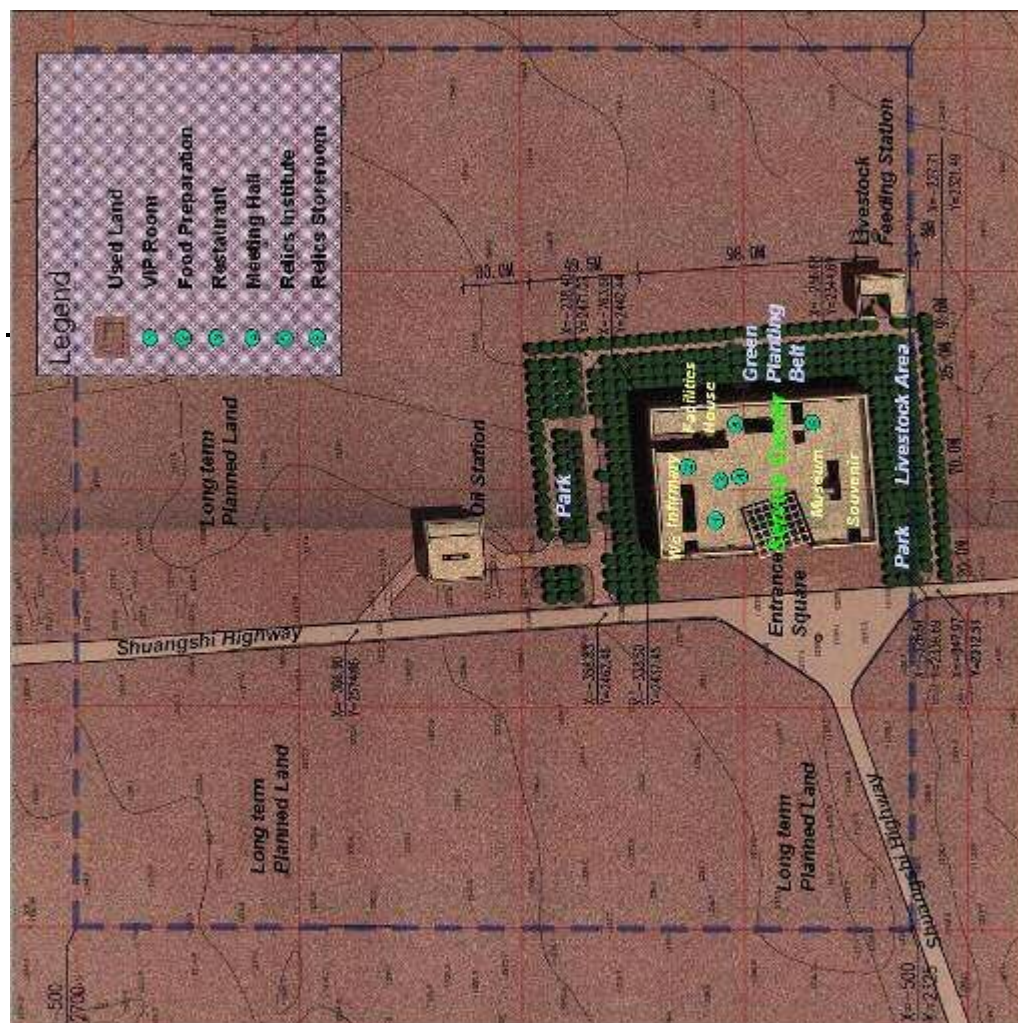
## Annex A: Maps of Each Site

Figure.1 Map for Yardang National Geological Park





*Figure.2 Map of Suoyang Ancient Town*



## Suodong Highway

Figure.3 Map for Jiuquan Museum

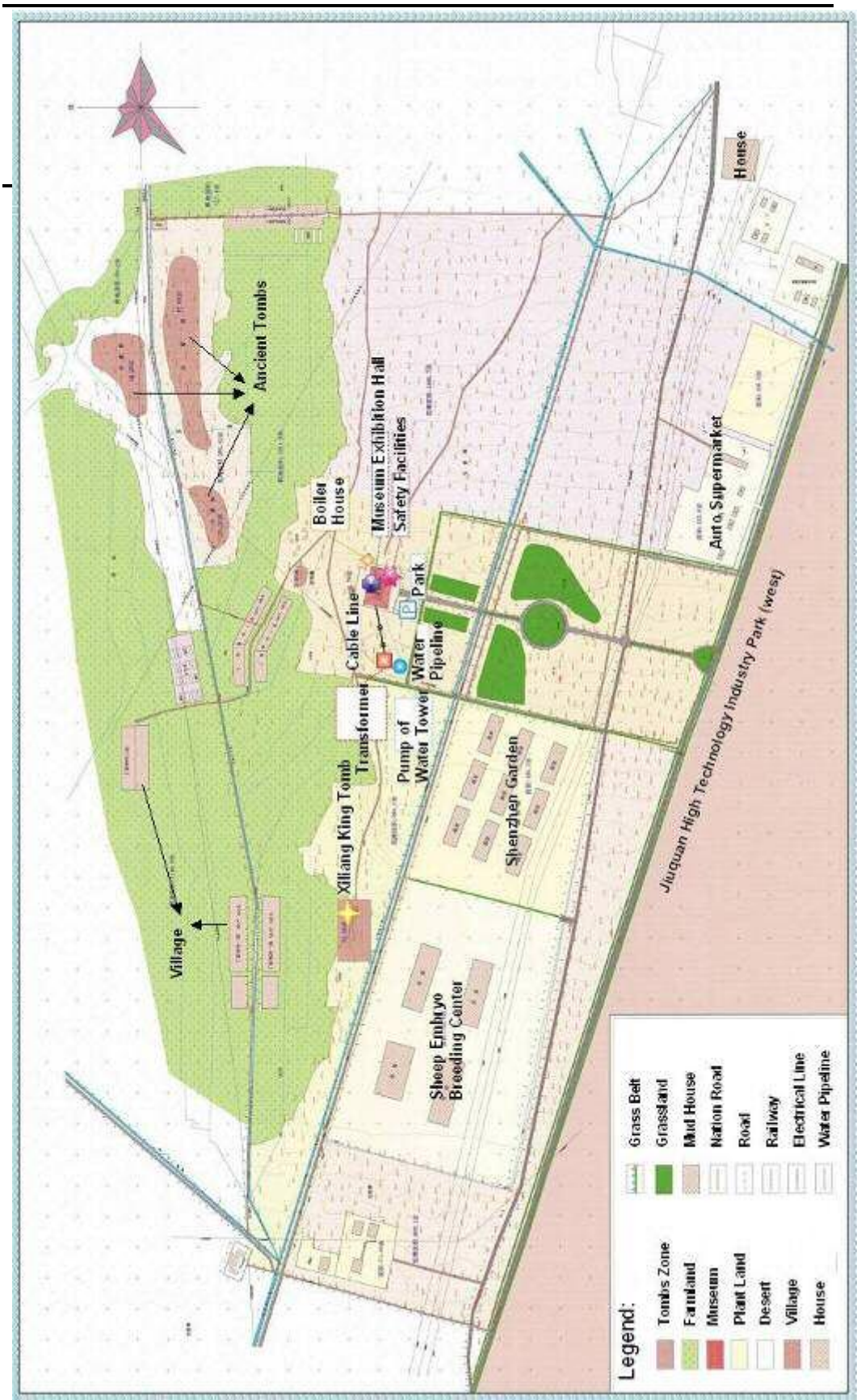




Figure.4 Map for Wei Jin Folk Culture Park

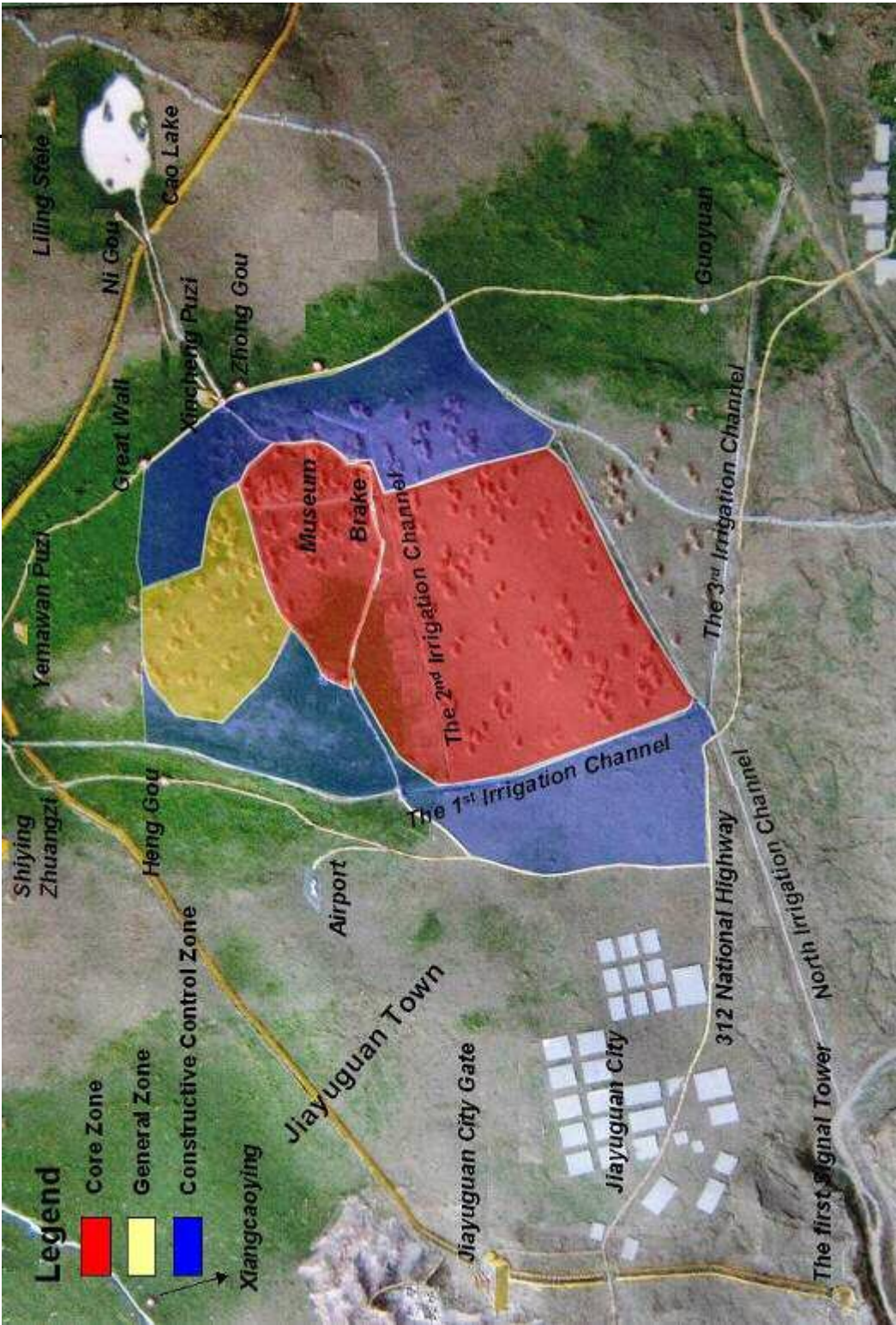


Figure.5 Map for Jiayuguan Great Wall

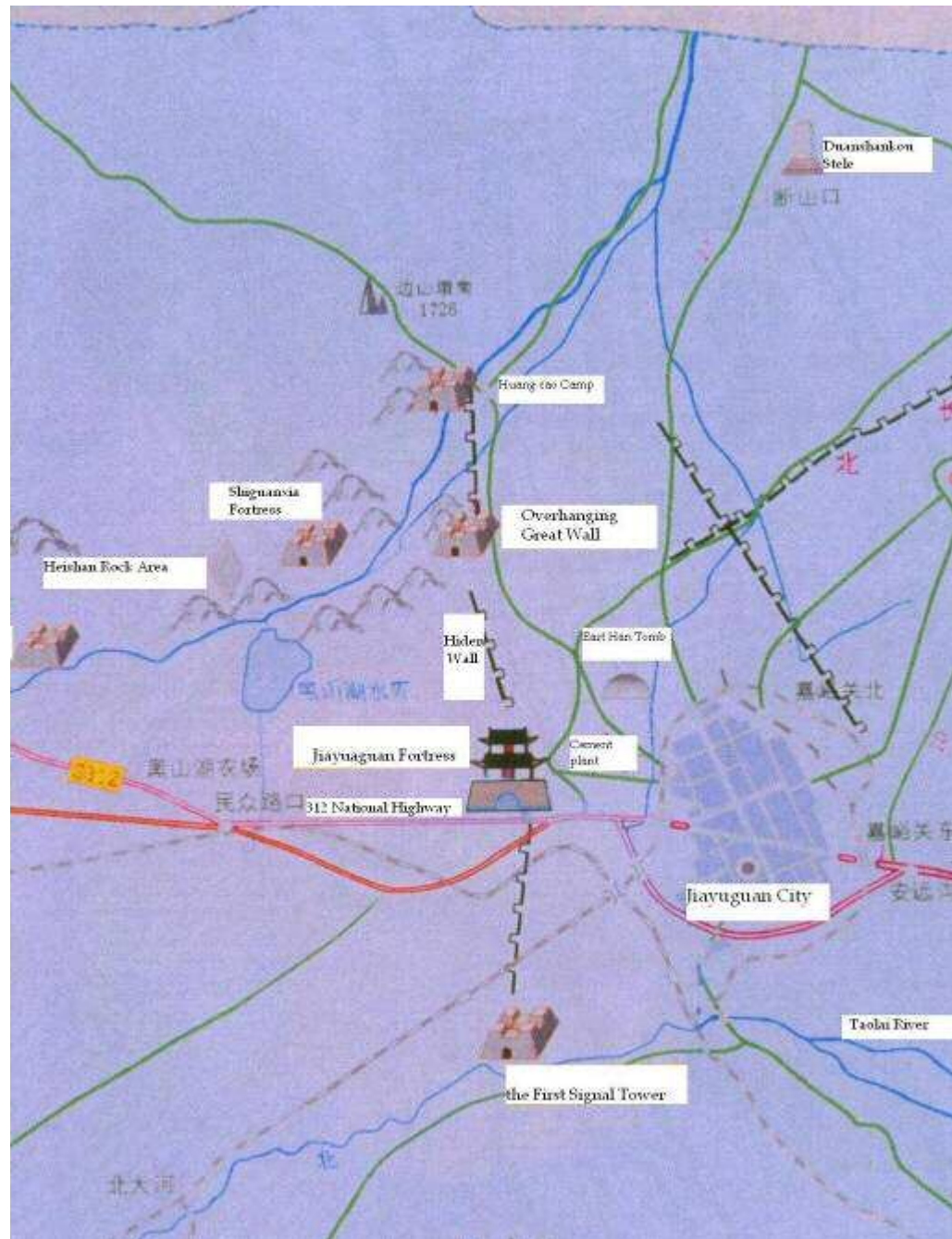




Figure.6 Map for Majishan Scenic Area

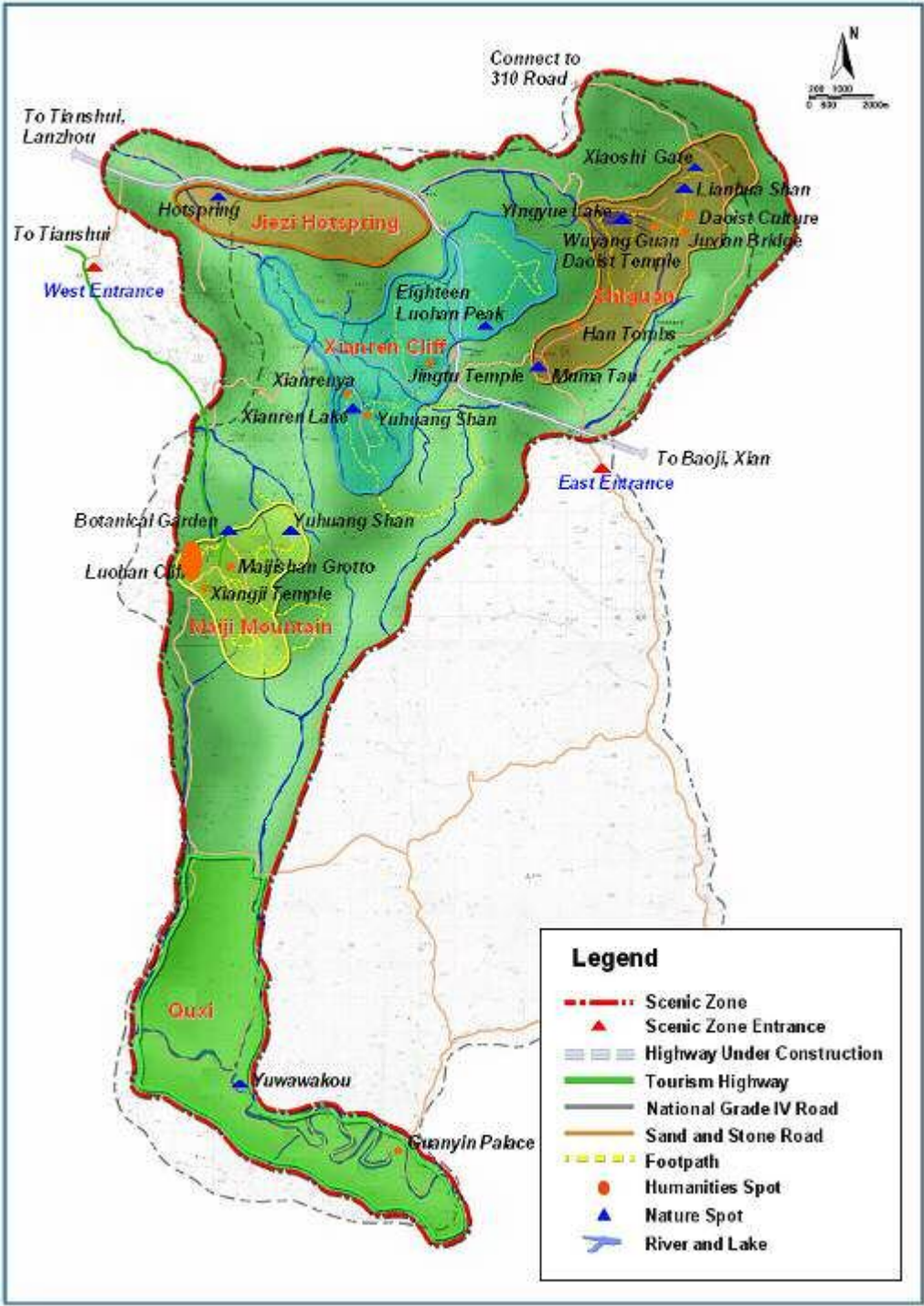
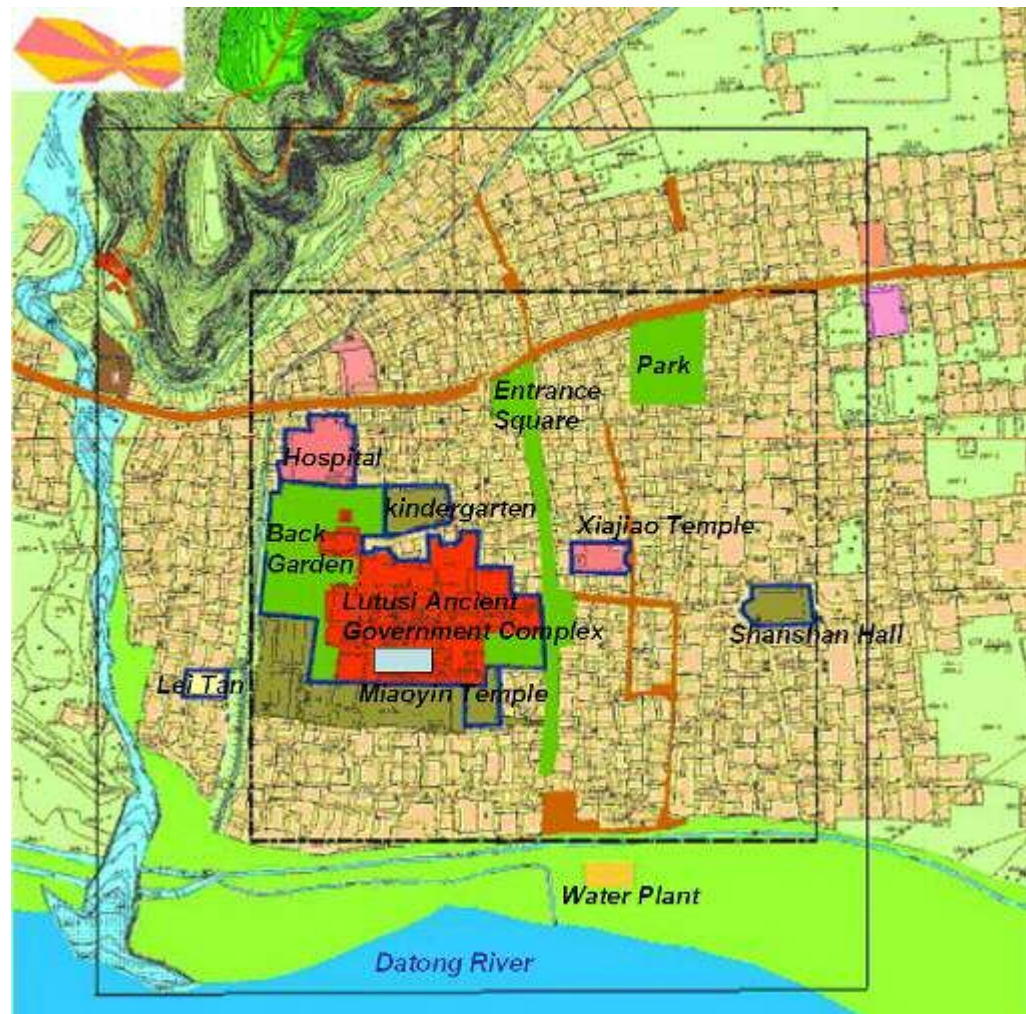




Figure.7 Map for Lutusi Ancient Government Centre



*Figure.8      Map for Shi Chuan Ancient Pear Orchard*



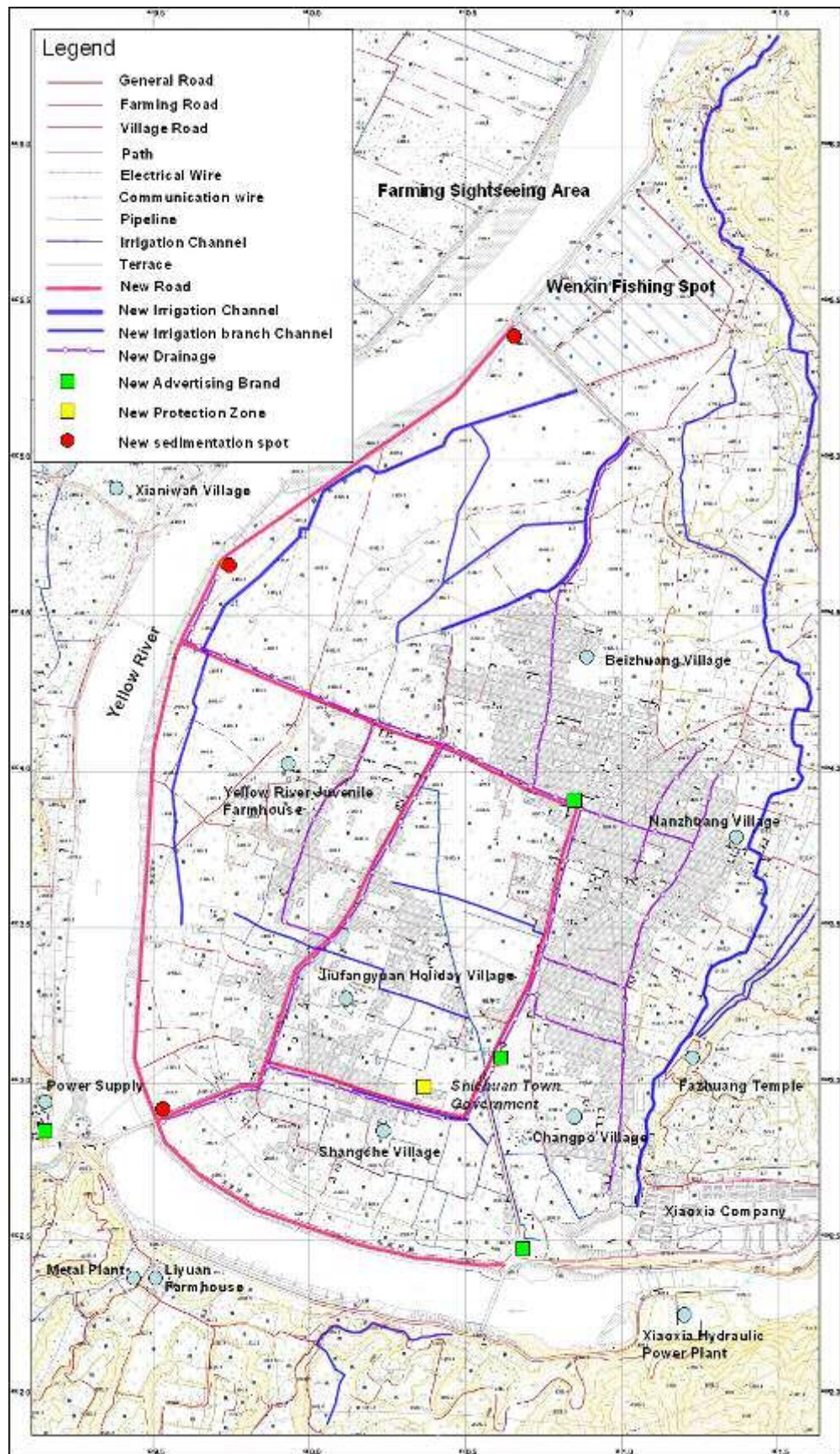


Figure.9 Map for Qingcheng Ancient Town

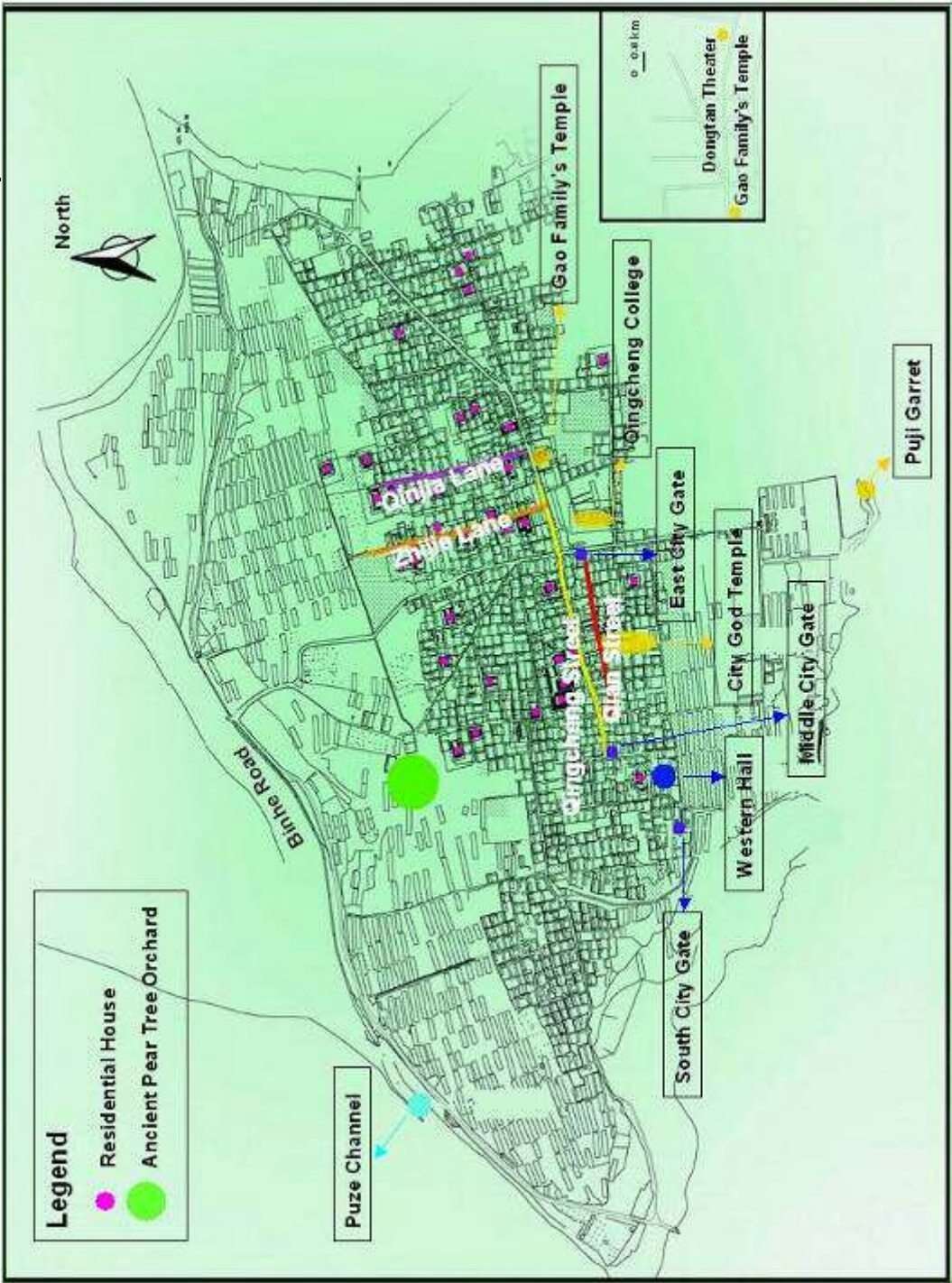




Figure.10 Map for Yellow River Stone Forest National Park

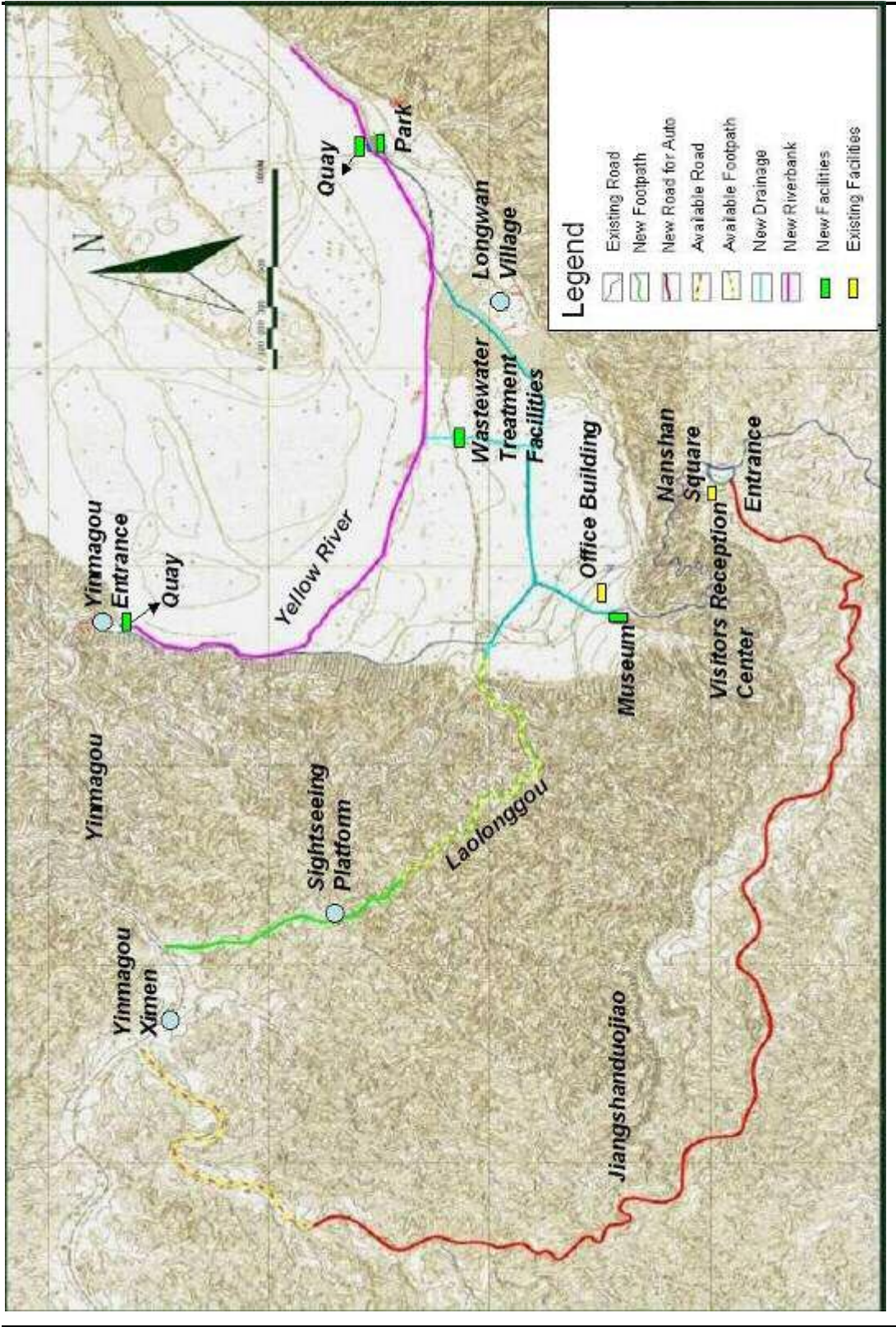
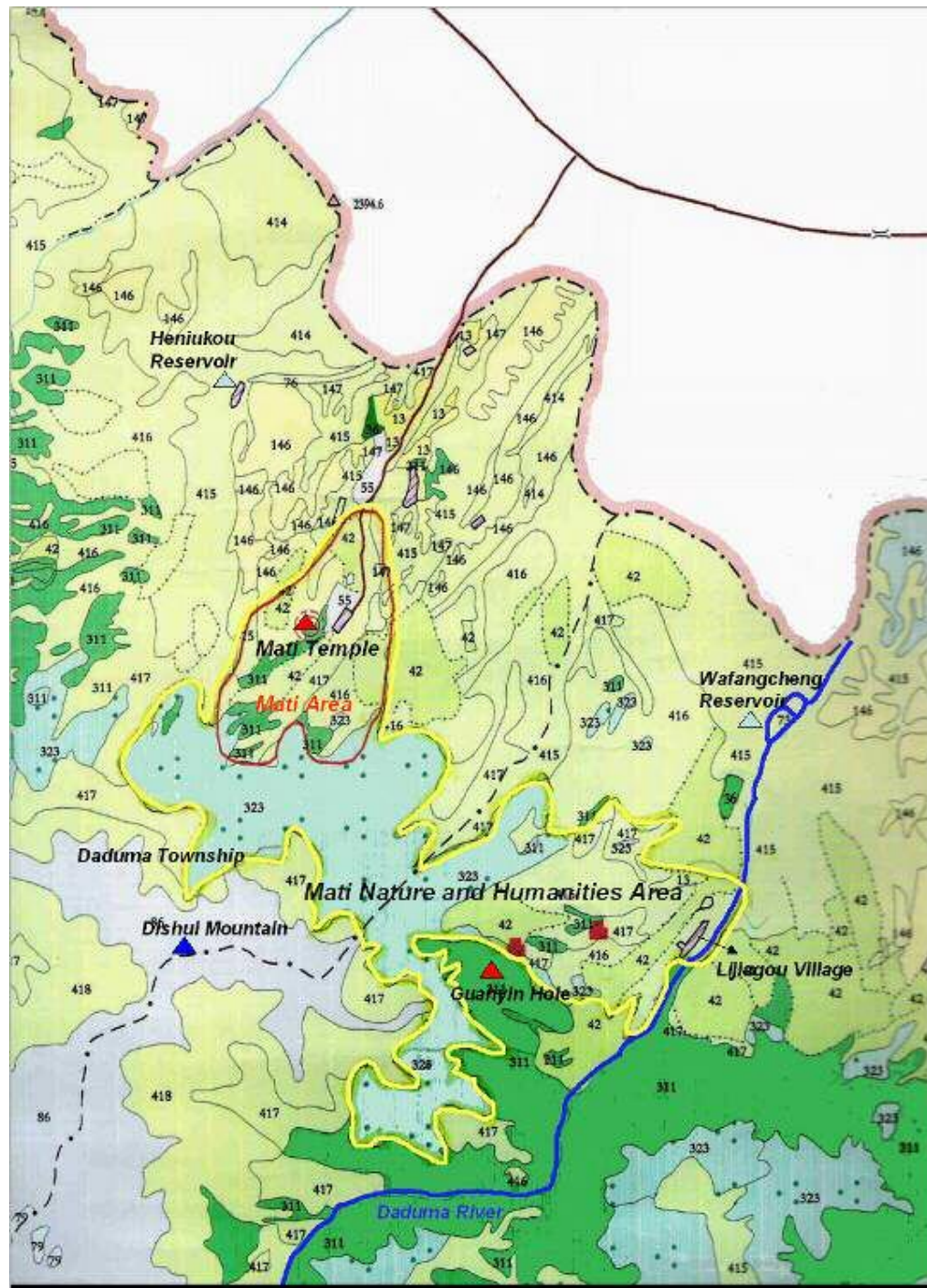




Figure.11 Map for Mati Temple Scenic Park





## 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:

- I. 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.
- II. 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 scholartrees, 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 14<sup>th</sup> 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




<b>Site Name:</b> Qingcheng Ancient Town	<b>Location:</b> Yuzhong County, Lanzhou City	<b>Coordinates:</b> N.36°32'95.38" E.104°19'02.60"	<b>Bank Screening Assessment</b> Rank= 5 <sup>th</sup>
<b>Description:</b> 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>	
<b>Existing condition, restoration and maintenance:</b> 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> 	
<b>Cultural or Natural Heritage Significance:</b> 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”.			
<b>Classification:</b> <ul style="list-style-type: none"><li>49 of the courtyard houses are under county level protection.</li><li>The Gao Ancestral temple is under Provincial level protection.</li></ul>		<b>Tourist Numbers:</b> In 2004, there were 22,000 visitors to Qingcheng, generating RMB 380,000 in tourism revenue.	
<b>Threats:</b> 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>	






<b>Site Name:</b> Yellow River Stone Forest Park	<b>Location:</b> Jintai county, Baiyin city	<b>Coordinates:</b> N.36°91'17.22" E.104°28'71.60"	<b>Bank Screening Assessment</b> Rank= 10 <sup>th</sup>
<b>Description:</b> 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)</i> <i>Part of gorge wall(right)</i>	
<b>Existing condition, restoration and maintenance:</b> 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)</i> <i>Inside the Museum (right)</i>	
<b>Cultural or Natural Heritage Significance:</b>  It is a singular combination of landscapes including the Yellow River, stone forest, dryland and riverine oasis.			
<b>Classification:</b> National Geological Park		<b>Tourist Numbers:</b> Site management reports that in 2004, there were 60,000 visitors to the site, generating RMB 600,000 in tourism revenue.	
<b>Threats:</b> 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</i> <i>Right: rubbish bins are integrated with the environment</i>	





<b>Site Name:</b> Lutusi Ancient Government Centre	<b>Location:</b> Yongden county, Lanzhou City	<b>Coordinates:</b> N 36°35'20.86" E 102°50'11.16"	<b>Bank Screening Assessment</b>
<b>Description:</b> Oldest, largest and most complete example of an administrative building complex used by local leaders under the Minority Rule System in late 14 <sup>th</sup> 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>	
<b>Existing condition, restoration and maintenance:</b> 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>	
<b>Cultural or Natural Heritage Significance:</b> 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.			
<b>Classification:</b> National Cultural Heritage Protection		<b>Tourist Numbers:</b> Not verified.	
<b>Threats:</b> 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: House 708 on the commercial street that will be maintained and restored</i>	




<b>Site Name:</b> Majijshan Scenic Area	<b>Location:</b> Tianshui city	<b>Coordinates:</b> N.34°28'25.02" E.106°04'88.33"	<b>Bank Screening Assessment</b> Rank= 2 <sup>nd</sup>
<b>Description:</b> Located in the southeast of Tianshui City, Majijshan (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 Majijshan Grottoes, the Xianren Cliff, the Stone Gate, Quxi Stream and Jieting hot spring		 <p><i>Views of Majijshan Grotto (left)</i>  <i>Inside the Grotto Cave (right)</i></p>	
<b>Existing condition, restoration and maintenance:</b> <p>The severe, extensive deterioration of the Majijshan 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</p> <p>The safety of visitors is an issue when it has been raining as the stairways are covered in smooth, slippery sheet rubber.</p> <p>Despite these consolidation works, paintwork, wood structures, and sculptures are in need of urgent restoration.</p> <p>It is also necessary to design carrying capacity and visitor flow controls for the site.</p>		 <p><i>Informative panel of localization of the grottoes (left)</i>  <i>Local vendors in the scenic area (right)</i></p>	
<b>Cultural or Natural Heritage Significance:</b> <p>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.</p> <p>There is an ongoing project to classify documents from the Majijshan Grottoes in Tianshui City. The documents cover a large range of topics, including Buddhism, Confucianism, Taoism, medicine, divination, music, education, art, history and philosophy.</p> <p>Natural landscape (mainly forest but also including a botanical garden) is also considered as a part of the scenic area.</p>			
<b>Classification:</b> Natural Cultural Heritage Protection (Grottoes) National Class AAAA Key Scenic Area		<b>Tourist Numbers:</b> In 2004, there were reportedly 310,000 visitors to the site, generating RMB 6,960,000 in tourism revenue.	
<b>Threats:</b> <p>The Majijshan documents are threatened by mold and rot caused by the moist climate and damage done by moths and mice.</p> <p>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.</p> <p>Further deterioration of valuable documentation may occur without urgent protective action.</p>		 <p><i>Restoration works (left)</i>  <i>Problems with the light wire conduction (right)</i></p>	




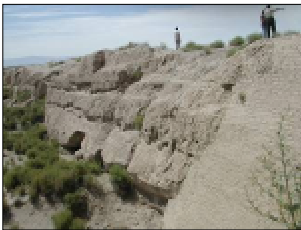
<b>Site Name:</b> Mati Temple Scenic Area	<b>Location:</b> Sunan County, Zhangye City	<b>Coordinates:</b> N.36°28'41.02" E.100°25'05.05"	<b>Bank Screening Assessment</b> rank=
<b>Description:</b> Buddhist cave complex located 65 km south of Zangye city in Sunnan Yugur-Tibetan Autonomous Prefecture. The 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>	
<b>Existing condition, restoration and maintenance:</b> 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>	
<b>Cultural or Natural Heritage Significance:</b> 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			
<b>Classification:</b> National Level Cultural Heritage Protection Qilinshan is a National level Nature Conservation Area		<b>Tourist Numbers:</b> 150,000 visitors during 2004; RMB15 entry fee and additional RMB9 for most of the sights within.	
<b>Threats:</b> 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>	

<b>Site Name:</b> Jiayuguan Great Wall	<b>Location:</b> Jiayuguan city	<b>Coordinates:</b> N.39°48'05.07" E.098°13'04.04"	<b>Bank Screening Assessment</b> Rank= 1 <sup>st</sup>
<b>Description:</b> 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>	
<b>Existing condition, restoration and maintenance:</b> <b>Jiayuguan Pass:</b> 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. <b>Overhanging Great Wall:</b> Entirely reconstructed on the original basements between 1985 and 1992. It is a re-invention emulating the Badaling Great Wall in Beijing. <b>The first signal tower:</b> 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>	
<b>Cultural or Natural Heritage Significance:</b> 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.			
<b>Classification:</b> UNESCO World Heritage site National Level Cultural Heritage		<b>Tourist Numbers:</b> <b>Jiayuguan Pass:</b> 350,000 visitors per year, entry fee 60 RMB/person <b>Overhanging Great Wall:</b> 150,000 visitors per year, entry fee 21 RMB/person <b>First Signal Tower:</b> entry fee 21RMB/person	
<b>Threats:</b> <b>Jiayuguan:</b> Construction of a car park, 2 km from the west gate threatens to intrude on the cultural landscape of the site. <b>Overhanging Great Wall:</b> Since the wall has been absolutely recreated and reconstructed, there is little threat to heritage significance at this site. <b>First Signal Tower:</b> 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>	





<b>Site Name:</b> Wei Jin folk Culture park	<b>Location:</b> Xincheng Town, Jiayuguan City	<b>Coordinates:</b> N.39°51'05.09" E.098°26'04.08"	<b>Bank Screening Assessment</b> Rank= 7 <sup>th</sup>
<b>Description:</b> <p>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 km<sup>2</sup> 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.</p>		 <p><i>Some details of paint decoration of the tombs</i></p>	
<b>Existing condition, restoration and maintenance:</b> <p>Of the 18 studied tombs, only two of them are opened to the public. The conservation state is excellent.</p> <p>The management of the tombs includes measures such as visitor flow controls and climate control devices.</p> <p>An exhibition hall has been established near the main gate of the site and is implementing good educational function.</p>		 <p><i>Left: Brick construction inside the tomb</i> <i>Right: Scale model of a tomb located in the museum</i></p>	
<b>Cultural or Natural Heritage Significance:</b> <p>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.</p>			
<b>Classification:</b> <p>National Level Cultural Heritage Together with tombs located in Jiuquan City, the official name of the site is Guoyuan-Xincheng Tombs Complex.</p>		<b>Tourist Numbers:</b> <p>14,000 visitors in 2004, entry fee 35 RMB/person generating RMB 406,300 in tourism revenue.</p> <p><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)</p>	
<b>Threats:</b> <p>None detected. The research programme for the site could be strengthened.</p>			

<b>Site Name:</b> Yardang National Geological Park	<b>Location:</b> Dunhuang, Jiuquan City	<b>Coordinates:</b> N.40°25'00" E.092°59'30"	<b>Bank Screening Assessment</b> Rank= 8 <sup>th</sup>
<b>Description:</b>  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.		 <i>The Museum (Left)</i>   Yardang landscape (right and below)	
<b>Existing condition, restoration and maintenance:</b>  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.			
<b>Cultural or Natural Heritage Significance:</b> It is the world largest known “yardang” landscape.			
<b>Classification:</b> National Geological Park		<b>Tourist Numbers:</b> 136,000 tourists in 2004; entry fee 60RMB/person, generating RMB 8,320,000 in tourism revenue.	
<b>Threats:</b>  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.			

<b>Site Name:</b> Souyang Town	<b>Location:</b> Anxi County, Jiuquan	<b>Coordinates:</b> N.40°15'10.08" E.096°11'57.07"	<b>Bank Screening Assessment</b> Rank= 13 <sup>th</sup>
<b>Description:</b> 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.		<div><div>Watch tower relic (left)</div></div> <div><div>View of the Ancient City Wall Relics (right)</div></div>	
<b>Existing condition, restoration and maintenance:</b>  The ancient city of Suoyang is now regarded as one of China’s best preserved Han Dynasty relics. Ruins of castles and cannons can still be seen there. However, all houses and temples were almost totally destroyed.		<div><div>View of Qilianshan from Souyang</div></div>	
<b>Cultural or Natural Heritage Significance:</b>  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.  The site is linked to the history of the Silk Road.			
<b>Classification:</b> National Level Cultural Heritage Protection		<b>Tourist Numbers:</b> In combination with the nearby Qiaowan site, Suoyang City received 17,700 tourists in 2004, generating RMB 540,500 in tourism revenue.	
<b>Threats:</b> Wind erosion.  Unrestricted visitor access.  Need for archaeological investigation.		<div><div>Remains of the Suoyang City Wall</div></div>	

<b>Site Name:</b> Xiliang King City Scenic Area	<b>Location:</b> Suzhou District, Jiuquan	<b>Coordinates:</b> N.39°46'11.8" E.098°25'58.3"	<b>Bank Screening Assessment</b> Rank= 11 <sup>th</sup>
<b>Description:</b>  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.			
<b>Existing condition, restoration and maintenance:</b>  Jiuquan Museum is new and remains empty.			
<b>Cultural or Natural Heritage Significance:</b> The Wei-Jin tombs are under national level cultural heritage protection.  The Dingjiazha Tomb is famous for its wall paintings.			
<b>Classification:</b> The Wei-Jin tombs are under national level cultural heritage protection.		<b>Tourist Numbers:</b> Undeveloped site	
<b>Threats:</b> In need of academic research.			



<b>Site Name:</b> Shi Chuan Ancient Pear Orchard	<b>Location:</b> Gaolan County, Lanzhou City	<b>Coordinates:</b> N.36°15'21.70" E.104°00'46.23"	<b>Bank Screening Assessment</b> Rank= 4 <sup>th</sup>
<b>Description:</b>  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.			
<b>Existing condition, restoration and maintenance:</b>  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.			
<b>Cultural or Natural Heritage Significance:</b>  It is thought to be amongst the first Chinese pear orchards. A "Pear Flower" Festival is celebrated in Shi Chuan during the Spring.			
<b>Classification:</b>  Ancient trees over 300 years old are city level protected historic relics		<b>Tourist Numbers:</b>  Site management reports 200,000 visitors per year. Master Plan reports 62,000 visitors in 2004	
<b>Threats:</b>  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
<b>Management Structures</b>		
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 &amp; 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&amp;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>
<b>Tourism Marketing and Promotion</b>		
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.
<b>Cultural Heritage Protection</b>		
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.
	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]	Evidence from early 20 <sup>th</sup> Century photographs suggests that the forces of natural erosion may be overstated, especially in the short-term.  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.
<b>Cultural Heritage Interpretation</b>		
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"
<b>Tourism Infrastructure</b>		
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.
<b>Site Operations and Management</b>		
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.
<b>Economic Development and Commercial Issues</b>		
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.
<b>Community Consultation and Participation</b>		
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><b>Establish an independent single unitary management organisation:</b> 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 <b>independent panel of external advisors</b> (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 <b>Profit &amp; Loss system</b> 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&amp;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.	<b>Create a management library</b> 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 <b>study tour</b> 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>
<b>Tourism Marketing and Promotion</b>		
Marketing capacity	Marketing and promotion is seen as a 'special activity' rather than a basic budgeted cost.	Ensure that future <b>budgets</b> 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 <b>specific training</b> 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 <b>conduct a statistically significant, stratified survey of tourism</b> in the city and at Maijishan to get an accurate understanding of the market and tourism drivers.</p> <p>Develop methodology for expanding current <b>visitor surveys</b>, 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 <b>develop a strategy to implement integrated ticketing system</b> 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 <b>strengthening these market sectors</b> . 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 <b>consider combining forces with Dingxi and possibly Baoji in Shaanxi Province to develop an “Upper Wei River”</b> 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.
<b>Heritage Protection</b>		
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 <b>protection and management plan</b> 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 <b>to expand the product offering</b> . 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 <b>ensure compatibility of the proposed development at Quxi with the objectives and requirements of new Scenic Area Master Plan</b> 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.)
<b>Tourism Infrastructure</b>		
Market Segments	<p>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.</p> <p>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</p>	<p>Tianshui Municipality should, with the Provincial and Municipal Cultural Heritage and Forestry Bureau, consider, as a realistic alternative, the <b>use of different zones within the Scenic Area for different purposes and sectors.</b></p> <ul style="list-style-type: none"> <li>㉓ Religious Cultural Heritage (The Grottos, The Immortals’ Cliff and Temples),</li> <li>㉔ Leisure and Entertainment (The Hot Springs Area),</li> <li>㉕ Environmental Education (The Botanical Gardens/ Arboretum)</li> <li>㉖ Wilderness and Adventure (Quxi).</li> </ul> <p>‘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.</p> <p>Planning objectives and goals should be provided and linked to the justification of tourism facilities, activities and infrastructure (existing and proposed) that</p>

	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.	<b>Introduce a variety of international practices to determine the true net value of existing and new tourism assets</b> 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.	<b>Develop plans to reuse buildings</b> 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.	<b>Develop formal regulations for design and construction standards in Core and Buffer Zone.</b>
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, <b>detailed plan</b> including objectives, strategies, fixed investments and costs of establishing an <b>intra-park transportation system</b> to establish viability and avoid reducing the attractiveness of Maijishan for certain market segments.  MAASB and the XFB are asked to consider <b>dropping the concept of a circular route</b> 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
<b>Site Operations and Management</b>		
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.
<b>Local Economic Development Public/Private Tourism Initiatives</b>		
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.
<b>Community Consultation and Development</b>		

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.

	It is more common practice now, around the world, for options to be developed which can then be discussed and assessed by different stakeholders.	
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.
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>	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.
Resettlement	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.	MSAAB and the PMO should confirm issues surrounding the resettlement of people for the UNESCO World Heritage Listing.
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.



Annex E

## Yinyue Lake Dam Safety Review Report

**The World Bank**

**Yinyue Lake  
Dam Safety Review Report**

**May 11, 2007**

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## *Dam Safety Review Report for Yinyue Lake*

### **1. 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.

### **2. 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  $5.75\text{km}^2$  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.

### **3. 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.

- (1) 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.

- (2) Both the left and the right abutment are founded on bare rock, which composed of fresh coarse marble, appears favourable geology condition.
- (3) 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.
- (4) There exists reservoir sediment deposition, which was mainly caused by large flood happened in July of 2005.
- (5) 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.
- (6) 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.
- (7) No EPP document has been prepared as nobody manages the dam.

#### **4. Dam Safety Assessment**

- (1) 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.
- (2) 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.
- (3) 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.

#### **5. Conclusions and Recommendations**

- (1) Carry out necessary boring test and survey to get the following information:
  - ④ Dam site geology information.
  - ④ Foundation treatment and dam construction quality.
  - ④ Dam section profile.
  - ④ Location of discharge tunnel, size and elevation of approach channel, tunnel, and outlet channel.
  - ④ 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

- ④ maintenance policies, procedure, records and responsibilities
- ④ equipment inspection and tests

Surveillance – regular inspection

- ④ regular inspection
- ④ special inspection and increased levels of surveillance
- ④ instrumentation monitoring, maintenance and testing

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

- ④ instrumentation data evaluated and assessed promptly and stored permanently
- ④ 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



## Appendix E

### **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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- B *References*
- C *List of Local Participants*
- D *Sample of OMS Manuals contents*
- E *Sample of EPP Contents*
- F *Site Photos*

## *Site Visit Report for Xianren Lake*

### **6. 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.

### **7. 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  $2.38\text{km}^2$  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:

- ④ Type of dam: stone masonry dam with reinforced concrete facing
- ④ Crest elevation of dam: 1404.90m
- ④ Crest length of dam: 88.0m
- ④ Crest width of dam: 3.0m
- ④ Maximum hight of dam:20.0m
- ④ Spillway: overflow open weir on dam, ski-jump energy dissipator
- ④ Length of weir: 10.0m
- ④ Crest elevation of weir: 1401.80m
- ④ Longitudinal drainage gallery:  $1.20\text{m} \times 1.80\text{m}$ , bottom elevation 1388.60m
- ④ Water release conduit for waterfalls at right horizontal gallery  $\phi 40\text{cm}$
- ④ Water release conduit at right abutment slope  $\phi 20\text{cm}$ , entrance elevation 1398.80m
- ④ Year of design: 1986
- ④ Year of construction: 1987
- ④ Year of storage start: 1988
- ④ Year of completion: 1989
- ④ Primary function: tourism
- ④ Secondary function: aquiculture, irrigation for farmland 800mu
- ④ 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.

## **8. 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.

- (8) Many cracks were observed on reinforced concrete facing of the overflow weir.
- (9) Freezing damage was observed on variable water level region of upstream reinforced facing.
- (10) 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.
- (11) 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.
- (12) 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.
- (13) Neither safety monitoring instrument, nor reservoir level gauge has been installed in dam and reservoir area.
- (14) Neither dam management agency nor personnel at dam site responsible for operation, maintenance and surveillance. Neither OMS manual nor dam maintenance record is available.
- (15) It is said the Maijishan Water Resources Bureau carried out inspection before every flood season, but no inspection record is available.
- (16) 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.

## **9. Conclusions and Recommendations**

- (1) 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.
- (2) Repair the cracks on overflow weir facing and freezing damage area of the upstream reinforced concrete facing.
- (3) 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.
- (4) 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.
- (5) Replace the wire cable of the conduit gate to ensure gate operation safety.
- (6) Remove tree, brush and soil on downstream facing.
- (7) Install reservoir level gauge, additional rain gauge station upstream the dam, and necessary dam safety monitoring instrument.
- (8) Assign dam operation and management personnel and prepare OMS manuals. A proposed content of OMS Manual is included in Appendix D.
- (9) 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
April 25	10:30~12:00	Filed Visit to Xianren 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 inspection report
	12:00~13:00	Exchange opinions with Maijishan Scenic Area Administration Bureau
April 27	9:00~10:00	Report draft inspection 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 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

### **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

- ④ maintenance policies, procedure, records and responsibilities
- ④ equipment inspection and tests

Surveillance – regular inspection

- ④ regular inspection
- ④ special inspection and increased levels of surveillance
- ④ instrumentation monitoring, maintenance and testing

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

- ④ instrumentation data evaluated and assessed promptly and stored permanently
- ④ 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

## Appendix E

### **Proposed EPP Contents**

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- ⌘ 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

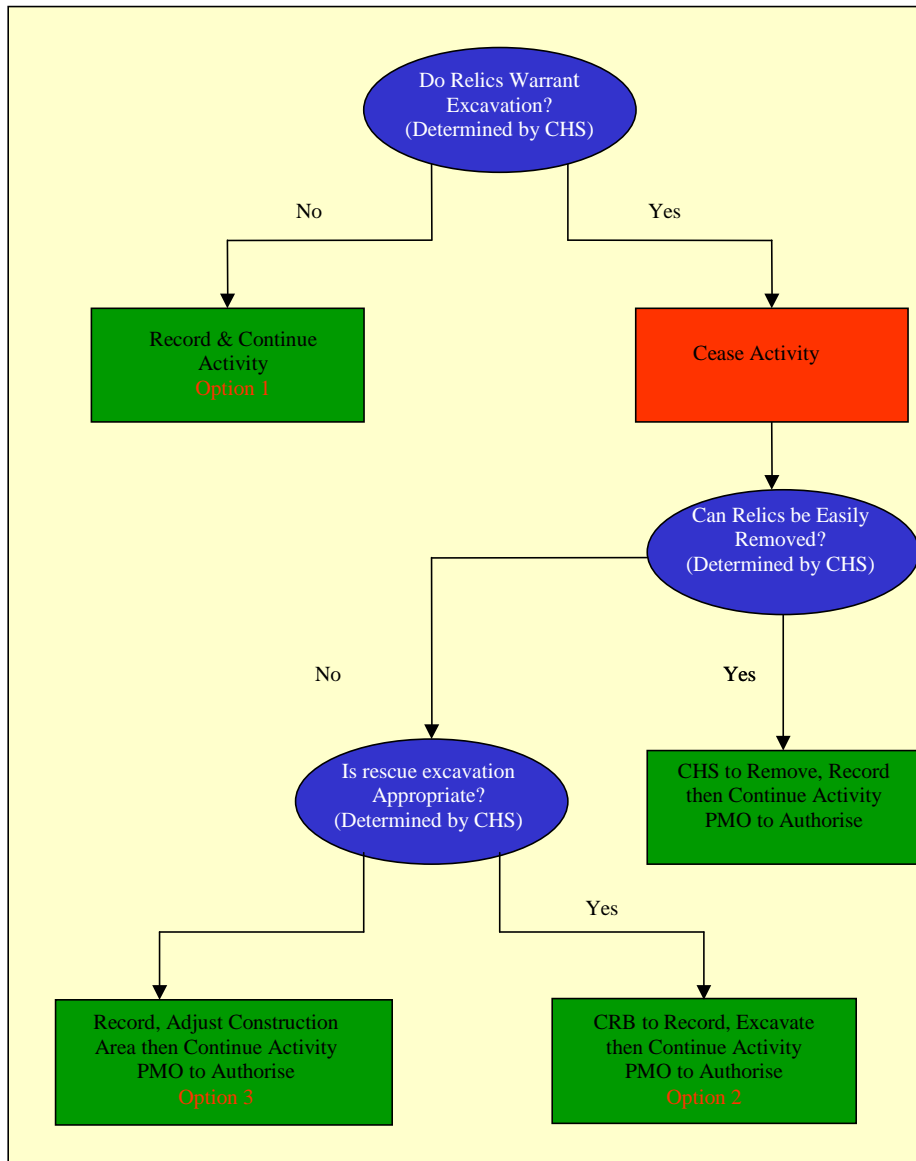
Where rescue excavation is deemed necessary, the following shall occur:

- 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(1). 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.

---

(1) 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:

1. As advance warning of the approach.
2. "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 bunded 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:

1. Reduce the soil excavation surface as small as possible, and avoid soil excavation on windy days.
2. The soil excavation should avoid to be conducted at during blustery days and rainstorm days.
3. 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:

1. 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.
2. 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.

3. Use soft noise absorption screen instead of nylon side curtains at construction field.
4. 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:

1. 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.
2. 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.
3. Reduction of the area of excavation land and the excavation in disorder should be prohibited.
4. The excavated ground should be filled in and levelled or tamped ASAP.
5. The construction materials transporting vehicles should be drive slow and the construction materials should be covered or sealed.
6. 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:



1. Reuse the construction waste and soil as much as possible, for example, using some of them as the base material of roads.
2. The excavated soil should be reused to fill as much as possible in priority. The residual should be disposed with construction waste.
3. 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.
4. The construction waste and domestic garbage should be collected separately.
5. 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:

- ⌘ develop transportation and other management procedures to be followed;
- ⌘ 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:

- ⌘ Open fires will be prohibited at all times;
- ⌘ Rubbish will be removed at frequent intervals and the site kept clean and tidy;
- ⌘ Hoardings shall be frequently inspected, repaired and re-painted as necessary;
- ⌘ Adequate toilet facilities shall be provided for all site staff. Toilets shall be kept clean;
- ⌘ Food waste shall be removed frequently;
- ⌘ The wheel washing facilities area shall be brushed clean frequently.
- ⌘ Lorries shall enter and exit the Site in a forward direction.
- ⌘ 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.

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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

## Work Team of the Report



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