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Gansu Cultural and Natural Heritage Protection and Development Project

Consolidated

Environmental Assessment & Environmental Management Plan

Volume II

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

Jiayuguan Great Wall

Location: In Yuquan County, 5 km from Jiayuguan city, N.39▫48′05.07″, E.098▫13′04.04″

Area: 15 km^2

Natural or Cultural Heritage Value

Constructed under the Han Dynasty, dating from about 600 years ago. Jiayuguan Pass is the most intact ancient military building of all the passes on the Great Wall and therefore of immense heritage conservation significance.

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

Activities to be Completed

Archaeological excavation, heritage inventory and preservation	Exhibition display in underground centre, storage facility for Museum,	**Dams and embankments**	195m river embankment
Roads and bridges	Footpaths along North bank	**Water supply and drainage**	Moat renovation, storm drainage upgrading, internal Fortress stormwater management, well, fire booster pump, tank
Vehicle parking lots	2000 m2 expansion of existing car parking	**Sanitation facilities, toilets and wastewater treatment**	Drainage network and wastewater treatment
Building Construction	2050m2 multi-function training center	**Solid waste collection and disposal**	-
Rehabilitation	Heritage buildings and relics rehabilitation, restoration and structural enhancement of First Signal Tower and Ruoyuan Tower	**Power and heating**	Heating system and boiler
Walkways, lookouts, signage and electric vehicles	-	**Safety and security systems**	Heritage security system and fire protection system
Landscaping and fencing	Expansion of underground center for exhibition, environmental rehabilitation in core protection area, boundary markers for Great Wall	**Other**	-

Budget: 29,657,400 Yuan (3,851,610 USD)

Applicable Chinese Environmental Quality Requirements

Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)
II	III	III	1

Applicable World Bank Safeguards

Activities at this site address the restoration of both the Jiayuguan Great Wall Fortress and the First Signal Tower. At the Fortress, activities include the rehabilitation of foundations, construction of a training centre and a storage facility, and a 2000 m3 car park, rehabilitation of existing woodframed buildings, security measures and heritage restoration measures (painting). At the First Signal Tower, activities include the strengthening of the cliffface foundation of the tower, rehabilitation of the dyke adjacent to the river, extension of the underground exhibition hall, and relocation of the rope bridge. Each of these carry some environmental risk, particularly associated with visual impact, erosion, sourcing of construction materials and disposal of construction waste. In particular, activities to strengthen the foundation of the First Tower carries great risks to tower itself, and to the safety of labourers during construction, owing to the precariousness of the operation. The associated riverbank protection may affect the dynamics of river erosion and deposition downstream.	OP 4.01 Environmental Assessment OP 4.04 Natural Habitats OP 4.09 Pest Management OP 4.36 Forestry OP 4.11 Physical Cultural Resources OP 4.10 Indigenous Peoples OP 4.12 Involuntary Resettlement OP 4.37 Safety of Dams OP 7.50 International Waterways OP 7.60 Disputed Areas

Baseline

Population	Nil	**Surface water**	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.
Relief	Gently undulating, between 1400 and 2200 m ASL.	**Groundwater**	n/a
Relevant climatic features	Average annual temperature between 6.7℃ and 7.7℃, maximum 39℃, minimum -32℃. Annual precipitation c. 82 mm.	**Air quality**	n/a
Geology and soils	Gobi desert. Gravels to a depth of 300m.	**Natural habitats and Flora and Fauna**	Desert vegetation, and woodlots.

Planning

Tourism Development Plan	**Heritage Conservation Plan**		**Feasibility Study Report**	
	Completion	**Prepared by**	**Completion**	**Prepared by**
completed thoroughly	The Second draft completed	China Academy of Urban Planning and Design	Completed and waiting for approval	College of Tourism, Northwest Norma University

Consultation and Disclosure

Consultation activities:	Questionnaire survey	Expert consultation	Workshop	Public hearing
	X	X	X	X

Questionnaire Date	Number of questionnaires	Proportion of responses	Respondents	Proportion of respondents satisfied with environmental quality	Proportion of people in agreement with the proposed project
10 April, 2006	97	100%	Residents, tourists and Scenic area managers	95%	80%

Workshop Date	Topics	Participants	Responses
20 May, 2006	Declare the project progress, discuss the environmental impacts and consult the public opinion and suggestions.	• EIA institution staffs; • Site management staffs; • Officers from Jiayuguan city EPB; • Local residents.	It was suggested that promote the management level of this site, enlarge the landscaping, establis the environmental facilities and the garbage shou be disposed centralized.

Information disclosed	Disclosure date	Disclosure ways
Briefings of the project and summery of EIA report and the method to reach EIA report.	20 April, 2007	Through bulletin at the site, presswork distributing, website (www.ngocn.org), and newspaper (Democratic Consultation Newspaper)

Impacts and Mitigation Measures: Prior to Construction

[Measures specific to this site in bold]

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Visual impact of new facilities, if not located, designed or constructed in sympathy with the local heritage and surroundings	Construction of all facilities according to minimum standards of design, and in keeping with a site design that enhances its visual and landscape value	Procurement of design consultant to provide consistent design of facilities across all sites	PPMO	YR1
		Planning of the required design for all sites, in coordination with the development of a Gansu tourism 'brand'	Design consultant	YR1
		Design consultant to incorporate	Design consultant	YR1

		building and road design standards into the designs (eg to prevent soil erosion alongside roads), and landscaping including ecological restoration if necessary Include appropriate environmental technologies as part of design process.	Design consultant	YR1
Disturbance of river sedimentation processes by the First Signal Tower river embankment, leading to erosion downstream, or erosion of new river embankment	**Design of river embankment according to engineering design that takes full account of river sedimentation and erosion**	**Gansu Water Resources and Hydropower Design Institute has been appointed to provide designs**	**Municipal PMO**	**YR 0**
Risk of damage to the First Signal Tower during strengthening of the cliff, owing to its precarious position on the cliff top.	**Design of works and to avoid risk to First Signal Tower**	**Ministry of Railways has been appointed to design cliff strengthening work**	**Municipal PMO**	**YR 0**

Impacts and Mitigation Measures: During Construction

Impact	**Mitigation Measures (Site Level only)**	**Further details**	**Responsibility**	**Timing**
Adverse impacts of construction activities including fugitive dust and noise, soil erosion	Construction Management Plan	Provision of guidance on the measures required of the contractor as part of a construction management plan. Preparation of written construction management plan, submitted to EPB Construction Department and PPMO. Municipal PMO to include assessment of construction management approach in contractor's bidding documents Adherence to construction management plan during implementation: construction area to be arranged to avoid fugitive dust	EPB Site Managers Muncipal PMO Contractors, monitored by Supervision Management Engineer and EPB	Prior to commencement of construction at any site Prior to commencement of construction at any site. During Evaluation of Bids During Construction

		(by covering stacks of cement/gravel materials etc, sprinkling periodically during windy days, constructing enclosing barrier), and use of noisy machines far from residents and other noise sensitive receptors, etc. Note: Annex H sets out an initial template of construction management guidelines, to be tailored by each site.		
Disturbance of river sedimentation processes, leading to erosion downstream, or erosion of new river embankment	**Construction of river embankment according to engineering design that takes full account of river sedimentation and erosion**	**Appointment and monitoring of contractor with full understanding of Gansu Water Resources and Hydropower Design Institute's designs**	**Municipal PMO, Supervision Management Engineer**	**During construction**
Risk of damage to the First Signal Tower during construction owing to its precarious position on the cliff top.	**Implementation of strengthening works that take account of the fragile nature of the First Signal Tower**	**Appointment and monitoring of contractor with full understanding of the Ministry of Railways' designs**	**Municipal PMO, Supervision Management Engineer**	**During construction**
Risk of injury of labourers and the public during construction and rehabilitation activities	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, and prevention of public access.	Provision of guidance on the measures required of the contractor as part of a health and safety plan Request to potential contractors to supply health and safety details with tenders. Plans to be submitted to EPB construction department. Adherence to health and safety plan during implementation	PPMO, through Safe Manufacture Supervision Bureau Municipal PMOs Contractors, monitored by Supervision Management Engineer and EPB	Prior to commencement of construction Prior to commencement of construction Following award of contract, prior to commencement of work
Casual disposal of solid waste and construction waste materials in the local environment	Implementation of Site Waste Management Plans	Appointment of contractor with track record of responsible disposal of construction waste (Grade A or B contractors) Monitoring of disposal of construction waste	Muncipal PMO Site management and Supervision Management Engineer	During Bidding During construction
Reduced local availability of groundwater or surface water	Identify permitted level of water extraction, and limit extraction within this level, taking steps to	Apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required	Municipal PMO	Before any water abstraction

	reduce water consumption through water reuse, and capture of rainwater, where necessary			
Disposal of wastewater into surface water courses	Prevent disposal of wastewater that exceeds environmental quality standards to local water courses	Dispose of water responsibly into wastewater treatment areas	Contractor, monitored by Supervision Management Engineer	During construction
Loss of 'chance finds' of archaeological artefacts during rehabilitation or construction	Education of labourers in the recognition of potential artefacts, and use of a protocol for steps to take in the event of chance finds.	Provision of basic guidance on the content of a chance finds policy Design of a chance finds protocol Education of contractors and employees in the steps to take in the event of chance finds.	Cultural Relics Bureau Site management Site management	Prior to construction Prior to construction During construction
Risk of damage to cultural heritage through vibrations created during construction	Use of professional contractors with experience of working in areas where fragile cultural relics are present. Temporary removal of cultural relics if feasible.	Evaluation of contractors' experience in carrying out construction works in areas with sensitive cultural heritage during bidding process; appointment of suitable contractors	Municipal PMOs	During bidding process
Impacts associated with use of materials (water, timber, cement etc) from unsustainable sources	Use only materials from sources approved as sustainable	Site management to arrange for sourcing of materials from sustainable sources only. Record numbers of instances of use of materials from unsustainable sources.	Supervision Management Engineer Supervision Management Engineer	Throughout construction Throughout construction

Impacts and Mitigation Measures: During Operation

Impact	**Mitigation Measures (Site Level only)**	**Further details**	**Responsibility**	**Timing**
Reduced local availability of groundwater or surface water, disposal of wastewater into surface water courses, unmanaged disposal of solid waste.	Adoption and implementation of an environmental policy by the site	Identify permitted level of water extraction for the site, and apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required. Maintenance of wastewater treatment facilities to avoid unplanned wastewater disposal. Management of vehicles eg use of vehicles on site that use clean power	Site management	During Operation

		such as electric power or gas or solar power. Manage solid waste on basis of predictions of the level and composition of waste to be expected, and carry out waste minimisation, recycling and re-use Monitoring of environmental management on the site by EPB	EPB	
Risk of injury of public and staff	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, prevention of public access, and planning for emergencies.	Site management to submit Health and Safety plans to EPB, in compliance with Scenic Area management guidelines of the state administration	Site management	During operation
Induced environmental impacts of traders and public gathering around the site, adverse social impacts associated with increased tourism to the area		Community engagement to maximise benefits from tourism for local communities, and prevent unplanned gathering of vendors and beggars.	Discussions with local communities on concerns Identification of measures to maintain good relations with communities, and gain their assistance in preventing unwanted vendors, including special provision for the poorest	Site management Municipal PMO

Monitoring Requirements: During Construction

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Ambient Air	TSP	Three locations (2 at Fortress, one at FST)	Twice monthly
Noise	Leq(A)	Four monitoring points in sensitive project areas	Once per week, at least 10 minutes per time
Water quality	pH, COD, BOD, Suspended Solids	Two sites: Jiu Yan Quan Lake at Fortress, Taolai River	Once monthly
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At Fortress Site and FST	Continuous

Monitoring Requirements: During Operation

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Ambient air	TSP	Sensitive areas including roadsides and car park surrounding areas	Twice monthly
Noise	Leq(A)	Sensitive areas including roadsides and car park surrounding areas (3-4 points)	Twice monthly
Water quality	pH, COD, BOD	Taolai River	Three times per year
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At Fortress Site and FST	Continuous

Costs

Description	Rate	Unit	Number	Expenditure Classification	Base Cost (1 USD = 7.7 RMB)		% by year						Notes
					Yuan	USD	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Jiayuguan Great Wall													
Third Party supervision of construction works	2000	Days	120	Services	240,000	31,169	25%	25%	25%	25%			5 days per month Apr-Sept, for four years
Monitoring During Construction													
Ambient Air	172	Yuan	144	Services	24,768	3,217	25%	25%	25%	25%			All monitoring during Apr-Sept
Noise	300	Yuan	416	Services	124,800	16,208	25%	25%	25%	25%			
Water quality	366	Yuan	48	Services	17,568	2,282	25%	25%	25%	25%			
Monitoring During Operation					0	0							
Ambient air	172	Yuan	144		24,768	3,217					50%	50%	
Noise	300	Yuan	192		57,600	7,481					50%	50%	
Water quality	366	Yuan	6		2,196	285					50%	50%	
TOTAL					**491,700**	**63,857**							

Lutusi Ancient Government Centre

Location: In Liancheng Town, Yongdeng County, Gansu Province, N 36°35'20.86",E 102°50'11.16"

Area: -

Natural or Cultural Heritage Value

The most complete local ancient palace complex that has survived through Chinese history. Used by local leaders under the Minority Rule System in the 14th Century, the site is symbolic of 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.

Legal Status: A National level cultural relic.

Activities to be Completed

Archaeological excavation, heritage inventory and preservation	Survey, inventory, collection, and research of relics; Rebuilding walls and streets	**Dams and embankments**	-
Roads and bridges	Linkage road from Xianjiao Temple to the new parking lot, road length of 600m, and 3-4m wide.	**Water supply and drainage**	600 m water pipes, 1,500 m drainage pipes in core zone
Vehicle parking lots	2,000m2	**Sanitation facilities, toilets and wastewater treatment**	4 water-flush toilets, total 240m2, compact treatment facility
Building Construction	Garage for solid waste truck, 60 m2 building for parking lot	**Solid waste collection and disposal**	30 dustbins in the scenic area, 5 transfer stations, 1 truck
Rehabilitation	400m2 building, rebuilding temple gate	**Power and heating**	550 m underground cable, 15 street lights
Walkways, lookouts, signage and electric vehicles	-	**Safety and security systems**	Security monitoring facilities for temples, fire protection facilities
Landscaping and fencing	(i) 2000 m2 including parking lot, (ii) 11,000 m2	**Other**	-

Budget: 5,535,800Yuan

Applicable Chinese Environmental Quality Requirements

Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)
I	III	-	1 or 4 depending on location

Applicable World Bank Safeguards

Activities will include the rehabilitation, rebuilding or construction of four small buildings, two parking lots (2000 m2 and 3000 m 2), upgrading / widening of small-scale roads and pathways, construction of a 1240 m wall, water supply, drainage and toilets, solid waste management, electric cables and lights, and security and fire prevention systems. Each of these activities carried limited environmental risks associated with visual impact, sound design, waste disposal, and sourcing of materials. There may be risks to the cultural heritage during construction activities. Forty-eight households will be physically resettled for the parking lot and the rehabilitation of a pedestrian street, triggering OP 4.12.	☑	OP 4.01 Environmental Assessment
	☐	OP 4.04 Natural Habitats
	☐	OP 4.09 Pest Management
	☐	OP 4.36 Forestry
	☐	OP 4.11 Physical Cultural Resources
	☐	OP 4.10 Indigenous Peoples
	☑	OP 4.12 Involuntary Resettlement
	☐	OP 4.37 Safety of Dams
	☐	OP 7.50 International Waterways
	☐	OP 7.60 Disputed Areas

Baseline

Population	The population of the whole Liancheng village is 5336. The population within the Ancient Government Centre zone is 786.	Surface water	Datong River, second level branch of Yellow River and the biggest branch of Huangshui River, is the main surface water in this region. Annual average flux volume of 150 cubic metres per second.
Relief	The town occupies the basin and gorge formed by the Datong River.	Groundwater	Groundwater is available from aquifers in (i) the gravel and pebble layers under the Datong watershed, and (ii) fissure water in base rock. Both sources provide potable drinking water.
Relevant climatic features	Semi-arid, with an annual average temperature of 7.4℃,maximum 33℃, minimum -20.5℃, and annual average precipitation of 419 mm, with rainstorms in summer-autumn.	Air quality	Meet the requirements of Class □of Ambient Air Quality Standard (GB3095-1996)
Geology and soils	Geology of this area belongs to the third level terrace of Upper Pleistocene, Quaternary, and the second level terrace of Holocene. Alluvial grits and pebbles stratum. The alluvial soil layer is 6-15 m in thickness in the upper part of the area.	Natural habitats and Flora and Fauna	Natural habitats in the area of Liancheng Town include forests (5.52 km2), and grasslands (3 km2), There is a virgin forest 3 kilometres away from Liancheng Township, where 1614 plant species are found, and ten species of rare animals, (*Capreolus capreolus*, blue sheep and lynxes)..

Planning

Tourism Development Plan	**Heritage Conservation Plan**	**Feasibility Study Report**

	Completion	Prepared by	Completion	Prepared by
completed thoroughly	Completed and waiting approval	China National Institute of Cultural Property	Completed and waiting for approval	Forestry Investigation and Planning Institute of Gansu Province; School of Management of Lanzhou University

Consultation and Disclosure

Consultation activities:	Questionnaire survey	Expert consultation	Workshop	Public hearing
	X		X	

Questionnaire Date	Number of questionnaires	Proportion of responses	Respondents	Proportion of respondents satisfied with environmental quality	Proportion of people in agreement with the proposed project
13 Feb, 2006	100	82%	Residents around Liancheng Town government, Liancheng villiage committee, archaizing street, Lutusi Yamun, entrance square and parking lot, including 28 individual who will be resettled	80%	91.50%

Workshop Date	Topics	Participants	Responses
2 March, 2006	Declare the project progress, discuss the environmental impacts and consult the public opinion and suggestions.	• Officer from Liancheng village committee and villager representatives; • Representatives who are influence by removal; • Management staffs from Lutusi ancient government centre; • Villager representatives from the potential construction fields.	All the questioned public agree with the construction of the project, and it will promote th living conditions of local residents without negative impacts. It was also suggested that strengthen the protection to cultural heritage and pay more attention to the garbage disposal.

Information disclosed	Disclosure date	Disclosure ways
Briefings of the project , EIA report and EMP	22 August, 2006	Through website (www.ztxbkxyjy.com), newspaper (western commercial newspaper) , and bulletin at local area.

Impacts and Mitigation Measures: Prior to Construction

[Measures specific to this site in bold]

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Visual impact of new facilities, if not located, designed or constructed in sympathy with the local heritage and surroundings	Construction of all facilities according to minimum standards of design, and in keeping with a site design that enhances its visual and landscape value (Currently 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 ancillary 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; there is a risk of unsympathetic or overenthusiastic restoration, and there is already some evidence of inappropriate material use.)	Procurement of design consultant to provide consistent design of facilities across all sites Planning of the required design for all sites, in coordination with the development of a Gansu tourism 'brand' Design consultant to incorporate building and road design standards into the designs (eg to prevent soil erosion alongside roads), and landscaping including ecological restoration if necessary Include appropriate environmental technologies as part of design process.	PPMO Design consultant Design consultant Design consultant	YR1 YR1 YR1 YR1

Impacts and Mitigation Measures: During Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Adverse impacts of construction activities including fugitive dust and noise, soil erosion, domestic sewage generated from workers, noise generated from transportation vehicles.	Construction Management Plan, including: The domestic sewage generated during construction stage will be collected and discharged into Heqiao irrigation channel; agree transportation routes through Liancheng Town with Transport Bureau before construction works; restrict speeds shall to 30 km/h and prohibit the use of horns.	Provision of guidance on the measures required of the contractor as part of a construction management plan. Preparation of written construction management plan, submitted to EPB Construction Department and PPMO. Municipal PMO to include assessment of construction management approach in contractor's bidding documents	EPB Site Managers Muncipal PMO	Prior to commencement of construction at any site Prior to commencement of construction at any site. During Evaluation of Bids

		Adherence to construction management plan during implementation: construction area to be arranged to avoid fugitive dust (by covering stacks of cement/gravel materials etc, sprinkling periodically during windy days, constructing enclosing barrier), and use of noisy machines far from residents and other noise sensitive receptors, etc. Note: Annex H sets out an initial template of construction management guidelines, to be tailored by each site.	Contractors, monitored by Supervision Management Engineer and EPB	During Construction
Risk of injury of labourers and the public during construction and rehabilitation activities	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, and prevention of public access.	Provision of guidance on the measures required of the contractor as part of a health and safety plan Request to potential contractors to supply health and safety details with tenders. Plans to be submitted to EPB construction department. Adherence to health and safety plan during implementation	PPMO, through Safe Manufacture Supervision Bureau Municipal PMOs Contractors, monitored by Supervision Management Engineer and EPB	Prior to commencement of construction Prior to commencement of construction Following award of contract, prior to commencement of work
Casual disposal of solid waste and construction waste materials in the local environment	Implementation of Site Waste Management Plans	Appointment of contractor with track record of responsible disposal of construction waste (Grade A or B contractors) Monitoring of disposal of construction waste	Muncipal PMO Site management and Supervision Management Engineer	During Bidding During construction
Reduced local availability of groundwater or surface water	Identify permitted level of water extraction, and limit extraction within this level, taking steps to reduce water consumption through water reuse, and capture of rainwater, where necessary	Apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required	Municipal PMO	Before any water abstraction
Disposal of wastewater into surface water courses	Prevent disposal of wastewater that exceeds environmental quality	Dispose of water responsibly into wastewater treatment areas	Contractor, monitored by Supervision Management Engineer	During construction

	standards to local water courses			
Loss of 'chance finds' of archaeological artefacts during rehabilitation or construction	Education of labourers in the recognition of potential artefacts, and use of a protocol for steps to take in the event of chance finds.	Provision of basic guidance on the content of a chance finds policy Design of a chance finds protocol Education of contractors and employees in the steps to take in the event of chance finds.	Cultural Relics Bureau Site management Site management	Prior to construction Prior to construction During construction
Risk of damage to cultural heritage through vibrations created during construction	Use of professional contractors with experience of working in areas where fragile cultural relics are present. Temporary removal of cultural relics if feasible.	Evaluation of contractors' experience in carrying out construction works in areas with sensitive cultural heritage during bidding process; appointment of suitable contractors	Municipal PMOs	During bidding process
Impacts associated with use of materials (water, timber, cement etc) from unsustainable sources	Use only materials from sources approved as sustainable	Site management to arrange for sourcing of materials from sustainable sources only. Record numbers of instances of use of materials from unsustainable sources.	Supervision Management Engineer Supervision Management Engineer	Throughout construction Throughout construction

Impacts and Mitigation Measures: During Operation

Impact	**Mitigation Measures (Site Level only)**	**Further details**	**Responsibility**	**Timing**
Reduced local availability of groundwater or surface water, disposal of wastewater into surface water courses, unmanaged disposal of solid waste.	Adoption and implementation of an environmental policy by the site.	Identify permitted level of water extraction for the site, and apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required. Maintenance of wastewater treatment facilities to avoid unplanned wastewater disposal. Management of vehicles, including use of vehicles on site that use clean power such as electric power or gas or solar power, management of traffic noise (vehicles speeds shall be restricted to 30 km/h and the use of horns prohibited)	Site management	During Operation

		Use of energy-saving burners on coal-fired boilers to limit dust generated from the small burners used by hotels and tourism facilities Reduce noise generated from commercial stores or peddlers (strengthen the management of these commercial stores and prohibit the use of loudspeakers); Wastewater to be collected and treated by septic and used for irrigation Manage solid waste on basis of predictions of the level and composition of waste to be expected, and carry out waste minimisation, recycling and re-use Monitoring of environmental management on the site by EPB	EPB	
Risk of injury of public and staff	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, prevention of public access, and planning for emergencies.	Site management to submit Health and Safety plans to EPB, in compliance with Scenic Area management guidelines of the state administration	Site management	During operation
Induced environmental impacts of traders and public gathering around the site, adverse social impacts associated with increased tourism to the area		Community engagement to maximise benefits from tourism for local communities, and prevent unplanned gathering of vendors and beggars.	Discussions with local communities on concerns Identification of measures to maintain good relations with communities, and gain their assistance in preventing unwanted vendors, including special provision for the poorest	Site management Municipal PMO

Monitoring Requirements: During Construction

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Ambient air	TSP	Backyard garden of *Lutusi* Yamun and *Liancheng* Middle School	Five days of successive monitoring, once durir heating period.
Noise	Leq(A)	• Screen wall in front of *Lutusi* Yamun; • In front of *Liancheng* Kindergarten, *Liancheng* Primary School and Ancestor Hall of *Lutusi* Yamun; • Car park entrance; • Plaza boundaries; and • In front of *Dengshan*.	Monitoring during day and night times once p year.
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At all construction sites	Continuous

Monitoring Requirements: During Operation

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Ambient air	TSP	Backyard garden of *Lutusi* Yamun and *Liancheng* Middle School	Five days of successive monitoring once per heating period
Noise	Leq(A)	In front of Ancestor Hall of Lutusi Yamun; Car park entrance; and Plaza boundaries	Annually both day and night.
Discharge of wastewater treatment station	pH, SS, COD, BOD, Ammonia nitrogen, petroleum	Wastewater treatment station discharge point	Quarterly, both day and night
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Town-wide	Continuous

Costs

Description	Rate	Unit	Number	Expenditure Classification	Base Cost (1 USD = 7.7 RMB)		% by year						Notes
					Yuan	USD	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Lutusi													

Third party supervision of construction works	2000	Days	72	Services	144,000	18,701	33%	33%	33%				2 days per month over three years of construction
Monitoring During Construction													
Air	40	Yuan	30	Services	1,200	156	33%	33%	33%				
Noise	75	Yuan	21	Services	1,575	205	33%	33%	33%				
Monitoring During Operation													
Air	40	Yuan	30	Services	1,200	156				33%	33%	33%	
Noise	75	Yuan	9	Services	675	88				33%	33%	33%	
Discharge from WWTP	326	Yuan	12	Services	3,912	508				33%	33%	33%	
TOTAL					**152,562**	**19,813**							

Majishan Scenic Area

Location: Southeast part of Tianshui city, 300 km west of Lanzhou.

Area:

Natural or Cultural Heritage Value: 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 m^2 of murals. Carving sin the grottoes date from 384 AD, and continue over 1,500 years. The grotto sanctuaries played an important role in the development and dissemination of Buddhism in China. Forested landscape, and a botanical garden) is also a part of the scenic area.

Legal Status: Grottoes are classified as National level cultural relics, while the surrounding area is a National Class AAAA Key Scenic Area.

Activities to be Completed

Archaeological excavation, heritage inventory and preservation	Heritage protection and preservation in 3 sub-areas	**Dams and embankments**	Xianren Lake and Yinyue Lake protection (enhancement to existing dams)
Roads and bridges	10km, 13 km, 6 km and 18km road upgrading and 20m bridge	**Water supply and drainage**	Pumping station, water storage tank, 3 km of water mains, 2 km of branch pipes in two sub-areas
Vehicle parking lots	4500 m2, 4000m2 and 500m2 parking lots	**Sanitation facilities, toilets and wastewater treatment**	Wastewater collection system and septic tank in 3 sub-areas,10 toilets
Building Construction	1000m2, 1500m2 and 2000m2 visitor centers, 600m2 and 660m2 administration buildings	**Solid waste collection and disposal**	12 solid waste transfer stations, 3 garbage trucks, 500 garbage bins
Rehabilitation	-Heritage relics, Xianrenya and Shimen sub-area buildings rehabilitation	**Power and heating**	Transformer, 5 km, 3km and 4km underground cables, 3 km and 2km ighting wires, solar power equipment
Walkways, lookouts, signage and electric vehicles	15 km, 2km, 6.5km and 3km footpaths, double 100 m2 lookouts and 100m2 pavilion	**Safety and security systems**	Boundary landmarks, security monitoring system, heritage security equipment
Landscaping and fencing	260ha landscaping and ecological rehabilitation, 50ha landscaping, 60 boundary landmarks, and 150 boundary poles and 400 signs	**Other**	3 environmental monitoring stations, 3 sets of environmental monitoring equipments and two environmental monitoring and inspection vehicles

Budget:

Applicable Chinese Environmental Quality Requirements

Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)

Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)
I	I	-	0

Applicable World Bank Safeguards

At a number of sites within the area, infrastructure to be financed includes buildings (tourist service centre, administration building, training centre, visitor centre), road upgrading (total length 47 km), three parking lots, footpaths, walkways and lookouts, water supply systems, waste management facilities, and power cables with associated transformers. Given the area's significant natural scenic beauty, and the forests and botanic garden at the mountain, OP4.01, and OP4.04 are triggered. Detailed mitigation measures are set out in Chapter 8.	☜	OP 4.01 Environmental Assessment
	☜	OP 4.04 Natural Habitats
		OP 4.09 Pest Management
		OP 4.36 Forestry
Two existing dams will be rehabilitated, triggering OP4.37, and requiring a dam safety assessment.	☜	OP 4.11 Physical Cultural Resources
		OP 4.10 Indigenous Peoples
		OP 4.12 Involuntary Resettlement
	☜	OP 4.37 Safety of Dams

Baseline

Population	-	Surface water	This site bestrides the Jialing River (tributary of the Baijai River) in the Changjiang watershed and the Wei River in the Yellow River watershed.
Relief	Mountainous, from 1400 m ASL, to 2200 m ASL at the peak.	Groundwater	-
Relevant climatic features	Maximum temperature 33 degrees C, minimum -15℃. Annual precipitation is 800-1000 mm.	Air quality	-
Geology and soils	Loess hilly zone soils, and cinnamon soil depending on altitude. Rufous wind-eroded rocks forming numerous splendid Danxia landforms.	Natural habitats and Flora and Fauna	Plentiful of plants and wild animals and birds. 2738 spp of higher plants, 138 species of moss, 92 species of fern, Thirty-one relict species of plant. 95 birds, 29 mammal species. 18 species of nationally protected wild animals, including Class Ⅰ such as takin and forest muskdeer, Class Ⅱ such as giant salamander, golden pheasant, stone marten, red deer, macaque and mandarin duck, and Class Ⅲ such as tufted deer and otter.

Planning

Tourism Development Plan	Heritage Conservation Plan	Feasibility Study Report

	Completion	Prepared by	Completion	Prepared by
completed thoroughly	Now bidding		Completed and waiting for approval	Yuanjian tourism research Co., Ltd

Consultation and Disclosure

Consultation activities:	Questionnaire survey	Expert consultation	Workshop	Public hearing
	X	X		

Questionnaire Date	Number of questionnaires	Proportion of responses	Respondents	Proportion of respondents satisfied with environmental quality	Proportion of people in agreement with the proposed project
11-15 Feb., 2006	100	93%	Governments,residents, schools and government organizatons	74%	100%

Workshop Date	Topics	Participants	Responses
		•	Most of public think that the project is necessary and will promote the economic development. It was also suggested that the tourism and economi development should bring benefits to local residents and the environmental protection measures should be taken to avoid the induced pollution.

Information disclosed	Disclosure date	Disclosure ways
Briefings of the project and summery of EIA report and the method to reach EIA report.	April, 2007	Through bulletin at the site and presswork distributing

Impacts and Mitigation Measures: Prior to Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Visual impact of new facilities, if not located, designed or constructed in sympathy with the local heritage and surroundings	Construction of all facilities according to minimum standards of design, and in keeping with a site design that enhances its visual and landscape value	Procurement of design consultant to provide consistent design of facilities across all sites Planning of the required design for all sites, in coordination with the development of a Gansu tourism	PPMO Design consultant	YR1 YR1

		'brand' Design consultant to incorporate building and road design standards into the designs (eg to prevent soil erosion alongside roads), and landscaping including ecological restoration if necessary Include appropriate environmental technologies as part of design process.	 Design consultant Design consultant	 YR1 YR1
Risk of failure of Xianren and Yinyue Dams	**Implementation of measures recommended in dam safety reports** **Prepare Operation and Maintenance plans and Emergency Preparedness Plans**	 **Procurement of dam safety specialist to prepare the plans**	**Site management** **Muncipal PMO**	**YR 0** **YR 0**

Impacts and Mitigation Measures: During Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Limited Habitat destruction during construction, limited habitat loss due to land take, noise and disturbance to wildlife. Particular concern during breeding seasons of rare species.	**Identification of the spatial and seasonal constraints to the location of building, paths and roads etc and to construction operations, based on important habitats and rare or endangered species, and avoidance of disturbance to these areas.**		**Site management**	**YR 1**
Xianren and Yinyue Dams: disturbance of river sedimentation processes, leading to erosion downstream, or erosion of river embankment; risk of soil erosion and disturbance to river disturbance to aquatic habitats during construction, and permanent loss of riverbank	**Construction supervision and quality assurance** **Implementation of operation and maintenance plans, and emergency preparedness plans**		**Site management and supervising engineers** **Site management**	**YR 1** **YRS 1-5**

habitat; risk of damage to the downstream life, property, or facilities by possible failure of these dams.				
Adverse impacts of construction activities including fugitive dust and noise, soil erosion	Construction Management Plan	Provision of guidance on the measures required of the contractor as part of a construction management plan (including Concrete mixing plant to be located downwind of scenic area to avoid fugitive dust; Store fuels and chemicals on an impervious layer such as plastic sheeting; use drip trays when refuelling, replacing oil and handling chemicals. Preparation of written construction management plan, submitted to EPB Construction Department and PPMO. Municipal PMO to include assessment of construction management approach in contractor's bidding documents Adherence to construction management plan during implementation: construction area to be arranged to avoid fugitive dust (by covering stacks of cement/gravel materials etc, sprinkling periodically during windy days, constructing enclosing barrier), and use of noisy machines far from residents and other noise sensitive receptors, etc. Note: Annex H sets out an initial template of construction management guidelines, to be tailored by each site.	EPB Site Managers Muncipal PMO Contractors, monitored by Supervision Management Engineer and EPB	Prior to commencement of construction at any site Prior to commencement of construction at any site. During Evaluation of Bids During Construction
Risk of injury of labourers and the public during construction and	Design and enforcement of Site Health and Safety Plans	Provision of guidance on the measures required of the contractor	PPMO, through Safe Manufacture Supervision Bureau	Prior to commencement of construction

rehabilitation activities	encompassing protective clothing, safe working at height, and prevention of public access.	as part of a health and safety plan Request to potential contractors to supply health and safety details with tenders. Plans to be submitted to EPB construction department. Adherence to health and safety plan during implementation	 Municipal PMOs Contractors, monitored by Supervision Management Engineer and EPB	 Prior to commencement of construction Following award of contract, prior to commencement of work
Casual disposal of solid waste and construction waste materials in the local environment	Implementation of Site Waste Management Plans	Appointment of contractor with track record of responsible disposal of construction waste (Grade A or B contractors) Monitoring of disposal of construction waste	Muncipal PMO Site management and Supervision Management Engineer	During Bidding During construction
Reduced local availability of groundwater or surface water	Identify permitted level of water extraction, and limit extraction within this level, taking steps to reduce water consumption through water reuse, and capture of rainwater, where necessary	Apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required	Municipal PMO	Before any water abstraction
Disposal of wastewater into surface water courses	Prevent disposal of wastewater that exceeds environmental quality standards to local water courses	Dispose of water responsibly into wastewater treatment areas	Contractor, monitored by Supervision Management Engineer	During construction
Loss of 'chance finds' of archaeological artefacts during rehabilitation or construction	Education of labourers in the recognition of potential artefacts, and use of a protocol for steps to take in the event of chance finds.	Provision of basic guidance on the content of a chance finds policy Design of a chance finds protocol Education of contractors and employees in the steps to take in the event of chance finds.	Cultural Relics Bureau Site management Site management	Prior to construction Prior to construction During construction
Risk of damage to cultural heritage through vibrations created during construction	Use of professional contractors with experience of working in areas where fragile cultural relics are present. Temporary removal of cultural relics if feasible.	Evaluation of contractors' experience in carrying out construction works in areas with sensitive cultural heritage during bidding process; appointment of suitable contractors	Municipal PMOs	During bidding process
Impacts associated with use of materials (water, timber, cement etc) from unsustainable sources	Use only materials from sources approved as sustainable	Site management to arrange for sourcing of materials from sustainable sources only.	Supervision Management Engineer	Throughout construction

		Record numbers of instances of use of materials from unsustainable sources.	Supervision Management Engineer	Throughout construction

Impacts and Mitigation Measures: During Operation

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Reduced local availability of groundwater or surface water, disposal of wastewater into surface water courses, unmanaged disposal of solid waste.	Adoption and implementation of an environmental policy by the site	Identify permitted level of water extraction for the site, and apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required. Maintenance of wastewater treatment facilities to avoid unplanned wastewater disposal. Management of vehicles eg use of vehicles on site that use clean power such as electric power or gas or solar power. Manage solid waste on basis of predictions of the level and composition of waste to be expected, and carry out waste minimisation, recycling and re-use Monitoring of environmental management on the site by EPB	Site management EPB	During Operation
Risk of injury of public and staff	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, prevention of public access, and planning for emergencies.	Site management to submit Health and Safety plans to EPB, in compliance with Scenic Area management guidelines of the state administration	Site management	During operation
Induced environmental impacts of traders and public gathering around the site, adverse social impacts associated with increased tourism to the area		Community engagement to maximise benefits from tourism for local communities, and prevent unplanned gathering of vendors and beggars.	Discussions with local communities on concerns Identification of measures to maintain good relations with	Site management Municipal PMO

			communities, and gain their assistance in preventing unwanted vendors, including special provision for the poorest	
Impacts of dam management and failure	**Dam O&M and EPP plan implementation**		**Site management**	**YRS 1-5**

Monitoring Requirements: During Construction

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Ambient Air	TSP	At each construction site	Twice monthly
Noise	Leq(A)	At each construction site	Once per week, at least 10 minutes per time
Water quality	pH, COD, BOD, Suspended Solids	At at least three selected streams in the scenic area (in Quxi, Xianren, Yinyue)	Once monthly
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At Fortress Site and FST	Continuous

Monitoring Requirements: During Operation

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Ambient air	TSP	Sensitive areas including roadsides and car park surrounding areas	Once monthly
Noise	Leq(A)	Sensitive areas including roadsides and car park surrounding areas (3-4 points)	Once monthly
Water quality	pH, COD, BOD	In selected streams	Three times per year
Solid waste	Conditions of solid waste collection and disposal	Restaurant, guesthouse, hotel, office, waste collection at the service area, and waste transfer point	Peak tourism seasons
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)		Continuous

Costs

Description	Rate	Unit	Number	Expenditure Classification	Base Cost (1 USD = 7.7 RMB)	% by year	Notes

					Yuan	USD	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Majishan Scenic Area													
Third Party supervision of construction works	2000	Days	360	Services	720,000	93,506	20%	20%	20%	20%	10%	10%	5 days per month for six years
Prepararion of O&M and EPP plans for dams	2000	Days	20	Services	40,000	5,195	100%						
Monitoring During Construction													
Ambient Air	40	Yuan	612	Services	24,480	3,179	20%	20%	20%	20%	10%	10%	51 'site-years' of construction, construction during Apr-Sept only
Noise	75	Yuan	1326	Services	99,450	12,916	20%	20%	20%	20%	10%	10%	
Water quality	366	Yuan	108	Services	39,528	5,134	20%	20%	20%	20%	10%	10%	
Monitoring During Operation													
Ambient air	40	Yuan	240	Services	9,600	1,247					50%	50%	
Noise	75	Yuan	240	Services	18,000	2,338					50%	50%	
Water quality	234	Yuan	18	Services	4,212	547					50%	50%	
TOTAL					**955,270**	**124,061**							

Mati Temple Scenic Area

Location: In Daduma township, Sunan county, 60 km from Zhangye city, in the middle sect of the Hexi corridor, at the northern foot of Qilian Mountain,N.36▫28′41.02″,E.100▫25′05.05″

Area: 68 km2

Natural or Cultural Heritage Value

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 goddess, preserved by the dry climate of Gansu. The grottoes have bas-relief Apsaras, which are only seen in frescos at Dunhuang and Maijishan.

Legal Status:

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

Activities to be Completed

Archaeological excavation, heritage inventory and preservation	Inventory	**Dams and embankments**	-
Roads and bridges	2 new roads (1.8 and 0.7 km long), 2 upgraded roads (1.2 and 0.8 km)	**Water supply and drainage**	0.5 km water mains, 4.5 km water pipes
Vehicle parking lots	-	**Sanitation facilities, toilets and wastewater treatment**	5 water flush toilets
Building Construction	New 120 m2 administration building, a traditional-style gatehouse, a folk culture exhibition area (2000 m2), and a 400 m2 tourist service centre	**Solid waste collection and disposal**	200 litter bins, vehicle and 1000 m2 landfill
Rehabilitation	-	**Power and heating**	10 km underground cables
Walkways, lookouts, signage and electric vehicles	-	**Safety and security systems**	1 security system
Landscaping and fencing	-	**Other**	-

Budget: 12,096,000Yuan (1,570,909USD)

Applicable Chinese Environmental Quality Requirements

Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)
I	I	-	0

Applicable World Bank Safeguards

Mati Temple Scenic Park is a 14 km2 area containing numerous ancient Buddhist caves, within the wider 100 km2 Matic Scenic Area. The project will finance the construction and rehabilitation of links roads, a 140 m2 administration building, a traditional-style gatehouse, a folk culture exhibition area, and a 400 m2 tourist service centre. It will also finance piped water supply infrastructure and toilets, laying of power cables, and solid waste management facilities including a 1000 m2 landfill site. These activities carry environmental risks, and risks to the cultural heritage of the site, if not properly planned and executed. Owing to the natural wildlife interest of the site, OP 4.04 is also triggered. A range of minority groups live in the area, requiring the preparation and implementation of a separate Indigenous Peoples Plan to consult with and engage minority groups effectively in the activities in the area. Use of heritage resources belonging to indigenous peoples requires their "free, prior and informed consent".	☑	OP 4.01 Environmental Assessment
	☑	OP 4.04 Natural Habitats
		OP 4.09 Pest Management
		OP 4.36 Forestry
		OP 4.11 Physical Cultural Resources
	☑	OP 4.10 Indigenous Peoples
		OP 4.12 Involuntary Resettlement
		OP 4.37 Safety of Dams
		OP 7.50 International Waterways
		OP 7.60 Disputed Areas

Baseline

Population		Surface water	Mati River and Xiaoling River, in flow through the area. Mati River, is a seasonal river of snowmelt, yielding 8.5 million m3. xiaoling River flows from the southeast to meet the Mati River at the Longzongfu.
Relief	Mountainous	Groundwater	The ground water mainly exists in the structure fractures and erosional fracture and evacuate into river valley as springs.
Relevant climatic features	Annual average temperature of Mati temple area is between 1 and 3℃. Annual precipitation is between 360 and 550 mm, mainly falling in June, July, August and September.	Air quality	Meet the requirements of Class Ⅰ of Ambient Air Quality Standard (GB3095-1996)
Geology and soils	Soils are mainly kastanozem, grey-cinnamon soil, alpine steppe soil and alpine meadow soil, depending on altitude. Above 4200 m ASL, soils are permanently covered by glacier and snow.	Natural habitats and Flora and Fauna	Mati Temple is located at the boundary of Qilian National Nature Reserve Zone, which is an important area for biodiversity conservation in China and in world. In this natural reserve there are 1020 angiosperm species, 10 gymnosperm species, and 14 species of fern. Three species of plants are nationally protected (one is in the first level and the other two are in the second level). Eleven species of Orchidaceae that are listed in the Convention on International Trade in Endangered Species are found in this nature reserve.

Planning

Tourism Development Plan	Heritage Conservation Plan		Feasibility Study Report	
	Completion	Prepared by	Completion	Prepared by
completed thoroughly	Under preparing	Cultural Relics Protection Institute of Zhangye City	Completed and waiting for approval	Engineering Consultation Center of Zhangye City

Consultation and Disclosure

Consultation activities:	Questionnaire survey	Expert consultation	Workshop	Public hearing
	X	X	X	-

Questionnaire Date	Number of questionnaires	Proportion of responses	Respondents	Proportion of respondents satisfied with environmental quality	Proportion of people in agreement with the proposed project
17 April, 2006	110	97.3%	Residents around this site, public officers, employees, members of social groups.	90%	95.33%

Workshop Date	Topics	Participants	Responses
17 April, 2006	Disclosure the project information and consult the public opinion and suggestions.	Local residents.	Most public agree with the construction of the project, and the project will promote the development of local economy and tourism.

Information disclosed	Disclosure date	Disclosure ways
Materials relevant to EIA	21 May, 2006	Through newspaper (Zhangye Daily)

Impacts and Mitigation Measures: Prior to Construction

[Measures specific to this site in bold]

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Visual impact of new facilities, if not located, designed or constructed in sympathy with the local heritage	Construction of all facilities according to minimum standards of design, and in keeping with a site	Procurement of design consultant to provide consistent design of facilities across all sites	PPMO	YR1

and surroundings	design that enhances its visual and landscape value	Planning of the required design for all sites, in coordination with the development of a Gansu tourism 'brand'	Design consultant	YR1
		Design consultant to incorporate building and road design standards into the designs (eg to prevent soil erosion alongside roads), and landscaping including ecological restoration if necessary	Design consultant	YR1
		Include appropriate environmental technologies as part of design process.	Design consultant	YR1

Impacts and Mitigation Measures: During Construction

Impact	**Mitigation Measures (Site Level only)**	**Further details**	**Responsibility**	**Timing**
Adverse impacts of construction activities including fugitive dust and noise, soil erosion	Construction Management Plan	Provision of guidance on the measures required of the contractor as part of a construction management plan.	EPB	Prior to commencement of construction at any site
		Preparation of written construction management plan, submitted to EPB Construction Department and PPMO.	Site Managers	Prior to commencement of construction at any site.
		Municipal PMO to include assessment of construction management approach in contractor's bidding documents	Muncipal PMO	During Evaluation of Bids
		Adherence to construction management plan during implementation: construction area to be arranged to avoid fugitive dust (by covering stacks of cement/gravel materials etc, sprinkling periodically during windy days, constructing	Contractors, monitored by Supervision Management Engineer and EPB	During Construction

		enclosing barrier), and use of noisy machines far from residents and other noise sensitive receptors, etc. Note: Annex H sets out an initial template of construction management guidelines, to be tailored by each site.		
Risk of injury of labourers and the public during construction and rehabilitation activities	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, and prevention of public access.	Provision of guidance on the measures required of the contractor as part of a health and safety plan Request to potential contractors to supply health and safety details with tenders. Plans to be submitted to EPB construction department. Adherence to health and safety plan during implementation	PPMO, through Safe Manufacture Supervision Bureau Municipal PMOs Contractors, monitored by Supervision Management Engineer and EPB	Prior to commencement of construction Prior to commencement of construction Following award of contract, prior to commencement of work
Casual disposal of solid waste and construction waste materials in the local environment	Implementation of Site Waste Management Plans	Appointment of contractor with track record of responsible disposal of construction waste (Grade A or B contractors) Monitoring of disposal of construction waste	Muncipal PMO Site management and Supervision Management Engineer	During Bidding During construction
Reduced local availability of groundwater or surface water	Identify permitted level of water extraction, and limit extraction within this level, taking steps to reduce water consumption through water reuse, and capture of rainwater, where necessary	Apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required	Municipal PMO	Before any water abstraction
Disposal of wastewater into surface water courses	Prevent disposal of wastewater that exceeds environmental quality standards to local water courses	Dispose of water responsibly into wastewater treatment areas	Contractor, monitored by Supervision Management Engineer	During construction
Loss of ‘chance finds’ of archaeological artefacts during rehabilitation or construction	Education of labourers in the recognition of potential artefacts, and use of a protocol for steps to take in the event of chance finds.	Provision of basic guidance on the content of a chance finds policy Design of a chance finds protocol Education of contractors and employees in the steps to take in the	Cultural Relics Bureau Site management Site management	Prior to construction Prior to construction During construction

		event of chance finds.		
Risk of damage to cultural heritage through vibrations created during construction	Use of professional contractors with experience of working in areas where fragile cultural relics are present. Temporary removal of cultural relics if feasible.	Evaluation of contractors' experience in carrying out construction works in areas with sensitive cultural heritage during bidding process; appointment of suitable contractors	Municipal PMOs	During bidding process
Impacts associated with use of materials (water, timber, cement etc) from unsustainable sources	Use only materials from sources approved as sustainable	Site management to arrange for sourcing of materials from sustainable sources only. Record numbers of instances of use of materials from unsustainable sources.	Supervision Management Engineer Supervision Management Engineer	Throughout construction Throughout construction

Impacts and Mitigation Measures: During Operation

Impact	**Mitigation Measures (Site Level only)**	**Further details**	**Responsibility**	**Timing**
Reduced local availability of groundwater or surface water, disposal of wastewater into surface water courses, unmanaged disposal of solid waste.	Adoption and implementation of an environmental policy by the site	Identify permitted level of water extraction for the site, and apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required. Maintenance of wastewater treatment facilities to avoid unplanned wastewater disposal. Management of vehicles eg use of vehicles on site that use clean power such as electric power or gas or solar power. Manage solid waste on basis of predictions of the level and composition of waste to be expected, and carry out waste minimisation, recycling and re-use Monitoring of environmental management on the site by EPB	Site management EPB	During Operation
Risk of injury of public and staff	Design and enforcement of Site Health and Safety Plans	Site management to submit Health and Safety plans to EPB, in	Site management	During operation

	encompassing protective clothing, safe working at height, prevention of public access, and planning for emergencies.	compliance with Scenic Area management guidelines of the state administration		
Induced environmental impacts of traders and public gathering around the site, adverse social impacts associated with increased tourism to the area		Community engagement to maximise benefits from tourism for local communities, and prevent unplanned gathering of vendors and beggars.	Discussions with local communities on concerns Identification of measures to maintain good relations with communities, and gain their assistance in preventing unwanted vendors, including special provision for the poorest	Site management Municipal PMO

Monitoring Requirements: During Construction

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Ambient Air	TSP	At road and building construction sites	Twice monthly
Noise	Leq(A)	At road and building construction sites	Once per week, at least 10 minutes per time
Water quality	pH, COD, BOD, Suspended Solids	Matihe River and Xiaolinghe River	Once monthly
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Scenic area-wide	Continuous

Monitoring Requirements: During Operation

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Ambient air	TSP	Matisi Temple scenic site	Twice per year
Noise	Leq(A)	Matisi scenic site	Twice per year
Surface water	pH, COD, BOD, Suspended Solids	Matihe River and Xiaolinghe River	Twice per year
Landfill leachate	COD, BOD_5, Ammonia nitrogen, Total iron content, Chlorides	Leachate collection well	Twice per year
Groundwater	Standard water quality monitoring	Up and downstream groundwater at landfill site	Once per year
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Scenic area-wide	Continuous

Costs

Description	Rate	Unit	Number	Expenditure Classification	Base Cost (1 USD = 7.7 RMB)		% by year						Notes
					Yuan	USD	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Mati Temple Scenic Area													
Third party supervision of construction works	2000	Days	180	Services	360,000	46,753	33%	33%	33%				5 days per month over three years of construction
Monitoring During Construction													
Air	40	Yuan	192	Services	7,680	997	33%	33%	33%				16 'siteyears', civil works in Apr-Sept
Noise	75	Yuan	416	Services	31,200	4,052	33%	33%	33%				
Water quality	1206	Yuan	36	Services	43,416	5,638	33%	33%	33%				
Monitoring During Operation													
Air	40	Yuan	6	Services	240	31				33%	33%	33%	
Noise	75	Yuan	6	Services	450	58				33%	33%	33%	
Surface water	1206	Yuan	6	Services	7,236	940				33%	33%	33%	
Landfill leachate	241	Yuan	6	Services	1,446	188				33%	33%	33%	
Groundwater	1206	Yuan	3	Services	3,618	470				33%	33%	33%	
TOTAL					**455,286**	**59,128**							

Qingcheng Ancient Town

Location: In the northern part of Yuzhong county, Langzhou city, 110 km to Lanzhou city, N.36▫32′95.38″, E.104▫19′02.60″

Area: 0.9 ha.

Natural or Cultural Heritage Value

Ancient wooden courtyard houses are the main cultural asset of the town. Other heritage sites of interest include the Gao Family Ancestral Temple, the City Academy, the Chenghuang Temple, 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 the local "Xixiang Song", "Hero Drum Dance"and "Happiness Paper-cutting".

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

Activities to be Completed

Archaeological excavation, heritage inventory and preservation	Restoration of many historical houses, inventory	**Dams and embankments**	
Roads and bridges	New 8.9 km road, and upgrading 5 small lanes in town, total length 1.92 km (road width 6-7 meters), bridge 60.5m	**Water supply and drainage**	water storage tank, wastewater treatment plant, 8 toilets
Vehicle parking lots		**Sanitation facilities, toilets and wastewater treatment**	Sewer, mains and house connections, 1500 m2 treatment plant
Building Construction	Buildings of 300, and 236 m2	**Solid waste collection and disposal**	45 bins, 4 transfer stations, 75m^2 per station, 60000 m^3 landfill
Rehabilitation	Rehabilitation of 45 historical courtyard houses and Chenghuang Temple, 5.8 km ancient street	**Power and heating**	
Walkways, lookouts, signage and electric vehicles	500 signs	**Safety and security systems**	60 set of fire protection equipment
Landscaping and fencing		**Other**	

Budget: 31,541,900 Yuan (4,096,351 USD)

Applicable Chinese Environmental Quality Requirements

Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)
II	III	III	2

Applicable World Bank Safeguards

The project will support a plan to rehabilitate this town of 22,000 residents, and will finance: rehabilitation of houses, temples, city gates and traditional buildings, construc several small buildings for tourism management, construct an exhibition centre of 4000 m2, construct a new class IV road, landscape streets and upgrade lanes, construct a 3300 m2 parking lot, and construct water supply, wastewater and solid waste infrastructure, including a 5000 m2 landfill and a wastewater treatment plant. Design and mitigation measures of all these elements will be critical in avoiding adverse impacts on the environment or on the town's unique cultural heritage. A number of households will be physically resettled by the rehabilitation of a number of courtyard houses, and others will be affected by the removal of their businesses from the lanes to be landscaped, triggering OP 4.12.	☑	OP 4.01 Environmental Assessment
		OP 4.04 Natural Habitats
		OP 4.09 Pest Management
		OP 4.36 Forestry
	☑	OP 4.11 Physical Cultural Resources
		OP 4.10 Indigenous Peoples
	☑	OP 4.12 Involuntary Resettlement
		OP 4.37 Safety of Dams
		OP 7.50 International Waterways
		OP 7.60 Disputed Areas

Baseline

Population	The population within Qingcheng Ancient Town area is 5622.	Surface water	Yellow River flows through Qingcheng city, from where it flows northwards to Weiziwan, east to Yanjiadikou, and diverges into two rivers, flowing to Heilvxuanzi, and to Maozizui.
Relief	On the Loess Plateau, hilly with river valleys gulleys, between 1450 m and 2219 m ASL.	Groundwater	-
Relevant climatic features	Semi-arid. Annual average temperature is 9.3℃, with large temperature fluctuations daily and annually.	Air quality	-
Geology and soils	-	Natural habitats and Flora and Fauna	-

Planning

Tourism Development Plan	Heritage Conservation Plan		Feasibility Study Report	
	Completion	Prepared by	Completion	Prepared by

Tourism Development Plan	Heritage Conservation Plan		Feasibility Study Report	
	Completion	Prepared by	Completion	Prepared by
completed thoroughly	Draft	Lanzhou Engineering&Research Institute of Nonferrous Metallurgy Co.; Gansu Cultural Relics Protection and Maintenance Research Institute; Institute of Dunhuang Studies of Lanzhou University.	Completed and waiting for approval	Lanzhou Engineering&Research Insti of Nonferrous Metallurgy Co.; Gansu Highway Communication Surveying and Design Corp.; Institute of Dunhuang Studies of Lanz University.

Consultation and Disclosure

Consultation activities:	Questionnaire survey	Expert consultation	Workshop	Public hearing
	X		X	

Questionnaire Date	Number of questionnaires	Proportion of responses	Respondents	Proportion of respondents satisfied with environmental quality	Proportion of people in agreement with the proposed project
March, 2006	100	96%	Residents, workers and public officers	100%	100%

Workshop Date	Topics	Participants	Responses
June, 2006	Declare the project progress and consult the public opinion and suggestions.	Public around the site.	Most public agree with the construction of the project. It was suggested that the construction of this project should keep the original looks of ancient buildings and adapt to the village construction and enlarge the landscaping.

Information disclosed	Disclosure date	Disclosure ways
Briefings of the project and EIA report	March, 2007	Public can get the information at the site management

Impacts and Mitigation Measures: Prior to Construction

[Measures specific to this site in bold]

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing

Visual impact of new facilities, if not located, designed or constructed in sympathy with the local heritage and surroundings	Construction of all facilities according to minimum standards of design, and in keeping with a site design that enhances its visual and landscape value	Procurement of design consultant to provide consistent design of facilities across all sites Planning of the required design for all sites, in coordination with the development of a Gansu tourism 'brand' Design consultant to incorporate building and road design standards into the designs (eg to prevent soil erosion alongside roads), and landscaping including ecological restoration if necessary Include appropriate environmental technologies as part of design process.	PPMO Design consultant Design consultant Design consultant	YR1 YR1 YR1 YR1
Disturbance of river sedimentation processes by the First Signal Tower river embankment, leading to erosion downstream, or erosion of new river embankment	**Design of river embankment according to engineering design that takes full account of river sedimentation and erosion**	**Gansu Water Resources and Hydropower Design Institute has been appointed to provide designs**	**Municipal PMO**	**YR 0**
Risk of damage to the First Signal Tower during strengthening of the cliff, owing to its precarious position on the cliff top.	**Design of works and to avoid risk to First Signal Tower**	**Ministry of Railways has been appointed to design cliff strengthening work**	**Municipal PMO**	**YR 0**

Impacts and Mitigation Measures: During Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Adverse impacts of construction activities including fugitive dust and noise, soil erosion	Construction Management Plan	Provision of guidance on the measures required of the contractor as part of a construction management plan. Preparation of written construction management plan, submitted to EPB Construction Department and PPMO.	EPB Site Managers	Prior to commencement of construction at any site Prior to commencement of construction at any site.

		Municipal PMO to include assessment of construction management approach in contractor's bidding documents Adherence to construction management plan during implementation: construction area to be arranged to avoid fugitive dust (by covering stacks of cement/gravel materials etc, sprinkling periodically during windy days, constructing enclosing barrier), and use of noisy machines far from residents and other noise sensitive receptors, etc. Note: Annex H sets out an initial template of construction management guidelines, to be tailored by each site.	Muncipal PMO Contractors, monitored by Supervision Management Engineer and EPB	During Evaluation of Bids During Construction
Disturbance of river sedimentation processes, leading to erosion downstream, or erosion of new river embankment	**Construction of river embankment according to engineering design that takes full account of river sedimentation and erosion**	**Appointment and monitoring of contractor with full understanding of Gansu Water Resources and Hydropower Design Institute's designs**	**Municipal PMO, Supervision Management Engineer**	**During construction**
Risk of damage to the First Signal Tower during construction owing to its precarious position on the cliff top.	**Implementation of strengthening works that take account of the fragile nature of the First Signal Tower**	**Appointment and monitoring of contractor with full understanding of the Ministry of Railways' designs**	**Municipal PMO, Supervision Management Engineer**	**During construction**
Risk of injury of labourers and the public during construction and rehabilitation activities	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, and prevention of public access.	Provision of guidance on the measures required of the contractor as part of a health and safety plan Request to potential contractors to supply health and safety details with tenders. Plans to be submitted to EPB construction department. Adherence to health and safety plan during implementation	PPMO, through Safe Manufacture Supervision Bureau Municipal PMOs Contractors, monitored by Supervision Management Engineer and EPB	Prior to commencement of construction Prior to commencement of construction Following award of contract, prior to commencement of work
Casual disposal of solid waste and	Implementation of Site Waste	Appointment of contractor with	Muncipal PMO	During Bidding

construction waste materials in the local environment	Management Plans	track record of responsible disposal of construction waste (Grade A or B contractors) Monitoring of disposal of construction waste	 Site management and Supervision Management Engineer	 During construction
Reduced local availability of groundwater or surface water	Identify permitted level of water extraction, and limit extraction within this level, taking steps to reduce water consumption through water reuse, and capture of rainwater, where necessary	Apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required	Municipal PMO	Before any water abstraction
Disposal of wastewater into surface water courses	Prevent disposal of wastewater that exceeds environmental quality standards to local water courses	Dispose of water responsibly into wastewater treatment areas	Contractor, monitored by Supervision Management Engineer	During construction
Loss of 'chance finds' of archaeological artefacts during rehabilitation or construction	Education of labourers in the recognition of potential artefacts, and use of a protocol for steps to take in the event of chance finds.	Provision of basic guidance on the content of a chance finds policy Design of a chance finds protocol Education of contractors and employees in the steps to take in the event of chance finds.	Cultural Relics Bureau Site management Site management	Prior to construction Prior to construction During construction
Risk of damage to cultural heritage through vibrations created during construction	Use of professional contractors with experience of working in areas where fragile cultural relics are present. Temporary removal of cultural relics if feasible.	Evaluation of contractors' experience in carrying out construction works in areas with sensitive cultural heritage during bidding process; appointment of suitable contractors	Municipal PMOs	During bidding process
Impacts associated with use of materials (water, timber, cement etc) from unsustainable sources	Use only materials from sources approved as sustainable	Site management to arrange for sourcing of materials from sustainable sources only. Record numbers of instances of use of materials from unsustainable sources.	Supervision Management Engineer Supervision Management Engineer	Throughout construction Throughout construction

Impacts and Mitigation Measures: During Operation

Impact	**Mitigation Measures (Site Level only)**	**Further details**	**Responsibility**	**Timing**
Reduced local availability of	Adoption and implementation of an	Identify permitted level of water	Site management	During Operation

groundwater or surface water, disposal of wastewater into surface water courses, unmanaged disposal of solid waste.	environmental policy by the site	extraction for the site, and apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required. Maintenance of wastewater treatment facilities to avoid unplanned wastewater disposal. Management of vehicles eg use of vehicles on site that use clean power such as electric power or gas or solar power. Manage solid waste on basis of predictions of the level and composition of waste to be expected, and carry out waste minimisation, recycling and re-use Monitoring of environmental management on the site by EPB	EPB	
Risk of injury of public and staff	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, prevention of public access, and planning for emergencies.	Site management to submit Health and Safety plans to EPB, in compliance with Scenic Area management guidelines of the state administration	Site management	During operation
Induced environmental impacts of traders and public gathering around the site, adverse social impacts associated with increased tourism to the area		Community engagement to maximise benefits from tourism for local communities, and prevent unplanned gathering of vendors and beggars.	Discussions with local communities on concerns Identification of measures to maintain good relations with communities, and gain their assistance in preventing unwanted vendors, including special provision for the poorest	Site management Municipal PMO

Monitoring Requirements: During Construction

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency

Ambient air	TSP	At all construction sites	Five days of successive monitoring, once durir heating period.
Noise	Leq(A)	At all construction sites	Monitoring during day and night times once p year.
Wastewater effluent from construction sites	pH, SS, COD	At all construction sites	Once weekly
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At all construction sites	Continuous

Monitoring Requirements: During Operation

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Discharge of wastewater treatment station	pH, SS, COD, BOD	Wastewater treatment station discharge point	Quarterly, both day and night
Landfill leachate	COD, BOD_5, Ammonia nitrogen, Total iron content, Chlorides	Leachate collection well	Twice per year
Groundwater	Standard water quality monitoring	Up and downstream groundwater at landfill site	Once per year
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Town-wide	Continuous

Costs

Description	**Rate**	**Unit**	**Number**	**Expenditure Classification**	**Base Cost (1 USD = 7.7 RMB)**		**% by year**						**Notes**
					Yuan	**USD**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	
Qingcheng													
Third party supervision of construction works	2000	Days	100	Services	200,000	25,974	33%	33%	33%				2 days per month over four years of construction
Monitoring During Construction													
Air	40	Yuan	130	Services	5,200	675	33%	33%	33%				26 'site years' of civil works
Noise	75	Yuan	26	Services	1,950	253	33%	33%	33%				
Effluent from construction sites	1206	Yuan	676	Services	815,256	105,877	33%	33%	33%				Apr-Sept
Monitoring During Operation													
WWTP discharge	326	Yuan	12	Services	3,912	508				33%	33%	33%	

Landfill leachate	241	Yuan	6	Services	1,446	188				33%	33%	33%	
Groundwater	1206	Yuan	3	Services	3,618	470				33%	33%	33%	
TOTAL					**1,031,382**	**133,946**							

Suoyang City

Location: In the Gobi desert 7 km south of Qiaozi Nanba Village, and 68 km from the Anxi county town, N.40▫15′10.08″, E.096▫11′57.07″, standing at 1358 metre above sea level

Area: 274,900m^2

Natural or Cultural Heritage Value
Site of the remains of the ancient Suoyang City, first constructed in the Han Dynasty, with a Tang dynasty fortress. Despite its very high historical value, it has not been subject to detailed archaeological research.

Legal Status: A State Level protected cultural heritage site.

Activities to be Completed

Archaeological excavation, heritage inventory and preservation	Soil enhancement, city wall engineering, shelters for excavations, inventory, excavations	**Dams and embankments**	
Roads and bridges	10, 10, 4, 5 km new roads	**Water supply and drainage**	Water tower, 2.3 km of water supply pipes, 3 wells
Vehicle parking lots	2000 m^2	**Sanitation facilities, toilets and wastewater treatment**	4 water-flush toilets, 3 sedimentation tanks
Building Construction	2000 m^2 museum, heritage administration building, 200 m^2 tourist centre	**Solid waste collection and disposal**	14 garbage bins
Rehabilitation		**Power and heating**	2 km underground cables, 7 km of electricity cable from Suoyang Town to service center, 1 power transformer
Walkways, lookouts, signage and electric vehicles	Wooden footpath,	**Safety and security systems**	Sub-surface vibration monitoring, security system for heritage areas
Landscaping and fencing	2 km protective fencing, 6.67 ha landscaping	**Other**	

Budget: 20,900,000 Yuan (2,679,487 USD)

Applicable Chinese Environmental Quality Requirements

Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)
I	-	□	0

Applicable World Bank Safeguards

OP4.01 is triggered by the activities at this site, in addition to OP 4.11 on physical cultural resources. Infrastructure to be constructed at the site (including a museum, an administration building, a tourist service centre, landscaping, toilets and water supply the laying of power cables of 2 km and 7km, 2 km of fencing, two Class III highways of 10km and 4 km, and two access roads of 4km and 5km) will have significant environmental impacts encompassing visual impact, increased wind erosion, and impacts associated with the sourcing of materials (timber, gravel etc) for construction. Archaeological works including engineering to the ancient city wall and its foundation, 'soil enhancement', excavations and shelters for key sites, carry risks of damaging the cultural heritage, if carried out inappropriately or left unfinished. There are no critical natural habitats at the site, but there may be impacts on the area's natural habitats. The land to be used for museums, roads etc is not inhabited or used for any purpose by people, so the requirements of OP4.12 are not applicable at this site.	☞ OP 4.01 Environmental Assessment ☞ OP 4.04 Natural Habitats OP 4.09 Pest Management OP 4.36 Forestry ☞ OP 4.11 Physical Cultural Resources OP 4.10 Indigenous Peoples OP 4.12 Involuntary Resettlement OP 4.37 Safety of Dams OP 7.50 International Waterways OP 7.60 Disputed Areas

Baseline

Population	Not inhabited	Surface water	There is no surface water
Relief	Lowland dunes.	Groundwater	Good quality groundwater resources, replenished by Shule and Yulin rivers. There are two mechanical wells for livestock and one drinking water well.
Relevant climatic features	Desert conditions, annual rainfall 45–104 mm, average number of precipitation days 22.1, in June-August.	Air quality	-
Geology and soils	Desert, with enduring winds forming sand dunes.	Natural habitats and Flora and Fauna	Almost no plant grows on the moving dunes. Occasional plants on low-lying land between dunes.

Planning

Tourism Development Plan	Heritage Conservation Plan		Feasibility Study Report	
	Completion	Prepared by	Completion	Prepared by
completed thoroughly	completed	Institute of Architectural History of Chinese Architectural Design and Research Academy	Completed and waiting for approval	Forestry Investigation and Planning Institute of Gansu Province

Consultation and Disclosure

Consultation activities:	Questionnaire survey	Expert consultation	Workshop	Public hearing
	X	X		

Questionnaire Date	Number of questionnaires	Proportion of responses	Respondents	Proportion of respondents satisfied with environmental quality	Proportion of people in agreement with the proposed project
March, 2006	100	100%	Public around this site	68%	100%

Expert consultation	Topics	Participants	Responses
September,2006	Consult the Participants' opinion and suggestions.	⌘ EIA institution staffs; ⌘ Experts from Gansu Research Academy of Environmental Sciences ; ⌘ Officers from Jiuquan city EPB; ⌘ Officers from Jiuquan city DRC;	Most of the experts think the project will bring more benefit than adverse impacts, and will agree with the construction of the project.

Information disclosed	Disclosure date	Disclosure ways
Briefings of the project and EIA report	March, 2007	Public can get the information at the site management

Impacts and Mitigation Measures: Prior to Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Visual impact of new facilities, if not located, designed or constructed in sympathy with the local heritage and surroundings	Construction of all facilities according to minimum standards of design, and in keeping with a site design that enhances its visual and landscape value	Procurement of design consultant to provide consistent design of facilities across all sites	PPMO	YR1
		Planning of the required design for all sites, in coordination with the development of a Gansu tourism 'brand'	Design consultant	YR1
		Design consultant to incorporate building and road design standards into the designs (eg to prevent soil erosion alongside roads), and landscaping including ecological restoration if necessary	Design consultant	YR1
		Include appropriate environmental technologies as part of design process.	Design consultant	YR1

Impacts and Mitigation Measures: During Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Adverse impacts of construction activities including fugitive dust and noise, soil erosion	Construction Management Plan	Provision of guidance on the measures required of the contractor as part of a construction management plan. Preparation of written construction management plan, submitted to EPB Construction Department and PPMO. Municipal PMO to include assessment of construction management approach in contractor's bidding documents Adherence to construction management plan during implementation: construction area to be arranged to avoid fugitive dust (by covering stacks of cement/gravel materials etc, sprinkling periodically during windy days, constructing enclosing barrier), and use of noisy machines far from residents and other noise sensitive receptors, etc. Note: Annex H sets out an initial template of construction management guidelines, to be tailored by each site.	EPB Site Managers Muncipal PMO Contractors, monitored by Supervision Management Engineer and EPB	Prior to commencement of construction at any site Prior to commencement of construction at any site. During Evaluation of Bids During Construction
Risk of injury of labourers and the public during construction and rehabilitation activities	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, and prevention of public access.	Provision of guidance on the measures required of the contractor as part of a health and safety plan Request to potential contractors to supply health and safety details with	PPMO, through Safe Manufacture Supervision Bureau Municipal PMOs	Prior to commencement of construction Prior to commencement of construction

		tenders. Plans to be submitted to EPB construction department. Adherence to health and safety plan during implementation	 Contractors, monitored by Supervision Management Engineer and EPB	 Following award of contract, prior to commencement of work
Casual disposal of solid waste and construction waste materials in the local environment	Implementation of Site Waste Management Plans	Appointment of contractor with track record of responsible disposal of construction waste (Grade A or B contractors) Monitoring of disposal of construction waste	Muncipal PMO Site management and Supervision Management Engineer	During Bidding During construction
Reduced local availability of groundwater or surface water	Identify permitted level of water extraction, and limit extraction within this level, taking steps to reduce water consumption through water reuse, and capture of rainwater, where necessary	Apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required	Municipal PMO	Before any water abstraction
Disposal of wastewater into surface water courses	Prevent disposal of wastewater that exceeds environmental quality standards to local water courses	Dispose of water responsibly into wastewater treatment areas	Contractor, monitored by Supervision Management Engineer	During construction
Loss of 'chance finds' of archaeological artefacts during rehabilitation or construction	Education of labourers in the recognition of potential artefacts, and use of a protocol for steps to take in the event of chance finds.	Provision of basic guidance on the content of a chance finds policy Design of a chance finds protocol Education of contractors and employees in the steps to take in the event of chance finds.	Cultural Relics Bureau Site management Site management	Prior to construction Prior to construction During construction
Risk of damage to cultural heritage through vibrations created during construction	Use of professional contractors with experience of working in areas where fragile cultural relics are present. Temporary removal of cultural relics if feasible.	Evaluation of contractors' experience in carrying out construction works in areas with sensitive cultural heritage during bidding process; appointment of suitable contractors	Municipal PMOs	During bidding process
Impacts associated with use of materials (water, timber, cement etc) from unsustainable sources	Use only materials from sources approved as sustainable	Site management to arrange for sourcing of materials from sustainable sources only. Record numbers of instances of use of materials from unsustainable sources.	Supervision Management Engineer Supervision Management Engineer	Throughout construction Throughout construction

Impacts and Mitigation Measures: During Operation

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Reduced local availability of groundwater or surface water, disposal of wastewater into surface water courses, unmanaged disposal of solid waste.	Adoption and implementation of an environmental policy by the site	Identify permitted level of water extraction for the site, and apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required. Maintenance of wastewater treatment facilities to avoid unplanned wastewater disposal. Management of vehicles eg use of vehicles on site that use clean power such as electric power or gas or solar power. Manage solid waste on basis of predictions of the level and composition of waste to be expected, and carry out waste minimisation, recycling and re-use Monitoring of environmental management on the site by EPB	Site management EPB	During Operation
Risk of injury of public and staff	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, prevention of public access, and planning for emergencies.	Site management to submit Health and Safety plans to EPB, in compliance with Scenic Area management guidelines of the state administration	Site management	During operation
Induced environmental impacts of traders and public gathering around the site, adverse social impacts associated with increased tourism to the area		Community engagement to maximise benefits from tourism for local communities, and prevent unplanned gathering of vendors and beggars.	Discussions with local communities on concerns Identification of measures to maintain good relations with communities, and gain their assistance in preventing unwanted vendors, including special provision	Site management Municipal PMO

			for the poorest	

Monitoring Requirements: During Construction

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Noise	Leq(A)	One representative construction location	Once off
Ambient air	TSP		
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Site-wide	Continuous

Monitoring Requirements: During Operation

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Safety incidents	**Number and type of incidents concerning safety of workers and public (including near misses, and injuries)**	**Site-wide**	**Continuous**

Costs

Description	Rate	Unit	Number	Expenditure Classification	Base Cost (1 USD = 7.7 RMB)		% by year						Notes
					Yuan	USD	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Suoyang													
Third party supervision of construction works	2000	Days	72	Services	144,000	18,701	33%	33%	33%				2 days per month over three years of construction
Monitoring During Construction													
Ambient Air	120	Yuan	1	Services	120	16	33%	33%	33%				
Noise	225	Yuan	1	Services	225	29	33%	33%	33%				
TOTAL					**144,345**	**18,746**							

Wei Jin Folk Culture Park

Location: Within the boundaries of Xincheng Town, 18 km northeast of Jiayuguan, N.39▫51′05.09″, E.098▫26′04.08″.

Area: 30 km^2

Natural or Cultural Heritage Value: More than 1600 tombs of the Wei and Jin dynasties (220-420).are scattered over the area. Tombs unearthed to-date include colourful murals, earning the site a description as 'the largest subterranean art gallery in the world'. The Wei-Jin murals provide an example of pure Chinese realism, before the influences that came with Buddhism, and fill historic gaps in painting styles between the Wei and Jin periods. They are highly valuable for historic research.

Legal Status: Together with the tombs in Jiuquan City, the complex is a National level cultural relic.

Activities to be Completed

Archaeological excavation, heritage inventory and preservation	Tomb and mural preservation, tomb markers	**Dams and embankments**	-
Roads and bridges	-	**Water supply and drainage**	200m^2 water storage tank, pump and equipment, 600m water supply pipes, 2.5km drainage pipes, stormwater drainage for tombs protection
Vehicle parking lots	2000 m^2	**Sanitation facilities, toilets and wastewater treatment**	100m^3 septic tank
Building Construction	2,496m^2 exhibition centre, 715m^2 service centre and management facility	**Solid waste collection and disposal**	
Rehabilitation	-	**Power and heating**	-
Walkways, lookouts, signage and electric vehicles	1km walking paths, 30 set site signage	**Safety and security systems**	Site monitoring and surveillance equipment
Landscaping and fencing	1,600 sets protection area boundary markers, 3000m key protection area fencing, site environmental improvements	**Other**	

Budget: 22,865,300Yuan(2,931,449USD)

Applicable Chinese Environmental Quality Requirements

Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)

Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)
II	-	III	1

Applicable World Bank Safeguards

Key activities with environmental risks are the construction of the 1500 m2 exhibition centre, and the 3000 m2 parking lot. Other activities (water supply, drainage, and septic tanks) are relatively minor. The land to be used for the centre and parking lot is not inhabited or used for any purpose by people, so the requirements of OP4.12 are not applicable at this site.	☜	OP 4.01 Environmental Assessment
		OP 4.04 Natural Habitats
		OP 4.09 Pest Management
		OP 4.36 Forestry
	☜	OP 4.11 Physical Cultural Resources
		OP 4.10 Indigenous Peoples
		OP 4.12 Involuntary Resettlement
		OP 4.37 Safety of Dams
		OP 7.50 International Waterways
		OP 7.60 Disputed Areas

Baseline

Population	Not inhabited	Surface water	No natural surface water in the tomb area. An irrigation aqueduct with a plentiful water supply in April-August lies to the south.
Relief	Flat Gobi lands, from 1475 m ASL to 1486 m ASL.	Ground water	Groundwater is found 10-25 m below ground, and is plentiful.
Relevant climatic features	Day-night temperature difference is between 10 and 15 degrees C. Average depth of frozen ground in winter is 108 cm and the maximum is 132 cm.	Air quality	
Geology and soils	Flat Gobi lands, from 1475 m ASL to 1486 m ASL. Quartzite and metamorphic gravel stratum for 300m below ground level.	Natural habitats and Flora and Fauna	

Planning

Tourism Development Plan	Heritage Conservation Plan		Feasibility Study Report	
	Completion	Prepared by	Completion	Prepared by
completed thoroughly	Outline	Lanzhou University; Dunhuang Academy	Completed and waiting for approval	College of Tourism of Northwest Nor University

Consultation and Disclosure

Consultation activities:	Questionnaire survey	Expert consultation	Workshop	Public hearing
	X	X	X	

Questionnaire Date	Number of questionnaires	Proportion of responses	Respondents	Proportion of respondents satisfied with environmental quality	Proportion of people in agreement with the proposed project
10 April, 2006	46	100%	Residents, tourists and Scenic area managers	90%	80%

Expert consultation	Topics	Participants	Responses
Februry,2007	Consult the Participants' opinion and suggestions.	⌘ Lanzhou University Staffs; ⌘ Experts from Gansu Research Academy of Environmental Sciences ; ⌘ Officers from Jiayuguan city EPB; ⌘ Officers from Jiayuguan city DRC;	Most of the experts think the project will bring more benefit than adverse impacts, and will agree with the construction of the project.

Workshop Date	Topics	Participants	Responses
20 May, 2006	Declare the project progress, discuss the environmental impacts and consult the public opinion and suggestions.	⌘ EIA institution staffs; ⌘ Site management staffs; ⌘ Officers from Jiayuguan city EPB; ⌘ Local residents.	It was suggested that ameliorate the surrounding environment of the site, promote the managemen level of this site, establish the environmental facilities and the garbage should be disposed centralized.

Information disclosed	Disclosure date	Disclosure ways
Briefings of the project and summery of EIA report and the method to reach EIA report.	20 April, 2007	Through bulletin at the site, presswork distributing, website (www.ngocn.org), and newspaper (Democratic Consultation Newspaper)

Impacts and Mitigation Measures: Prior to Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Visual impact of new facilities, if not located, designed or constructed	Construction of all facilities according to minimum standards of	Procurement of design consultant to provide consistent design of	PPMO	YR1

in sympathy with the local heritage and surroundings	design, and in keeping with a site design that enhances its visual and landscape value	facilities across all sites Planning of the required design for all sites, in coordination with the development of a Gansu tourism 'brand' Design consultant to incorporate building and road design standards into the designs (eg to prevent soil erosion alongside roads), and landscaping including ecological restoration if necessary Include appropriate environmental technologies as part of design process.	 Design consultant Design consultant Design consultant	 YR1 YR1 YR1

Impacts and Mitigation Measures: During Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Adverse impacts of construction activities including fugitive dust and noise, soil erosion	Construction Management Plan	Provision of guidance on the measures required of the contractor as part of a construction management plan. Preparation of written construction management plan, submitted to EPB Construction Department and PPMO. Municipal PMO to include assessment of construction management approach in contractor's bidding documents	EPB Site Managers Muncipal PMO	Prior to commencement of construction at any site Prior to commencement of construction at any site. During Evaluation of Bids

		Adherence to construction management plan during implementation: construction area to be arranged to avoid fugitive dust (by covering stacks of cement/gravel materials etc, sprinkling periodically during windy days, constructing enclosing barrier), and use of noisy machines far from residents and other noise sensitive receptors, etc. Note: Annex H sets out an initial template of construction management guidelines, to be tailored by each site.	Contractors, monitored by Supervision Management Engineer and EPB	During Construction
Risk of injury of labourers and the public during construction and rehabilitation activities	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, and prevention of public access.	Provision of guidance on the measures required of the contractor as part of a health and safety plan Request to potential contractors to supply health and safety details with tenders. Plans to be submitted to EPB construction department. Adherence to health and safety plan during implementation	PPMO, through Safe Manufacture Supervision Bureau Municipal PMOs Contractors, monitored by Supervision Management Engineer and EPB	Prior to commencement of construction Prior to commencement of construction Following award of contract, prior to commencement of work
Casual disposal of solid waste and construction waste materials in the local environment	Implementation of Site Waste Management Plan, including use of slag (from boiler used to provide water during construction) for road base.	Appointment of contractor with track record of responsible disposal of construction waste (Grade A or B contractors) Monitoring of disposal of construction waste	Muncipal PMO Site management and Supervision Management Engineer	During Bidding During construction
Reduced local availability of groundwater or surface water	Identify permitted level of water extraction, and limit extraction within this level, taking steps to reduce water consumption through water reuse, and capture of rainwater, where necessary	Apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required	Municipal PMO	Before any water abstraction
Disposal of wastewater into surface water courses	Prevent disposal of wastewater that exceeds environmental quality	Dispose of water responsibly into wastewater treatment areas	Contractor, monitored by Supervision Management Engineer	During construction

	standards to local water courses			
Loss of 'chance finds' of archaeological artefacts during rehabilitation or construction	Education of labourers in the recognition of potential artefacts, and use of a protocol for steps to take in the event of chance finds.	Provision of basic guidance on the content of a chance finds policy Design of a chance finds protocol Education of contractors and employees in the steps to take in the event of chance finds.	Cultural Relics Bureau Site management Site management	Prior to construction Prior to construction During construction
Risk of damage to cultural heritage through vibrations created during construction	Use of professional contractors with experience of working in areas where fragile cultural relics are present. Temporary removal of cultural relics if feasible.	Evaluation of contractors' experience in carrying out construction works in areas with sensitive cultural heritage during bidding process; appointment of suitable contractors	Municipal PMOs	During bidding process
Impacts associated with use of materials (water, timber, cement etc) from unsustainable sources	Use only materials from sources approved as sustainable	Site management to arrange for sourcing of materials from sustainable sources only. Record numbers of instances of use of materials from unsustainable sources.	Supervision Management Engineer Supervision Management Engineer	Throughout construction Throughout construction

Impacts and Mitigation Measures: During Operation

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Reduced local availability of groundwater or surface water, disposal of wastewater into surface water courses, unmanaged disposal of solid waste.	Adoption and implementation of an environmental policy by the site	Identify permitted level of water extraction for the site, and apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required. Maintenance of wastewater treatment facilities to avoid unplanned wastewater disposal. Management of vehicles eg use of vehicles on site that use clean power such as electric power or gas or solar power. Manage solid waste on basis of	Site management	During Operation

		predictions of the level and composition of waste to be expected, and carry out waste minimisation, recycling and re-use Monitoring of environmental management on the site by EPB	 EPB	
Risk of injury of public and staff	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, prevention of public access, and planning for emergencies.	Site management to submit Health and Safety plans to EPB, in compliance with Scenic Area management guidelines of the state administration	Site management	During operation
Induced environmental impacts of traders and public gathering around the site, adverse social impacts associated with increased tourism to the area		Community engagement to maximise benefits from tourism for local communities, and prevent unplanned gathering of vendors and beggars.	Discussions with local communities on concerns Identification of measures to maintain good relations with communities, and gain their assistance in preventing unwanted vendors, including special provision for the poorest	Site management Municipal PMO

Monitoring Requirements: During Construction

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Ambient Air	TSP	Building and parking lot construction sites	Twice monthly
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Building and parking lot construction sites	Continuous

Monitoring Requirements: During Operation

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Conditions inside tombs	Humidity and temperature	Underground tombs	To be determined
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Building and parking lot construction sites	Continuous

Costs

Description	Rate	Unit	Number	Expenditure Classification	Base Cost (1 USD = 7.7 RMB)		% by year						Notes
					Yuan	USD	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Wei Jin													
Third party supervision of construction works	2000	Days	72	Services	144,000	18,701	33%	33%	33%				2 days per month over three years of construction
Monitoring During Construction													
Ambient Air	184	Yuan	36	Services	6,624	860	33%	33%	33%				
Monitoring During Operation													
Humidity and Temperature in Tombs	10000	Lump sum	1	Services	10,000	1,299	33%	33%	33%				
TOTAL					**160,624**	**20,860**							

Yardang National Geological Park

Location: 180 kilometres northwest to Dunhuang City□N.40▫25′00″ E.092▫59′30″

Area: 398.4km^2

Natural or Cultural Heritage Value：Largest known area of yardang formation in the world.

Legal Status: A Geological Park under State level protection. Not gazetted as a cultural heritage site.

Activities to be Completed

Archaeological excavation, heritage inventory and preservation		**Dams and embankments**	
Roads and bridges	New 19 km and 2 km roads, road width of 6.5m	**Water supply and drainage**	High level water storage tank of 150 m^3 with pipe work, 1 water transport truck
Vehicle parking lots	5800 m^2 and 5100 m^2 parking lots	**Sanitation facilities, toilets and wastewater treatment**	2 water flush toilets, 4 environment friendly toilets, 2 septic tanks, 3 km of sewage pipe work
Building Construction	Tourist center (including a clinic) of 742 m^2, air quality monitoring station 100 m^2, a vehicle garage	**Solid waste collection and disposal**	Landfill site of 500 m^2, located 10 km north, 100 garbage bins, 1 garbage truck, 1 front-end loader, 2 tipping truck, 1 road pavement scraping truck
Rehabilitation		**Power and heating**	road lights
Walkways, lookouts, signage and electric vehicles	Walkways, viewing platforms, and maintenance, operational vehicles	**Safety and security systems**	healthcare/emergency equipment
Landscaping and fencing	Fencing to protect key sites, 650 steel fence to 4 sites, 60 signage, 60 site interpretation boards, 20 security warming signage	**Other**	

Budget: 36,118,300Yuan (4,630,600USD)

Applicable Chinese Environmental Quality Requirements

Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)
I	-	Ⅴ	0 or 2 depending on location

Applicable World Bank Safeguards

OP4.01 is triggered by the activities at this site, and detailed assessment of impacts, and planned mitigation measures are given in Chapters 5 and 8. The key value of Yardang National Geological Park is its unusual formation of hills and dunes, formed by a natural process of wind erosion. Infrastructure to be constructed at the site (including asphalt roads of 19.2 km, and 6.5 km, two asphalt parking lots, 650 m of steel fencing, a 150m^3 water storage tank, construction of toilets and a 3 km sewage pipe, a 500 m^2 landfill outside of the park, a visitor centre and walkways) may alter the pattern of wind erosion, during both construction and operation. Infrastructure may also have visual impacts that undermine the value of the area. The sourcing of materials and water is not determined at this stage. There are no critical natural habitats at the site, but there may be impacts on the area's natural habitats, mitigation measures for which are detailed in Chapter 8. The land to be used for parking lots, roads etc is not inhabited or used for any purpose by people, so the requirements of OP4.12 are not applicable at this site.	☝	OP 4.01 Environmental Assessment
	☝	OP 4.04 Natural Habitats
		OP 4.09 Pest Management
		OP 4.36 Forestry
		OP 4.11 Physical Cultural Resources
		OP 4.10 Indigenous Peoples
		OP 4.12 Involuntary Resettlement
		OP 4.37 Safety of Dams
		OP 7.50 International Waterways
		OP 7.60 Disputed Areas

Baseline

Population	Not inhabited	Surface water	There is no surface water.
Relief	A plain from 1200 m ASL to 900m ASL, of 'yardang' formation	Groundwater	More than 30 meters under ground, and in poor flow condition.
Relevant climatic features	Frequent and strong winds, particularly in Spring, giving rise to the yardang formation. Precipitation is only 39.9 millimetres per year, falling in brief rainstorms in June to August.	Air quality	
Geology and soils	Thick silty clay, and fine and medium sand.	Natural habitats and Flora and Fauna	Desert scrub.

Planning

Tourism Development Plan	Heritage Conservation Plan		Feasibility Study Report	
	Completion	Prepared by	Completion	Prepared by
Completed thoroughly	none		Completed and waiting for approval	Lanzhou Coal Mining Design & Resea Institute; Jingwei Environmental Engineering Technology Co., Ltd

Consultation and Disclosure

Consultation activities:	Questionnaire survey	Expert consultation	Workshop	Public hearing
	X		X	

Questionnaire Date	Number of questionnaires	Proportion of responses	Respondents	Proportion of respondents satisfied with environmental quality	Proportion of people in agreement with the proposed project
4 Jan., 2006	100	91%	Residents, officers, teachers and tourists in Dunhuang city	95%	96.7%

Workshop Date	Topics	Participants	Responses
12 Jan., 2006	Consult the Participants' opinion and suggestions.	⌘ EIA institution staffs; ⌘ Site management staffs; ⌘ Officers from Dunhuang city EPB; ⌘ Officers from Dunhuang city DRC;	Most of the questioned public think the project w bring more benefit than adverse impacts, and will agree with the construction of the project and hav the will to take part in local environmental protection activities.

Information disclosed	Disclosure date	Disclosure ways
EMP of this site	Feb., 2007	Through website (www.jingweiese.com)

Impacts and Mitigation Measures: Prior to Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Visual impact of new facilities, if not located, designed or constructed in sympathy with the local heritage and surroundings	Construction of all facilities according to minimum standards of design, and in keeping with a site design that enhances its visual and landscape value	Procurement of design consultant to provide consistent design of facilities across all sites	PPMO	YR1
		Planning of the required design for all sites, in coordination with the development of a Gansu tourism 'brand'	Design consultant	YR1
		Design consultant to incorporate building and road design standards into the designs (eg to prevent soil	Design consultant	YR1

		erosion alongside roads), and landscaping including ecological restoration if necessary Include appropriate environmental technologies as part of design process.	Design consultant	YR1

Impacts and Mitigation Measures: During Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Adverse impacts of construction activities including fugitive dust and noise, soil erosion	Construction Management Plan	Provision of guidance on the measures required of the contractor as part of a construction management plan. Preparation of written construction management plan, submitted to EPB Construction Department and PPMO. Municipal PMO to include assessment of construction management approach in contractor's bidding documents Adherence to construction management plan during implementation: construction area to be arranged to avoid fugitive dust (by covering stacks of cement/gravel materials etc, sprinkling periodically during windy days, constructing enclosing barrier), and use of noisy machines far from residents and other noise sensitive receptors, etc. Note: Annex H sets out an initial template of construction management guidelines, to be	EPB Site Managers Muncipal PMO Contractors, monitored by Supervision Management Engineer and EPB	Prior to commencement of construction at any site Prior to commencement of construction at any site. During Evaluation of Bids During Construction

		tailored by each site.		
Risk of injury of labourers and the public during construction and rehabilitation activities	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, and prevention of public access.	Provision of guidance on the measures required of the contractor as part of a health and safety plan Request to potential contractors to supply health and safety details with tenders. Plans to be submitted to EPB construction department. Adherence to health and safety plan during implementation	PPMO, through Safe Manufacture Supervision Bureau Municipal PMOs Contractors, monitored by Supervision Management Engineer and EPB	Prior to commencement of construction Prior to commencement of construction Following award of contract, prior to commencement of work
Casual disposal of solid waste and construction waste materials in the local environment	Implementation of Site Waste Management Plans	Appointment of contractor with track record of responsible disposal of construction waste (Grade A or B contractors) Monitoring of disposal of construction waste	Muncipal PMO Site management and Supervision Management Engineer	During Bidding During construction
Reduced local availability of groundwater or surface water	Identify permitted level of water extraction, and limit extraction within this level, taking steps to reduce water consumption through water reuse, and capture of rainwater, where necessary	Apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required	Municipal PMO	Before any water abstraction
Disposal of wastewater into surface water courses	Prevent disposal of wastewater that exceeds environmental quality standards to local water courses	Dispose of water responsibly into wastewater treatment areas	Contractor, monitored by Supervision Management Engineer	During construction
Loss of ‘chance finds’ of archaeological artefacts during rehabilitation or construction	Education of labourers in the recognition of potential artefacts, and use of a protocol for steps to take in the event of chance finds.	Provision of basic guidance on the content of a chance finds policy Design of a chance finds protocol Education of contractors and employees in the steps to take in the event of chance finds.	Cultural Relics Bureau Site management Site management	Prior to construction Prior to construction During construction
Risk of damage to cultural heritage through vibrations created during construction	Use of professional contractors with experience of working in areas where fragile cultural relics are present. Temporary removal of cultural relics if feasible.	Evaluation of contractors’ experience in carrying out construction works in areas with sensitive cultural heritage during bidding process; appointment of suitable contractors	Municipal PMOs	During bidding process

Impacts associated with use of materials (water, timber, cement etc) from unsustainable sources	Use only materials from sources approved as sustainable	Site management to arrange for sourcing of materials from sustainable sources only. Record numbers of instances of use of materials from unsustainable sources.	Supervision Management Engineer Supervision Management Engineer	Throughout construction Throughout construction

Impacts and Mitigation Measures: During Operation

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Reduced local availability of groundwater or surface water, disposal of wastewater into surface water courses, unmanaged disposal of solid waste.	Adoption and implementation of an environmental policy by the site	Identify permitted level of water extraction for the site, and apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required. Maintenance of wastewater treatment facilities to avoid unplanned wastewater disposal. Management of vehicles eg use of vehicles on site that use clean power such as electric power or gas or solar power. Manage solid waste on basis of predictions of the level and composition of waste to be expected, and carry out waste minimisation, recycling and re-use Monitoring of environmental management on the site by EPB	Site management EPB	During Operation
Risk of injury of public and staff	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, prevention of public access, and planning for emergencies.	Site management to submit Health and Safety plans to EPB, in compliance with Scenic Area management guidelines of the state administration	Site management	During operation
Induced environmental impacts of traders and public gathering around		Community engagement to maximise benefits from tourism for	Discussions with local communities on concerns	Site management

the site, adverse social impacts associated with increased tourism to the area		local communities, and prevent unplanned gathering of vendors and beggars.	Identification of measures to maintain good relations with communities, and gain their assistance in preventing unwanted vendors, including special provision for the poorest	Municipal PMO

Monitoring Requirements: During Construction

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Ambient air	TSP	Construction site roadside	Duplicate samples every two months
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Site-wide	Continuous

Monitoring Requirements: During Operation

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Site-wide	Continuous

Costs

Description	Rate	Unit	Number	Expenditure Classification	Base Cost (1 USD = 7.7 RMB)		% by year						Notes
					Yuan	USD	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Yardang National Geological Park													
Third party supervision of construction works	2000	Days	100	Services	200,000	25,974	25%	25%	25%	25%			2 days per month over four years of construction

Measures to limit visual and odor impact of solid waste disposal site	70000	Lump sum	1	Civil works	100,000	12,987	100%						
Monitoring During Construction													
Ambient Air	40	Yuan	48	Services	1,920	249	25%	25%	25%	25%			
TOTAL					**301,920**	**39,210**							

Yellow River Stone Forest National Park

Location: Near Longwan village, Zhongquan Township, 60 km from Jingtai county, 70 km from Baiyin city. N.36▫91′17.22″□ E.104▫28′71.60″

Area: 50 km^2

Natural or Cultural Heritage Value 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.

Legal Status: The site is a National level Geological Park.

Activities to be Completed

Archaeological excavation, heritage inventory and preservation	-	**Dams and embankments**	2.7 km embankment on Yellow River
Roads and bridges	Improvement to 2.5 km drive, new road	**Water supply and drainage**	4 km water supply mains, 10km smaller diameter water pipes, 3.23 km trunk sewer and 10 km collectors
Vehicle parking lots	3000 m^2	**Sanitation facilities, toilets and wastewater treatment**	Wastewater treatment facility with capacity of 800 m^3/day
Building Construction	Construction of 2500 m^2 exhibition space	**Solid waste collection and disposal**	100 litter bins
Rehabilitation	-	**Power and heating**	150 solar-energy streetlights
Walkways, lookouts, signage and electric vehicles	2.8 km footpath upgrading, 60 tourist signs	**Safety and security systems**	-
Landscaping and fencing	3000 boundary stones, 4,000 boundary posts	**Other**	-

Budget: 36,300,000Yuan (4,653,846USD)

Applicable Chinese Environmental Quality Requirements

Class of Ambient Air Quality Standard (GB3095-1996)	Class of Environmental Quality Standards for Surface Water (GB3838-2002)	Class of Quality Standards for Groundwater (GB/T14848-93)	Class of Standard of Environmental Noise of Urban Area (GB3096-93)
II	III	-	1

Applicable World Bank Safeguards

The project will support the following key construction activities: roads, a 10,000 m^2 square, a 4000 m^2 parking lot, and a 4737 m^2 exhibition space, and a water supply system and sewers. It will also construct two river embankments, of 3.3 km and 1.5 km in length. The justification	X	OP 4.01 Environmental Assessment
		OP 4.04 Natural Habitats

for these investments is not clear in any case.		OP 4.09 Pest Management
		OP 4.36 Forestry
		OP 4.11 Physical Cultural Resources
		OP 4.10 Indigenous Peoples
		OP 4.12 Involuntary Resettlement
		OP 4.37 Safety of Dams
		OP 7.50 International Waterways
		OP 7.60 Disputed Areas

Baseline

Population	Not inhabited	Surface water	Yellow River flows through this area. The Longwan section of Yellow River flows steadily at with annual runoff of 32.8 billion m^3 and average flux of 1040 cubic m^3 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.
Relief	Mountainous	Groundwater	The groundwater in Longwan valley is generally from 3 meters to 10 meters below ground. The water volume yielded by a single well is between 100 and 500 cubic meters per day.
Relevant climatic features	Arid with high annual temperature variation, significant seasonal changes, sparse and uneven precipitation, dry and windy days. The annual average number of sandstorm days is 21.9.	Air quality	The main air pollutant is PM_{10}, which monitoring value overrun the requirement of Class □of Ambient Air Quality Standard (GB3095-1996). The monitoring values of SO_2 and NO_2 are all in accordance to the requirement of Class □of Ambient Air Quality Standard (GB3095-1996)
Geology and soils	North Qilian Drape Zone of Qilian Drape System, a series of faults and drapes, in west by northwest direction mainly. Sierozem soils (transitional grassland to desert) and irrigation-silting soils, with high nutrient content.	Natural habitats and Flora and Fauna	The vegetation in this area is sparse plants in desert grassland.

Planning

Tourism Development Plan	Heritage Conservation Plan		Feasibility Study Report	
	Completion	Prepared by	Completion	Prepared by
completed thoroughly	none		Completed and waiting for approval	Forestry Investigation and Planning Institute of Gansu Province

Consultation and Disclosure

Consultation activities:	Questionnaire survey	Expert consultation	Workshop	Public hearing
Yellow River Stone Forest National Park	X		X	

Questionnaire Date	Number of questionnaires	Proportion of responses	Respondents	Proportion of respondents satisfied with environmental quality	Proportion of people in agreement with the proposed project
9 May, 2006	103	93.2%	Residents around this site and tourists	83.33%	98.96%

Workshop Date	Topics	Participants	Responses
June, 2006	Declare the project progress, mitigation measures and consult the public opinion and suggestions.	⌘ Local residents; ⌘ Longwan village committee members; ⌘ Site management staffs.	The local public think that the current developme is not enough and eagerly hope to strengthen the development of the stone forest geological resource reasonably.

Information disclosed	Disclosure date	Disclosure ways
Briefings of the project conclusion of EIA report and summary of EIA report	26 April, 2006	Through website (www.nwimm.com),newspaper(Baiyin Daily), and obtaining relevant information from Gansu EPB, Baiyin EPB, Northwest Research Institute of Mining and Metallurgy and Yellow River Stone Forest National Park Office.

Impacts and Mitigation Measures: Prior to Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing

Visual impact of new facilities, if not located, designed or constructed in sympathy with the local heritage and surroundings	Construction of all facilities according to minimum standards of design, and in keeping with a site design that enhances its visual and landscape value	Procurement of design consultant to provide consistent design of facilities across all sites Planning of the required design for all sites, in coordination with the development of a Gansu tourism 'brand' Design consultant to incorporate building and road design standards into the designs (eg to prevent soil erosion alongside roads), and landscaping including ecological restoration if necessary Include appropriate environmental technologies as part of design process.	PPMO Design consultant Design consultant Design consultant	YR1 YR1 YR1 YR1
Risk of soil erosion and disturbance to Yellow River as a result of the construction of the river embankment: disturbance to aquatic habitats along these embankments during construction, and permanent loss of riverbank habitat	**Design river embankment on sound principles of river geomorphology, and minimise the size of the embankment to reduce habitat loss**		**Municipal PMO**	**YR 0**

Impacts and Mitigation Measures: During Construction

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Adverse impacts of construction activities including fugitive dust and noise, soil erosion	Construction Management Plan, including sprinkling the roads with cold water immediately after asphalting to reduce fumes.	Provision of guidance on the measures required of the contractor as part of a construction management plan. Preparation of written construction management plan, submitted to EPB Construction Department and PPMO.	EPB Site Managers	Prior to commencement of construction at any site Prior to commencement of construction at any site.

		Municipal PMO to include assessment of construction management approach in contractor's bidding documents Adherence to construction management plan during implementation: construction area to be arranged to avoid fugitive dust (by covering stacks of cement/gravel materials etc, sprinkling periodically during windy days, constructing enclosing barrier), and use of noisy machines far from residents and other noise sensitive receptors, etc. Note: Annex H sets out an initial template of construction management guidelines, to be tailored by each site.	Muncipal PMO Contractors, monitored by Supervision Management Engineer and EPB	During Evaluation of Bids During Construction
Risk of injury of labourers and the public during construction and rehabilitation activities	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, and prevention of public access.	Provision of guidance on the measures required of the contractor as part of a health and safety plan Request to potential contractors to supply health and safety details with tenders. Plans to be submitted to EPB construction department. Adherence to health and safety plan during implementation	PPMO, through Safe Manufacture Supervision Bureau Municipal PMOs Contractors, monitored by Supervision Management Engineer and EPB	Prior to commencement of construction Prior to commencement of construction Following award of contract, prior to commencement of work
Casual disposal of solid waste and construction waste materials in the local environment	Implementation of Site Waste Management Plans	Appointment of contractor with track record of responsible disposal of construction waste (Grade A or B contractors) Monitoring of disposal of construction waste	Muncipal PMO Site management and Supervision Management Engineer	During Bidding During construction
Reduced local availability of groundwater or surface water	Identify permitted level of water extraction, and limit extraction within this level, taking steps to	Apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required	Municipal PMO	Before any water abstraction

	reduce water consumption through water reuse, and capture of rainwater, where necessary			
Disposal of wastewater into surface water courses	Prevent disposal of wastewater that exceeds environmental quality standards to local water courses	Dispose of water responsibly into wastewater treatment areas	Contractor, monitored by Supervision Management Engineer	During construction
Loss of 'chance finds' of archaeological artefacts during rehabilitation or construction	Education of labourers in the recognition of potential artefacts, and use of a protocol for steps to take in the event of chance finds.	Provision of basic guidance on the content of a chance finds policy Design of a chance finds protocol Education of contractors and employees in the steps to take in the event of chance finds.	Cultural Relics Bureau Site management Site management	Prior to construction Prior to construction During construction
Risk of damage to cultural heritage through vibrations created during construction	Use of professional contractors with experience of working in areas where fragile cultural relics are present. Temporary removal of cultural relics if feasible.	Evaluation of contractors' experience in carrying out construction works in areas with sensitive cultural heritage during bidding process; appointment of suitable contractors	Municipal PMOs	During bidding process
Impacts associated with use of materials (water, timber, cement etc) from unsustainable sources	Use only materials from sources approved as sustainable	Site management to arrange for sourcing of materials from sustainable sources only. Record numbers of instances of use of materials from unsustainable sources.	Supervision Management Engineer Supervision Management Engineer	Throughout construction Throughout construction

Impacts and Mitigation Measures: During Operation

Impact	Mitigation Measures (Site Level only)	Further details	Responsibility	Timing
Reduced local availability of groundwater or surface water, disposal of wastewater into surface water courses, unmanaged disposal of solid waste.	Adoption and implementation of an environmental policy by the site, including (i) Planting of trees or shrubs on both sides of tourist roads and scenic spots to mitigate vehicle fumes, (ii) Construction of noise barriers or green belt around parking lot to mitigate noise, and (iii) Use of sludge generated from WWTP by farmers for use as fertilizer.	Identify permitted level of water extraction for the site, and apply to Water Resources Bureau for abstraction permit when surface water or groundwater is required. Maintenance of wastewater treatment facilities to avoid unplanned wastewater disposal. Management of vehicles eg use of	Site management	During Operation

		vehicles on site that use clean power such as electric power or gas or solar power. Manage solid waste on basis of predictions of the level and composition of waste to be expected, and carry out waste minimisation, recycling and re-use Monitoring of environmental management on the site by EPB	 EPB	
Risk of injury of public and staff	Design and enforcement of Site Health and Safety Plans encompassing protective clothing, safe working at height, prevention of public access, and planning for emergencies.	Site management to submit Health and Safety plans to EPB, in compliance with Scenic Area management guidelines of the state administration	Site management	During operation
Induced environmental impacts of traders and public gathering around the site, adverse social impacts associated with increased tourism to the area		Community engagement to maximise benefits from tourism for local communities, and prevent unplanned gathering of vendors and beggars.	Discussions with local communities on concerns Identification of measures to maintain good relations with communities, and gain their assistance in preventing unwanted vendors, including special provision for the poorest	Site management Municipal PMO

Monitoring Requirements: During Construction

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Ambient air	TSP	Around road, building and embankment construction sites	Four times per day for three successive days dur peak construction period.
Noise	Leq(A)	Around road, building and embankment construction sites	A whole day monitoring (day and night) durin peak construction period.
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	At construction sites	Continuous

Monitoring Requirements: During Operation

Aspect	Monitoring Parameters	Monitoring Locations	Monitoring Timing and Frequency
Noise	Leq(A)	Roadsides	Twice monthly
Discharge of wastewater treatment station	pH, SS, COD, BOD, Ammonia nitrogen, petroleum	Wastewater treatment station discharge point	Quarterly, both day and night
Safety incidents	Number and type of incidents concerning safety of workers and public (including near misses, and injuries)	Site-wide	Continuous

Costs

Description	Rate	Unit	Number	Expenditure Classification	Base Cost (1 USD = 7.7 RMB)		% by year						Notes
					Yuan	USD	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Yellow River Stone Forest													
Third party supervision of construction works	2000	Days	100	Services	200,000	25,974	25%	25%	25%	25%			2 days per month over four years of construction
Measures to limit visual and odor impact of solid waste disposal site	70000	Lump sum	1	Civil works	100,000	12,987	100%						
Monitoring During Construction													
Ambient Air	40	Yuan	78	Services	3,120	405	25%	25%	25%	25%			4 times per day for three days per item of civil works
Noise	75	Yuan	7	Services	488	63	25%	25%	25%	25%			Once per item of civil works
Monitoring During Operation													
Ambient air	40	Yuan	48	Services	1,920	249					50%	50%	Twice monthly at roadsides
Wastewater Treatment Plant Discharge	326	Yuan	16	Services	5,216	677			25%	25%	25%	25%	
TOTAL					**310,744**	**40,356**							