

**China: Chongqing New Urbanization Pilot  
And Demonstration Project**

**ENVIRONMENTAL ASSESSMENT  
Executive Summary**

**Chongqing Municipal PMO  
CCTEG Chongqing Engineering**

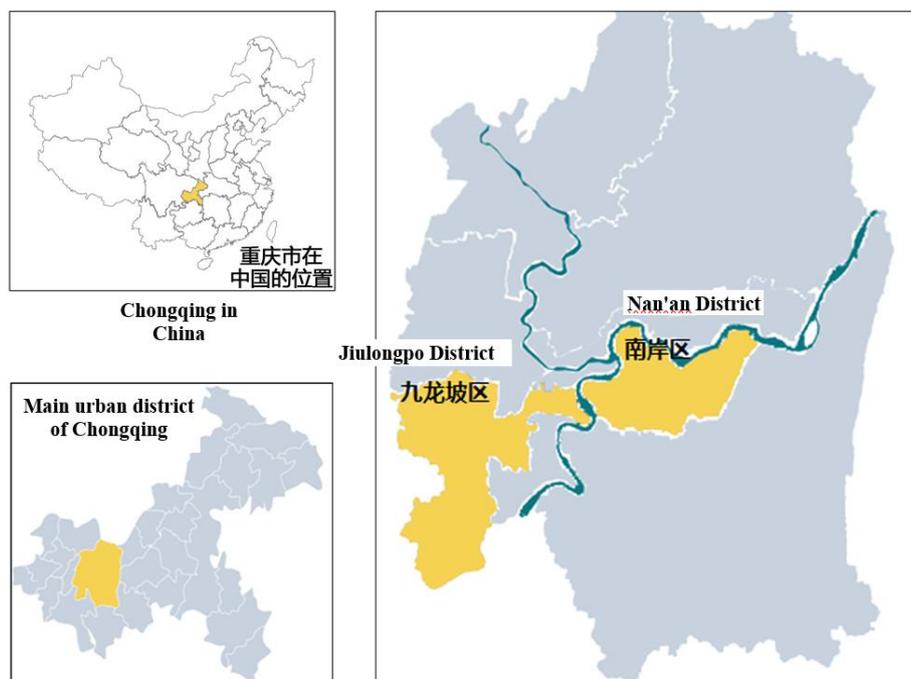
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## 1 PROJECT BACKGROUND

Chongqing new urbanization pilot and demonstration project is located in Nan'an and Jiulongpo District (**Figure 1-1**).



**Figure 1-1 The geographic location of the project**

As a main urban district of Chongqing, *Nan'an District* is located on the south bank of the Yangtze River in Chongqing, with its west and north areas bordering on the Yangtze River, its east and south areas on Banan District, and Jiulongpo District, Yuzhong District, Jiangbei District, and Yubei District separated by river. The entire district covers a total area of 265km<sup>2</sup>. It has jurisdiction over eight sub-districts and nine villages and towns, with a total permanent population of 873,900.

As a main urban district of Chongqing, *Jiulongpo District* is located on the west of the main urban area. Covering a total area of 432 km<sup>2</sup>, and with jurisdiction over 8 sub-districts and 11 towns, and a total permanent population of 1,186,900, such district has Yuzhong District and Nan'an District on the east, Dadukou District on the south, Bishan District and Jiangjin District on the west and Shapingba District on the north.

The project is assigned as Category A as per OP4.01 primarily due to diverse impacts associated with the various activities to be implemented in densely populated urban core areas. Full environmental assessment was conducted during the project preparation. The following World Bank safeguards policies are triggered: (1) OP4.01 Environmental Assessment; (2) OP4.04 Natural Habitats; (3) OP4.11 Physical Cultural Resources; and OP4.12 Involuntary Resettlement.

Environmental impact assessment (EIA) reports have been prepared for Nan'an subproject and Jiulongpo subproject respectively, based on which two stand-alone Environmental Management Plans (EMP) have been developed. An environmental and social management framework (ESMF) has been prepared for urban regeneration technical assistance of the Component 1. The preparation of EIAs and EMPs followed the relevant laws and regulations of China, World Bank safeguards policies, as well as World Bank Group EHS guidelines, with comments and guidance from the World Bank task team. Besides these environmental safeguards

documents, social safeguards documents have also been prepared following the requirement of OP4.12 respectively. These documents were submitted to the Bank, and found in conformity with World Bank safeguards policies. They have been locally disclosed in local website, Project Management Offices, local communities, and are also disclosed in the World Bank's external website.

This document summarizes the potential environmental and social impacts of the proposed Project based on above-mentioned safeguards documents. It highlights the key environmental and social safeguards issues related to the project construction and operation, describes the main findings and conclusion of impact assessment, and summarizes main mitigation measures and implementation management plans.

In summary, the proposed project will have significant positive impacts by old community regeneration, public space regeneration, slow-traffic system regeneration and quality improvement of public space. The direct environmental and social impacts are mostly site-specific, not significant and are well identified. Thorough environmental and social management plans have been developed that can adequately avoid, minimize, mitigate and compensate the adverse impacts to an acceptable level.

## 2 PROJECT OBJECTIVE AND DESCRIPTION

The project development objective is to improve use of public space and increase pedestrian mobility in select districts of Chongqing’s Central City.

The project interventions under this project development objective consist of four overall activities and components in the proposal should clearly fall in one of the four categories:

- (1) neighborhood public space improvements
- (2) parks and green public space improvements
- (3) pedestrian walkway improvements
- (4) urban regeneration technical assistance

The project will include the following components:

**Component 1 - Technical Support to Urban Regeneration Planning and Implementation at District Level (US\$ 2.8 million).** The component is expected to build institutional and technical capacity for urban regeneration at the district level (Nan’an and Jiulongpo), and to establish and demonstrate a mainstreamed process and practice for community-led bottom-up regeneration.

**Component 2 - Urban Regeneration Interventions in Nan’an District (US\$ 182 million of civil works).** This component consists of investments in (a) neighborhood rehabilitations focusing on improvements of neighborhood public space, backstreets, drainage, footpath and community landscaping for 13 selected old neighborhoods in Nan’an District’s densely built and populated central urban area; (b) improvements to the district-wide pedestrian walkway network (improving 46 pedestrian routines, total length of 135 kilometer including 3 road connections); (c) public space, parks and urban greening improvements (4 parks and 3 public space, totaled 32.6 hectare of land area).

**Component 3 - Urban Regeneration interventions in Jiulongpo District (US\$ 60 million of civil works).** This component consists of investments in (a) constructing 5.3 km pedestrian walkway to complete a district-wide pedestrian loop; (b) parks and urban greening improvements (9 parks, totaled 158.9 hectare of land area).

**Component 4 - Project Management and Capacity Building (US\$ 3.5 million).** Provision of project management, implementation support and capacity building activities for the two project districts of Nan’an and Jiulongpo and the Chongqing PMO of municipal level.

The executive summary of the environmental and social impact assessment includes the main contents of environmental impact assessment, social impact assessment and the Environmental and Social Impact Management Framework.

The detailed project activities in Nan’an District and Jiulongpo District are listed in Table 2-1 the locations of these project activities are shown in Figure 2-1 and Figure 2-2.

**Table 2-1 Detailed Project Activities in Nan’an and Jiulongpo District**

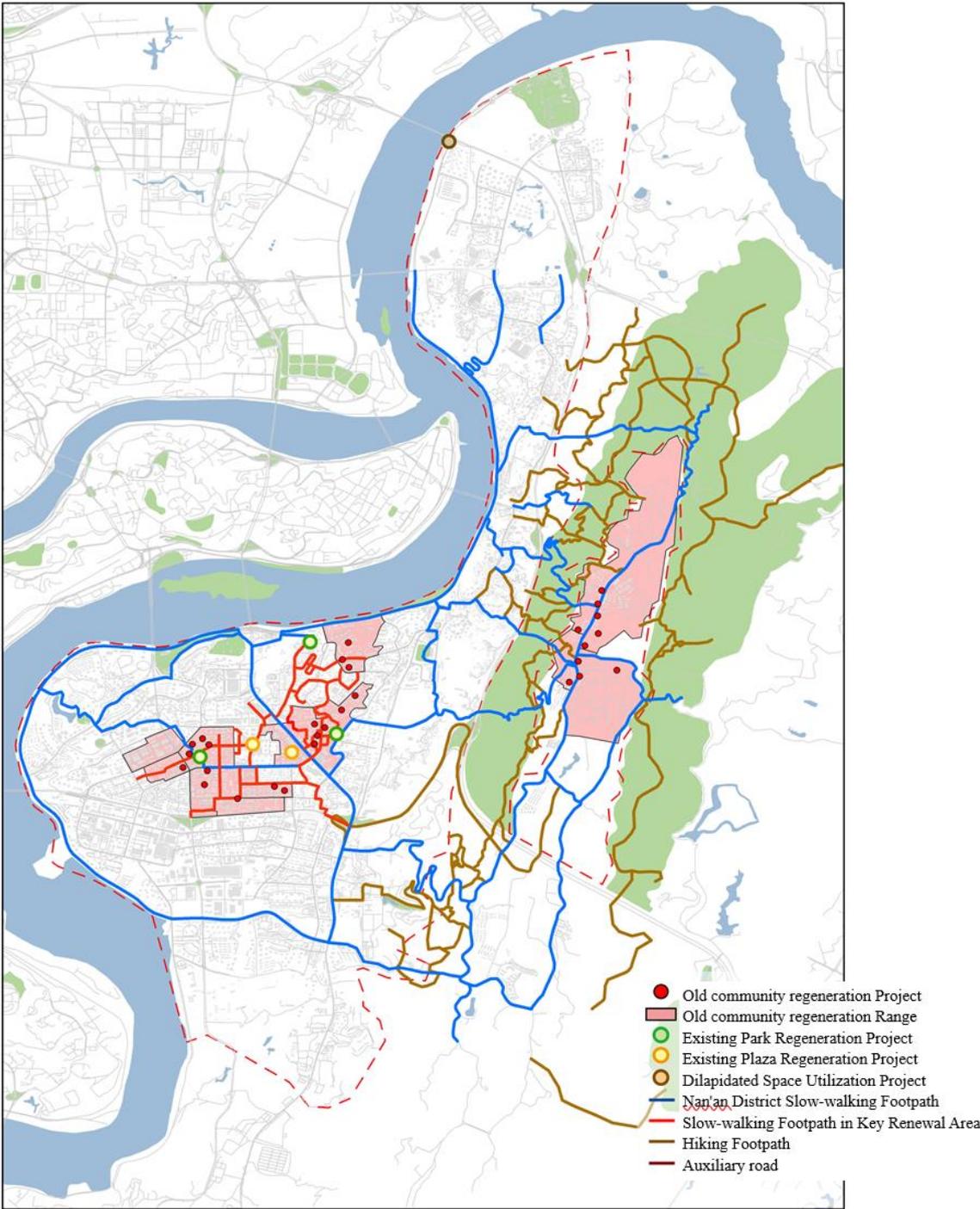
Sub-project name	Activities	
<b>Nan’an District</b>		
Old Neighborhood	Nanping Street Committee	It rehabilitates 4 old Communities <sup>1</sup> (Dongxing Road, Jinzi Street, Yangguang and Xiangshui Road)

<sup>1</sup> In the context of the project, Street Committee refers to 街道 (Jiedao) which is an administrative level below district; below Street Committee is Community (社区, Shequ). A Block is not an administrative unit. It refers to a residential area (小区, Xiaoqu).

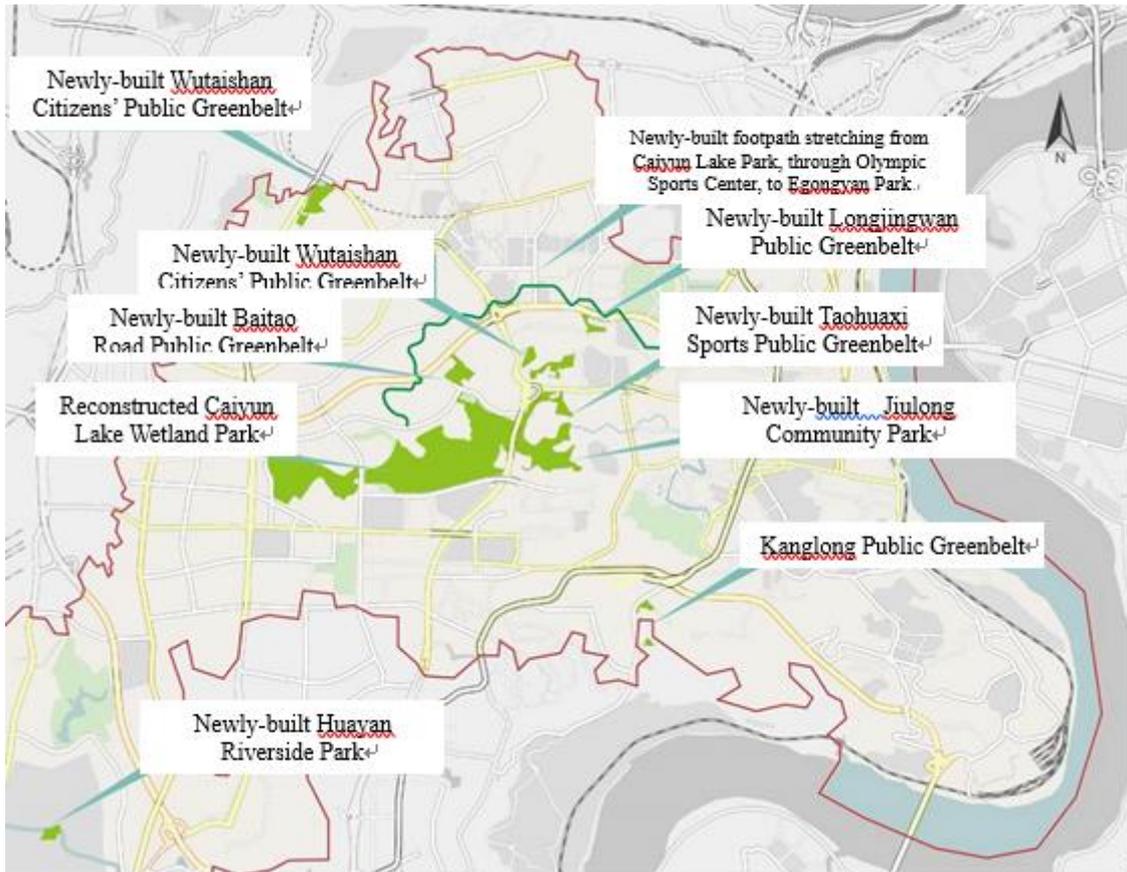
Rehabilitation	community rehabilitation	Communities), including 11 blocks, 83 residential buildings, and 4,678 households. The main project content includes rehabilitation and addition of street facilities (e.g. bench, staircase and functional artistic sketch), infrastructure improvements involving water supply and sewage pipeline.
	Huayuan Road Street Committee community rehabilitation	It rehabilitates 4 old Communities (Jinshan Road, Jinyan, Gulouwan and Nanhu Communities), including 8 blocks (communities), 158 residential buildings and 9,715 households. <i>The main project content same as above.</i>
	Nanshan Street Committee community rehabilitation	It rehabilitates 2 old Communities (Huangjueya, Zhenwushan Communities), including 10 blocks (Xiaoqu), 27 residential buildings and 1,740 households in total. <i>The main project content same as above.</i>
Public space improvements	Improvements to existing parks	It covers 3 green spaces including Nanhu Community Public Space, Guohuishan Public Greening Space, and Houbao Public Greenbelt Space, with the total area of 7.92ha. The improvements cover resting facilities, pavement, plant and greening space quality, etc.
	Improvements to existing squares	It covers the public recreational spaces of Nanping, the public space of Huigong Road, with the total area of approx. 4.25ha. The improvements cover pavement, resting facilities as well as artistic sketch, etc.
	Idled space utilization	It includes the vacant space utilization under Dafosi Bridge, with the total area of 20ha. It is to build a waterfront space, including footpath, pavement, greening and auxiliary facilities, etc.
Pedestrian walkway network improvements	Slow-walking footpath <sup>2</sup>	There are 29 slow-walking footpaths with total length of approx. 88.32km and a width of 3m. The improvements cover pavement, street façade, blind sidewalk, signage, resting facilities, dustbins, node greening, crossing facilities, urban furniture and sewage pipes, etc.
	Hiking footpath	There are 16 hiking footpaths in total with the length of approx. 42.31km. The improvements cover trail connection, pavement, resting facilities, power supply pipeline facilities, etc.
	Connection roads	There are 3 road connections, including i) Longhuang road widening: 769m in length, widen from 12m to approx. 2.5m each side; ii) Hugu Road 1,403m long and 12m-24m wide; including existing and new alignments; iii) Tushan Branch Road 647m long, 26m wide, including existing and new alignment.
<b>Jiulongpo District</b>		
Pedestrian walkway	Walking footpath project	Newly-built footpath from Caiyun Lake Park, through Olympic Sports Center, to Egongyan Park, with the length of 5.3km.
Public space	Yangjiaping	Newly-built <b>Kanglong</b> Public Green Space with a total

<sup>2</sup> A slow-walking footpath is often 3m in width, wider than a hiking footpath (trail) that is 1-2 m wide.

improvements	Street Committee public space improvement	area of 2.13 hectares is divided into two lots, of which Lot A covers the area of 15,113m <sup>2</sup> and Lot B of 6,171m <sup>2</sup> . The main construction content includes: i). Landscape buildings: landscape gallery frame, landscape and leisure pavilion (area); ii). Protection works; iii). Activity site and square; iv) Water and electricity pipe network and facilities; v) Landscape art (sculpture accessories, landscape wall, entrance landscape); vi) Function building and facilities (toilet and finished product management room); viii). Public furniture; ix) Road pavement and line; x). Signage
	Erlang Street Committee public space improvement	Newly-built Baitao Road Public Greenbelt with a total area of 2.28 hectares. <i>The main construction content same as above.</i>
		Newly-built Wutaishan Citizens' Public Greenbelt with a total area of 4.81 hectares. <i>The main construction content same as above.</i>
		Newly-built Longjingwan Public Greenbelt with a total area of 1.28 hectares. <i>The main construction content same as above.</i>
	Jiulong Town public space improvement	Improvement of existing Caiyun Lake Wetland Park The park has a total area of 110.26 hectares. <i>The main construction content same as above.</i>
	Shiqiaopu Street Committee public space improvement	Newly-built Shimei Citizens' Public Greenbelt with a total area of 4.55 hectares. <i>The main construction content same as above.</i>
	Shipingqiao Street Committee public space improvement	Newly-built Taohuaxi Sports Public Greenbelt with a total area of 2.46 hectares. <i>The main construction content same as above.</i>
		Newly-built Jiulong Community Park with a total area of 19.31 hectares. <i>The main construction content same as above.</i>
Huayan Town public space improvement	Newly-built Tiao Huayan Riverside Park with a total area of 1.29 hectares. <i>The main construction content same as above.</i>	



**Figure2-1 Nan'an District layout plan of each sub-project**



**Figure 2-2 Jiulongpo District layout plan of each sub-project**

### 3 REGULATORY AND LEGAL FRAMEWORK

The Environmental Impact Assessment (EIA) for both Nan'an and Jiulongpo District projects was conducted in accordance with Chinese EIA laws/regulations/guidelines, and the World Bank safeguards policies, as well as Environmental, Health and Safety guidelines of World Bank Group.

#### World Bank Safeguard Policy Requirements

Of the World Bank Groups ten safeguards policies, the following are triggered: 1) OP4.01 Environmental Assessment; 2) OP4.04 Natural Habitats; 3) OP4.11 Physical Cultural Resources; 4) OP4.12 Involuntary Resettlement. Compliance with these policies, and the World Bank's disclosure of information policy, is summarized in **Table3-1**.

**Table 3-1 Compliance with World Bank safeguards policies**

SN	Safeguard Policies	Whether applicable	Compliance
1	OP/BP4.01 <i>Environmental Assessment</i>	Yes	Category A project; Prepared full <i>Environmental Impact Assessment (EIA)</i> and <i>Environmental Management Plans (EMPs)</i> ; Prepared Environmental and Social Management Framework for component 1 Technical assistance activity; and Two rounds of public consultation and information disclosure were conducted as per OP4.01.
2	OP/BP4.04 <i>Natural Habitats</i>	Yes	Physical works in Nan'an district involve two forest parks and a scenic area. Physical works in Jiulongpo district involve a wetland park. Thus the policy is triggered.  These sensitive areas are for public recreational purpose. Proposed activities are of small scale, upgrading of existing facilities, and will not affect the ecological function or landscape of these sensitive areas. Mitigation measures have been incorporated into the EMP. The project will not cause significant conversion or degradation of natural habitats.
3	OP/BP4.36 <i>Forests</i>	No	The project will not have impacts on the health and quality of forests, or affect the rights and welfare of people and their level of dependence upon or interaction with forests. The policy is not triggered.
4	OP/BP4.09 <i>Pest Management</i>	No	The project will not involve use or procurement of pesticides directly or indirectly. The policy is not triggered.
5	OP/BP4.11 <i>Physical Cultural Resources</i>	Yes	Physical cultural resources survey was conducted through desk review, field visit and consultations.  Under Nan'an district component, proposed pedestrian walkway improvements are located in the vicinity of several PCR sites. The pedestrian walkway improvements won't affect these historical sites physically. Design has taken into account the landscape and preservation of these historical sites adequately. Pre-cautionary measures have been incorporated into the EMP.

SN	Safeguard Policies	Whether applicable	Compliance
6	OP/BP4.37 <i>Safety of Dams</i>	No	The policy is not triggered. The project doesn't involve any dams.
7	OP/BP4.10 <i>Indigenous Peoples</i>	No	No IPs affected in the project. The population of the affected areas of the project are mostly of Han ethnicity, or the ethnic majority population in China. Thus, the Indigenous Peoples OP/BP 4.10 is not triggered.
8	OP/BP4.12 <i>Involuntary Resettlement</i>	Yes	The social safeguard policy OP 4.12 is triggered as current land use of the existing proposals would cover collectively-owned land, land acquisition and physical resettlement that cannot be avoided.
9	OP/BP7.50 <i>Projects on International Waterways</i>	No	The policy is not triggered. The project area involves no international waterways.
10	OP/BP7.60 <i>Projects on Disputed Areas</i>	No	The policy is not triggered. The project area involves no place of disputes.

The World Bank Group *Environmental, Health and Safety Guidelines* (General Guidelines), and other applicable industry specific guidelines are incorporated into the EA. The mitigation measures included in the *Environmental Management Plans* of the project are completely in conformity with the requirement of foregoing guidelines. Particularly, the content in such guidelines is basically in line with the laws, regulations, guidelines and construction management rules of China.

**Table3-2 Compliance with WBG EHS Guidelines**

<i>General EHS Guidelines</i>	<b>Environmental impact assessment/compliance with Environmental Management Plans (EMPs)</b>
If any facility or project is near a recognized ecological sensitive area (for example, a national park), the pollution level increase shall be controlled as far as practicable; in addition, appropriate mitigation measures can also include the utilization of clean fuel or technology, and the application of comprehensive pollution control measures.	The project involves the ecological sensitive area, so existing municipal facilities shall be used and local residents shall be rented as far as possible during the construction phase, and the clean fuel may be used during the operational phase to reduce the pollution level.
Dust or particulate matter is the most common pollutant among irregular emissions. Some operations (for example, transportation and open-air storage of solid materials) and bare soil surface (including unpaved roads) will emit the particulate matter.	The management shall be strengthened, with the wet method operation promoted, barriers erected along the construction site, and the material storage yard fenced and covered; throwing materials from a high place is strictly prohibited. The testing and maintenance of motor vehicles shall be strengthened during the operational phase; automobiles of exhaust exceeding standard shall be prohibited from being on roads; road conditions shall be maintained; the vegetation shall be utilized to

	purify air.
<b><i>Environmental, Health and Safety Guidelines for Water and Sanitation</i></b>	<b>Environmental impact assessment/compliance with Environmental Management Plans (EMPs)</b>
The industrial wastewater, sanitary wastewater and the wastewater from operations of public works or rain water will be discharged to the public or private wastewater treatment system, and the pretreatment and monitoring requirements of the sewage treatment system such wastewater is discharged to will be met.	During the construction phase, the washing wastewater will be reused after the treatment of the oil separation and grit chamber, without being discharged outside; the sanitary sewage will be collected and pretreated by biochemical pools and regularly sucked to the sewage treatment plant by fecal suction trucks, or directly connected to the municipal sewage pipe network; during the operational phase, the sanitary wastewater from the public space will be all discharged to the sewage treatment plant through the municipal sewage pipe network for treatment.
The rain water shall be separated from the industrial wastewater and the sanitary wastewater to reduce the volume of wastewater which can be discharged after treatment;	The diversion of rain and sewage water will be utilized, with rain water conduits and sewage conduits built separately.
At the most sensitive point, if it is predicted that the noise from the project facilities or the operation activities will exceed relevant noise level, the noise prevention and control measures shall be taken.	The low-noise machines will be used during the construction phase; the construction will be appropriately scheduled, with the night-time construction avoided; construction machines and plant will be appropriately arranged inside the site; and the fence will be erected. At the operational phase, the asphalt pavement will be adopted, and trees and grass will be planted; the speed at the road sections along densely populated residential areas and schools will be limited and the signs of no honking will be erected, with acoustic screens built, special funds for noise monitoring and treatment provided and other measures taken to prevent and control the noise.
<b><i>Environmental, Health and Safety Guidelines for Toll Roads</i></b>	<b>Environmental impact assessment/compliance with Environmental Management Plans (EMPs)</b>
When appropriate, properly selecting road and supporting facility positions, and utilizing existing traffic corridors to avoid important terrestrial and aquatic habitat (for example, old-growth forests, wetlands and fish spawning habitat);	The region where this project is located is not an important terrestrial and aquatic habitat.
During the construction phase, efforts shall be made to reduce clearing local plant species, and to replant local plant species at the affected areas	The construction activities shall be arranged within the scope of the land occupied for the construction; local plants shall be appropriately planted.

Roads shall be paved in dry weather to avoid the loss of asphalt or cement materials;	During the construction phase, pavement construction is prohibited in gale weather, and the construction site shall be appropriately determined;
The oil-water separator must be used during treatment whether there will be a great amount of grease produced;	The oily water collecting container shall be equipped for construction machines at the construction site to collect the oily water produced. The collected oily water shall be delivered to and treated at the capable unit, and any direct discharge without treatment shall be prohibited.
Replacing diesel with vegetable oil to be releasing agent and cleanser to prevent any pollution caused by cleaning asphalt equipment; the cleaning products and polluted asphalt remaining shall be prevented from escape; scraping shall be conducted before cleaning, and the cleaning activities shall be conducted at the place far away from the surface water or drainage facilities.	Contractors shall set forth requirements on “storage of fuels, oil and hazardous and noxious substances” in their specifications, and all fuels at the construction site shall be stored and fenced; the storage area shall be 110% of the fuel storage containers. The fuel storage area shall not be near any source of water (namely, up to 100m from the source of water);
Acoustic treatment shall be made to surrounding buildings (generally, change of windows);  The road pavement of less and lower noise from road surface-tire friction shall be adopted, for example, the asphalt mastic crushed stone mixture.	At the operational phase, the speed at the road sections along densely populated residential areas and schools will be limited and the signs of no honking and acoustic screens will be erected, with special funds for noise monitoring and treatment reserved. All the roads of this project adopt asphalt pavement.
<b><i>Environmental, Health and Safety Guidelines for Waste Management Facilities</i></b>	<b>Environmental impact assessment/compliance with Environmental Management Plans (EMPs)</b>
Collection and transportation of wastes	They will be delivered to the local waste treatment plant for unified treatment
Garbage cans or garbage bags are encouraged to be used by every family or waste collecting stations around buildings; wastes shall be collected regularly and frequently to avoid waste accumulation; vehicles to collect and transport wastes shall be covered to avoid wastes blown away by wind when driving;	They shall be delivered to a fixed point, and shall be gathered and transported by the sanitation department to Nan’an District municipal solid waste treatment plant for disposal.
Regular waste collection;  Developing cleaning plans for garbage collection vehicles and all the garbage collection containers of the enterprises;	
Advocating the use of garbage bags to avoid polluting the garbage collection equipment.	
The garbage collection routes shall be optimized to shorten the driving distance, and reduce the	

total fuel consumption and emission; Forwarding stations will be established for small garbage collection vehicles to gather the collected garbage to large vehicles and deliver to the garbage treatment plant.	
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### Chinese Laws and Regulations

The EIA is prepared fully in compliance with relevant China national laws, regulations, technical guidelines and procedures. Compliance with a selective list of key Chinese regulations and EIA technical guidelines are summarized in **Table 3-3**.

**Table 3-3 Compliance with Key China Domestic Laws and Regulations**

China Laws and Regulations	Project Compliance
<i>Environmental Impact Assessment Law</i>	<ul style="list-style-type: none"> <li>EIA prepared by licensed EIA consultant, reviewed and approved by local environmental protection agency.</li> </ul>
<i>Classified Directory for Environmental Management of Construction Project</i>	<ul style="list-style-type: none"> <li>Individual EIAs have been prepared according to proper classification</li> </ul>
<i>Interim Measures for the Public Participation in Environmental Impact Assessment</i>	<ul style="list-style-type: none"> <li>Two rounds of public participation conducted in surrounding villages/towns, and info disclosure through website.</li> </ul>
<i>Notice on Strengthening EIA Management for Construction Projects Funded by Loans from International Financial Institutions</i>	<ul style="list-style-type: none"> <li>EIAs and EMPs are prepared in compliance with World Bank safeguards policies.</li> </ul>
<i>Culture Property Protection Law</i>	<ul style="list-style-type: none"> <li>Project adjusted to avoid known cultural property</li> </ul>
<i>EIA Technical Guidelines on Atmospheric Environment (HJ2.2-2008), Surface Water Environment (HJ/T2.3-1993), Noise Impact Assessment (HJ2.4-2009), Ecological Environment (HJ19-2011), Groundwater (HJ610-2016)</i>	<ul style="list-style-type: none"> <li>Impact assessment follows the technical requirements of these guidelines</li> </ul>

## 4 ENVIRONMENTAL AND SOCIAL BASELINES

### 4.1 Physical Environment

#### Location

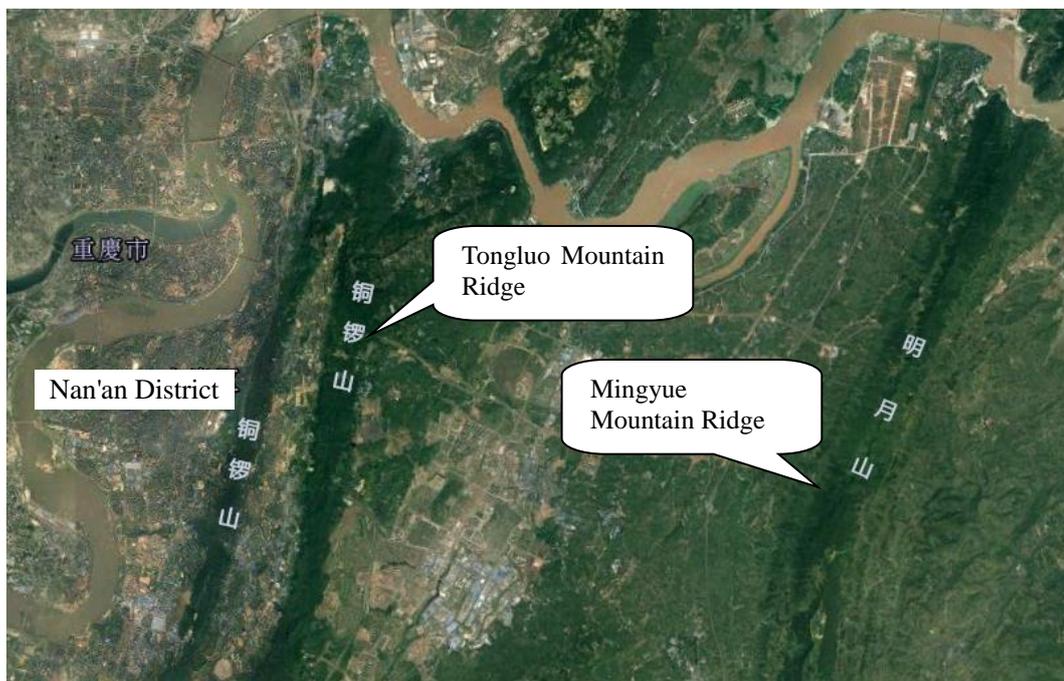
Chongqing is located in the southwestern part of China's inland and the upper reaches of the Yangtze River.

Nan'an District is in the main city of Chongqing, is located on the South Bank of the Yangtze River in Chongqing, between E106°3'14"~106°47'2" and N29°27'2"~29°37'2".

Jiulongpo District is in the west of Chongqing, between E106°14'52"~106°32'55" and N29°15'29"~29°33'44".

#### Topography

Nan'an District is located in the paralleled ridge-valley of East Sichuan where anticlines and synclines are distributed in parallel. From east to west, there is the Mingyuexia anticline, the Guangfusi syncline, and the Tongluoxia anticline. The anticline develops into mountains and the syncline into valleys. Therefore the combined geomorphic features of low mountains, hills, flat lands and rivers are formed here. The topography of of Nan'an district see Figure 4-1.



**Figure 4-1 Nan'an District topographic map**

Jiulongpo District belongs to south extension of Huayingshan ribbon fold. Anticline forms mountains and syncline forms valleys. The anticlinal structure generally forms the middle and low mountains, the two flanks are open and it's mainly round middle and low hills. The topograph of Jiulong district is shown as **Figure 4-2**.



**Figure 4-2 Jiulongpo District topographic map**

### **Meteorology**

Nan'an and Jiulongpo Districts are located in the Sichuan Basin. It is a subtropical monsoon humid climate, with abundant water and heat (rain season and hot season), less sunshine and long frost free period. It's cold in early spring, hot in summer, raining frequently in autumn and foggy in winter. The annual average temperature is 16°C~18°C and the frost-free season of a year is about 340 days.

### **Hydrology**

#### ***Nan'an District***

Surface water resources are mainly the transit water brought by rivers and streams. The accumulative annual average amount of transit water is 344.75 billion m<sup>3</sup>, of which the transit water of the Yangtze River accounts for most of it, and three small rivers with annual water amount of 40.48 million m<sup>3</sup> contribute less than the Yangtze River but more than other surface runoff waters in the area.

#### ***Jiulongpo District***

The Yangtze River flows from the south of jurisdiction area to the east and northeast, gathering tributaries like Taohuaxi, Motan River and Daxi River, it's generally developing in southeast-southwest direction. Liangtan River joins Jialing River out of the district.

## **4.2 Ecological environment**

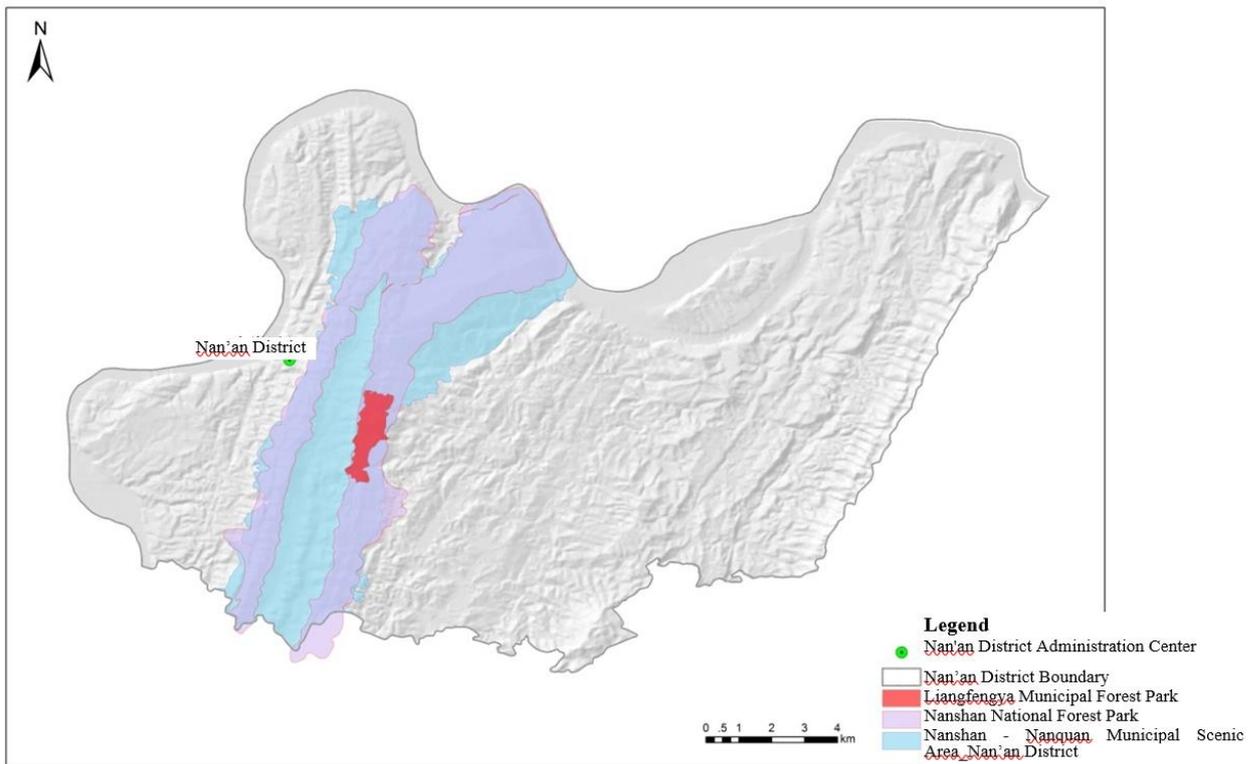
### **Nan'an District**

Nan'an District consists of urban artificial ecosystem and agricultural ecosystem. The landscape is dominated by hills and plains. The forest coverage rate is 28.2%.

The dominating vegetation in the project area is subtropical evergreen broad-leaved forest.

Due to long-term human activities, the zonal vegetation in the project construction area is degraded. The existing vegetation mainly consists of artificially planted trees, secondary shrubs, and natural weeds. Rare plants and ancient trees are not seen. The assessment area is mainly located in the built-up area and planning area of the main urban district, where surrounded by many construction activities and human production activities. Due to the influence of human activities, few amphibians, reptiles, mammals and other wild animals choose to inhabit in the area, and no national key protected wild animals, including amphibians, reptiles, mammals, etc. or their inhabits are discovered within 200m of the project area during the investigation.

**Sensitive Areas.** There are three ecologically sensitive areas, Nanshan National Forest Park, Liangfengya Municipal Forest Park, and Nanshan - Nanquan Municipal Scenic Area in Nan'an District. These three sensitive areas are overlapped in their geographic areas. See Fig. 4-3 for relative position of the sensitive areas.



**Figure 4-3 Relative position of sensitive points in Nan'an District**

Located between the main urban district of Chongqing and Chayuan New Area, **Nanshan National Forest Park** is a forest park in the city. Its geographic coordinates is between 106°34'07" to 106°39'54" east longitude and 29°27'50" to 29°35'36" north latitude. The Forest Park consists of two mountain ridges, with a width of about 6km from east to west, about 15km from north to south, and a total area of 3,080hm<sup>2</sup>.The construction included in this project is the upgrading and transformation of the walking footpath and hiking footpath, that is, the surfacing of the existing footpath, in the Nanshan National Forest Park, while community and public space regeneration is not included in this project.

Chongqing **Liangfengya Forest Park** was ranked as municipal forest park by Chongqing Forestry Bureau in 1994. Located at the junction of Liangfengya Village, Changshengqiao Town and Lianhe Village, Huangjueya Town, and with its geographic coordinate between 106°31'24" to 106°31'26" east longitude and 29°27'12" to 29°27'16" north latitude, borders Nanshan Town to the north and Huangjueya Town to the west, and adjoins Changshengqiao Town to the east and state-owned forest to the south, covering a total operating area of 1,009.3hm<sup>2</sup>. The construction

included in this project is the upgrading and transformation of one overall space footpath and two hiking footpaths in Liangfengya Municipal National Forest Park, that is, the surfacing of the existing footpaths, while community and public space regeneration is not included in this project.

**Nanshan-Nanquan Municipal Scenic Area**, approved to be a provincial scenic area by Sichuan Province in 1989, was rated as a municipal scenic area by Chongqing Municipal People's Government in 1999. This scenic area is mainly composed of Mount Nanshan and South Hot Spring scenic spots. The assessment area involves Nanshan area. Nanshan area locates within Nanshan-Nanquan Municipal Scenic Area. It is close to the downtown area. With its coordinates of north latitude 29°12', east longitude 106°32' to 106°38', Nanshan area, covering an area of about 5.667km<sup>2</sup>, is a part of the Tongluoxia Mountains and the ribbon-pattern area of Northeast-Southwest direction. The Nanshan Sub-district regeneration projects in Nanshan Sub-district are located in the scenic area, including two communities, namely Huangjueya Community and Zhenwushan Community; part of footpaths and hiking footpaths of the overall space locate within the scenic area. This project is to renew, upgrade and transform the existing communities and footpaths.

## **Jiulongpo District**

Jiulongpo District consists of urban artificial ecosystem and agricultural ecosystem. The landscape is dominated by hills and plains. The forest coverage rate is 28.2%.

In China's vegetation regionalization, it belongs to China subtropical evergreen broad-leaved forest, Sichuan east basin and southwest mountain evergreen broad-leaved forest zone. As per site survey, zonal vegetation in the project area is degraded by long-term human activities. Existing vegetation mainly includes manually planted trees, secondary shrubs and natural weed. There are no rare and precious plants, famous and ancient trees.

The project area is mainly located in major city built-up area, there are many surrounding construction activities and human production activities. There is few amphibians, reptiles, animals and other wildlife habitat due to human activities. In the survey period, there is no national level amphibian, reptile, and animal wild key protection animals and no habitat distribution in 200m of project site.

**Sensitive Areas**. The World Bank Financed Project proposes to support Caiyun Lake Wetland Park improvement subproject. The wetland park, 110ha in area, was built along a segment of Taohuaxi River during 2007-2010. The wetland park is managed by Jiulongpo District Parks Bureau. The wetland park is surrounded by road networks and new residential buildings. The wetland park aims to serve as an artificial wetland for providing living water source for Taohuaxi, protecting ecological environment and water quality purification, exhibiting wetland plant landscape, and create a wetland park in city center. As per improvement and upgrade planning of Caiyun Lake Wetland Park, the project is mainly located in sightseeing activity area and wetland functional exhibition area and will not affect the wetland park's ecological function and landscape.

## **4.3 Socio-Economics**

The area of Chongqing is 82,400 kilometres. According to statistics, the household registered population of Chongqing is 33,921,100 in 2016, the GDP of Chongqing in 2016 is 1,755.925 billion yuan.

The household registered population of Nan'an District is 700,100 in 2016, the GDP of Nan'an District in 2016 is 74.55 billion yuan, the per capita disposable income of Nan'an District residents is 32,160 yuan.

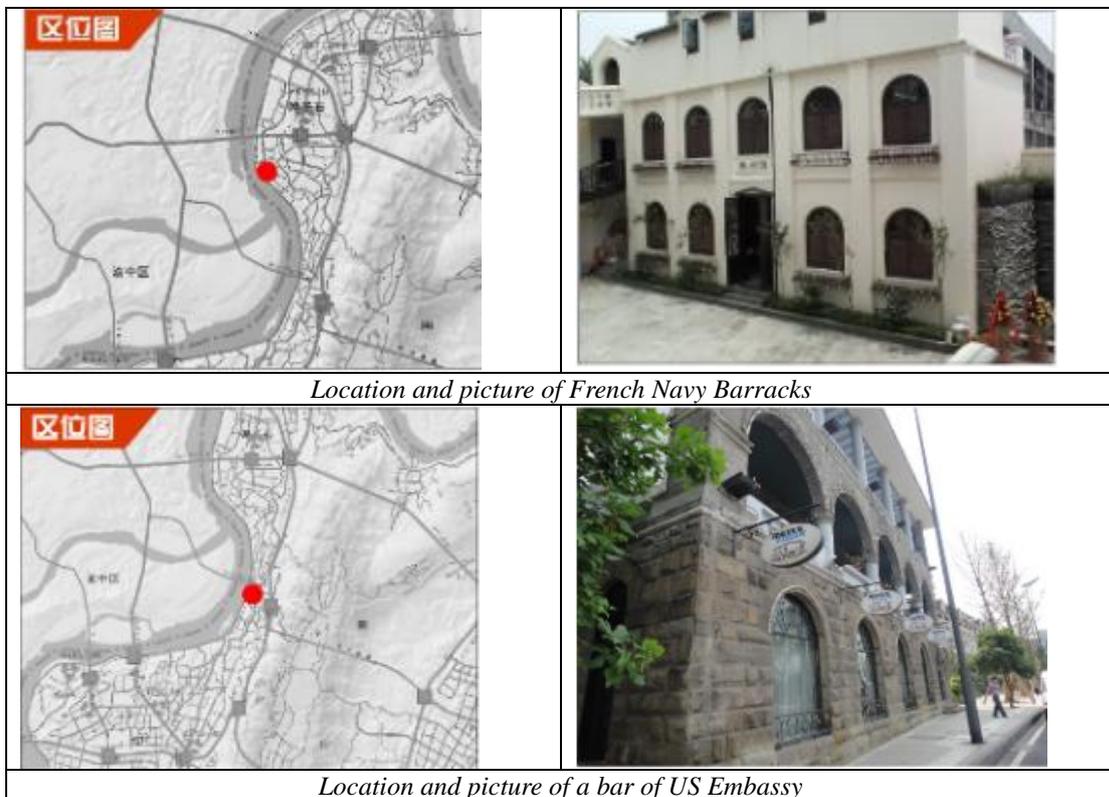
The household registered population of Jiulongpo District is 917,200 in 2016, the GDP of Jiulongpo District in 2016 is 108.967 billion yuan, the per capita disposable income of Jiulongpo

District residents is 32,075 yuan.

#### 4.4 Physical Cultural Resources

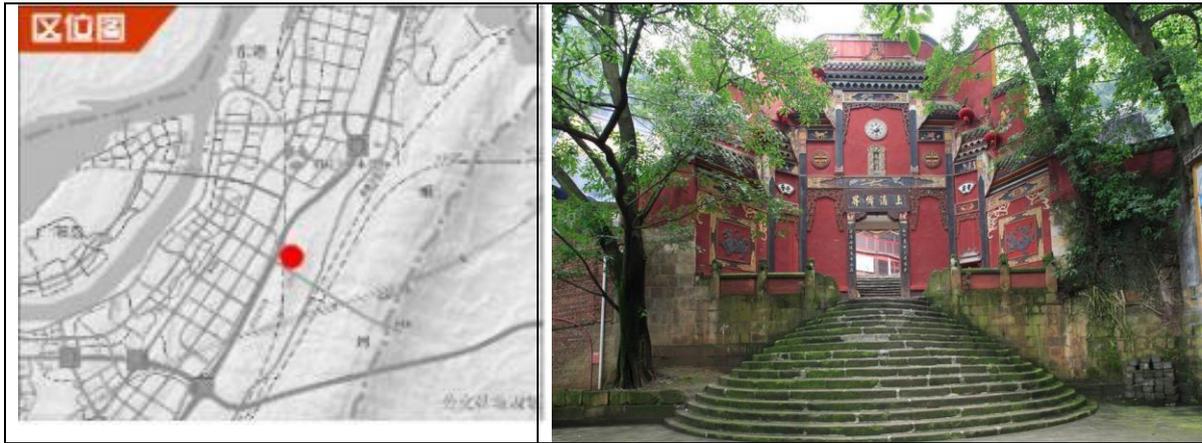
Physical cultural resources survey was conducted through desk review, field visit and consultations. Under Nan'an district component, pedestrian walkway involves several PCR sites, including Nanbin Road which housed historical buildings of the Allies during WWII period, a Laojun Temple by Longhuang Road and Anti-Japanese War (WWII) historic site museum.

- Nanbin Road runs along the Yantze river on its right bank. By the road there is a belt of historical buildings of the Allies during the second World War when Chongqing was the temporary capital of China. These historical buildings include assets affiliated to the US Embassy, Belgium Embassy, Italy Embassy (These are District Level Cultural Relics Protection Unit), French navy barracks (National Level Cultural Relics Protection Unit). Given its premium location, along the road there are other historical buildings belonged to trade companies and upper class. The project supported pedestrian walkway won't physically encroach these historical sites. Nonetheless, precaution should be made given the proximity of the constructions activities to the relics sites.



**Figure 4-4 Historical buildings by Nanbin Road**

- Laojundong Taoist Temple is located by Longhuang Road, on which pedestrian walkway will be implemented. The temple is a municipal level cultural relics protection unit. The main features are temple in a stone cave and stone carving. See Figure 4-5.



**Figure 4-5 Location and picture of Laojundong Taoist Temple**

- Chongqing Anti-Japanese War Historical Site Museum has 15 historical buildings scattered on an area of about 500mu. These buildings were constructed during the second World War and include residences of then top leaders of Chinese government and military, US military advisers, bomb shelter, etc. The site is located in a hilly and well vegetated area and featured beautiful landscape as well. In the whole it is a national level cultural relics protection unit. Within the area the project will support improvement of several pedestrian walkways.



**Figure 4-6 Chongqing Anti-Japanese War Historical Site Museum**

#### 4.5 Ambient Environmental Quality

**Surface water :** The water body the Nan'an District Project and the Jiulongpo District Project involves is Yangtze River. It is known from the monitoring data that all the monitoring factors of the Yangtze River Cuntan section, Yuzui section and Fengshou Dam section conform to the Category-III standard specified in the Environmental Quality Standards for Surface Water (GB3838-2002), and the water quality is overall good.

**Ambient air:** SO<sub>2</sub>, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> in each monitoring point of the Nan'an District Project and the Jiulongpo District Project conform to the relevant requirements specified in the Ambient Air Quality Standards (GB3095-2012), and the ambient air quality is overall good.

**Ambient noise level:** All the noise values at most monitoring points of the Nan'an District Project and the Jiulongpo District Project in the day and at night conform to related standards in the Acoustical Environment Quality Standard (GB3096-2008), and the status of acoustic environment quality is good.

**Soils quality:** Site survey was carried out on the proposed newly built park and public space during the project preparation. Of the nine sites (eight in Jiulongpo and one in Nan'an), six are small land pockets that have been idled due to their difficult topography or location, and are planted vegetables by local residents. A number of them (Huayan riverside park and Wutaishan) were residential area or greening area. Baitao Road greenbelt currently houses construction material warehouse and small machinery processing workshop that presents low level of soil pollution risk.

## **5 ANALYSIS OF ALTERNATIVES**

### **5.1 "with project" and "without project"**

Comparison and selection between “With Project” and “Without Project” have been made on the Nan'an District project and Jiulongpo District project.

If the Nan'an District project is constructed, on the basis of the overall transformation, the road surface and the underground pipelines of the old communities will be renovated, so that the roads can be more convenient, and the overall design more reasonable. Meanwhile, the green space in the communities will take the unified planning and renewal, and together with the installation of energy-saving streetlights, leisure seats and other infrastructure, the living conditions of residents, the community environment and habitability index will all be improved. With the completion of the transformation, the community's roads, greening and public facilities will be fundamentally changed, and the community environment will have an entirely new look. After the construction of the slow-traffic system, more residents will visit the Waterfront Space on the Nanbin Road and enjoy the fun of playing water at close range; at the same time, the road capacity in the rush hours will be improved while the facilities for the pedestrian and carriage ways being completed to increase the safety. With the increase of public space, the parks will be more attractive, the sanitary condition of the squares will be improved and the disorderly parking of vehicles will be changed. Conversely, if the project is not carried out, the situation in the old communities will not be significantly improved, and the disadvantages caused therefrom will gradually be highlighted. Thus, the impact of “without project” on the external environment is clear and obvious.

If the Jiulongpo District project is constructed, it will improve the walking experience, promote the walking travel rate, reduce the use of motor vehicles, and enhance the accessibility of traffic and the integration of regional public space. Besides, it will strengthen the connectivity of community and public transport while promoting the land value of the surrounding areas of the project, increase the urban landscaping rate as well as improve the ecological micro-system and microclimate, alleviate the urban heat island effect while upholding urban ecological civilization. As a result, with the quality of living environment in Jiulongpo District being improved and the vitality of the neighborhood activated, the residents will have higher sense of happiness and gaining. Conversely, if the project is not carried out, the above situations will not be significantly improved, and the disadvantages caused therefrom will gradually be highlighted. Thus, the impact of “without project” on the external environment is clear and obvious.

These projects will bring benefits to the people's livelihood with advantages outweighing disadvantages. They have far-reaching influence on improving the living environment and quality for the residents, shaping Nan'an District's and Jiulongpo District's urban images, promoting the city construction as well as the sustainable development of economy, society and environment.

### **5.2 Road design**

According to the information of this project, the urban connecting road of Hugui Road has alternatives to compare.

In the design of Hugui Road are three alternative routes, namely the turning back curve route (Alternative 1), the three-layer helical interchange (Alternative 2) and the Taichang Road east extension (Alternative 3). The turning back curve route is recommended.

Compared in terms of engineering, Alternative 1 has shorter route, equal road design standard, and less engineering investment, but Alternative 3 has stronger traffic functions; in terms of environment protection, Alternative 1 occupies the least land area, the earthwork volume of Alternative 1 and 2 is far less than that of Alternative 3, Alternative 1 and 2 have less sensitive points nearby, Alternative 3 will involve many very near sensitive points and thus Alternative 3

will have greater noise impact on such sensitive points. Such three alternatives have no very significant difference in terms of the type of land occupied, their impacts on atmospheric environment, vegetation and animals, etc., but Alternative 1 is relative better. To sum up, Alternative 1 is relatively better in terms of engineering and environment protection; therefore, the environmental impact assessment approves Alternative 1 as the recommended plan.



**Figure 5-1 Selected alternative for Hugui Road**

## 6 ASSESSMENT OF IMPACTS AND MITIGATION MEASURES

The proposed project will have significant positive environmental and social benefits through improvement of the residential quality and promotion of the social and economic development of the project area. However, the project will have also adverse environmental and social impacts during the construction and operation stage. These negative impacts include:

**Table 6-1 Potential Negative Impacts during Construction and Operation**

Potential Environmental and Social Impacts during Construction	Potential Environmental and Social Impacts during Operation
<ul style="list-style-type: none"> <li>• Land acquisition and resettlement</li> <li>• Traffic and community disturbance</li> <li>• Construction nuisance and safety</li> <li>• Construction wastewater and sewage</li> <li>• Construction spoil and solid waste management</li> <li>• Impact on physical cultural resources</li> <li>• Ecological environmental impact</li> </ul>	<ul style="list-style-type: none"> <li>• Noise impact of road operation</li> <li>• Air quality impact from road operation</li> <li>• Impact on surface water and groundwater from park operation</li> <li>• Wastes from park operation</li> </ul>

Based on the environmental impact assessment, these impacts are found to be straightforward, limited in scope and can be readily mitigated with good construction and operation management. Adequate measures have been developed in EMP/RAP. In summary, the project will not have significant adverse environmental and social impacts, will not result in significant degradation or conversion of natural habitat and will not have significant impact on any physical cultural resources. Mitigation measures have been developed in the EMP, which can effectively avoid, minimize, mitigate or otherwise compensate potential environmental and social impacts.

### 6.1 Impacts during Construction Stage

#### 6.1.1 Land Acquisition and Resettlement

The project will have impact on such three communities as Liujiagang Community, Liuhulan Village, Tushan Town, Nan'an District, Guihuayuan Community, Lianhua Village, and Shanghao Community, Longmenhao Sub-district; permanently acquired rural collective land of 14.2mu, The number of people affected by such land acquisition is 14 households of 36 people. The demolished rural houses cover 1,450m<sup>2</sup>, demolished urban residences 539m<sup>2</sup>, demolished non-residence houses on state-owned land 4,464.32m<sup>2</sup>, and demolished houses with limited property rights 4,636.8m<sup>2</sup>. The number of people affected by such house demolition is 31 households of 90 people.

To address impacts of land acquisition and resettlement, a Resettlement Action Plan (RAP) has been prepared for Nan'an component following the relevant Chinese laws/regulations and World Bank *OP 4.12 Involuntary Resettlement*, and have been reviewed and approved by the World Bank. There is no land acquisition anticipated for the works in Jiulongpo district. Due diligence reports for land acquired before the project.

#### 6.1.2 Impact on traffic and communities

Since the project involves old community and neighborhoods that are densely populated, social disturbance arose from construction and transportation of materials, such as dust, noise, vibration, illumination at nighttime, blockage of access roads, and safety is a major concern.

Construction of the project requires mechanical operations and transport of building materials, the noise of machinery, construction works and construction vehicles will affect the residents' rest

and life to some extent; construction will cause inconvenience to residents' travel, affect the efficiency of traffic as well as the flow of automobile, but this impact is temporary, and will disappear once the construction activity is over.

In order to mitigate the impact of traffic and community disturbances, mitigation measures have been involved in the environmental management plans, including:

For the optimization of the construction plan, all construction units shall actively optimize those for the busy roads and intersections, accelerate the construction progress, and timely inform the residents about the project construction progress through various channels;

Construction activities shall be regulated, and construction vehicles and equipment are strictly required to operate within the specified construction area. It is not allowed to affect the normal running of vehicles outside the area. For individual indistinguishable construction intersections, guards should be assigned to guide the traffic on-site;

In order to strengthen the safety protection, all construction units shall set up fixed warning signs in notable locations to remind vehicles to slow down, and set the signs of "single lane" at both ends of the construction section;

Emergency management should be strengthened, emergency rescue equipment and vehicles be completed, and fast and efficient handling be ensured in case emergencies and dangerous situations occur.

### **6.1.3 Road safety and disturbance near school**

Tushan Branch Road in Nan'an District is close to Tushan Campus of Longmenhao Primary School. Currently the road ends at the gate of the school; students and school workers use the existing road. By design the road will be provided with pedestrian and will extend along the east side of the school and connect to an existing dead-end road. This road extension will provide access to the students and school workers to the residential buildings in the north, compared to currently dirt trails. The potential negative impacts include road safety and nuisance during construction due to the proximity of the road to the school. To minimize the impacts,

(1) During construction, an access road dedicated to the students and school workers should be demarcated, fenced and signed to protect them from potential harm of construction vehicles; contractor should assign dedicated personnel onsite to direct the traffic;

(2) Arrange the construction time properly, undertake construction in summer and winter vacations and holidays as practical as possible, and forbid the construction work near the school within 15 days prior to and during the college entrance examination and senior high school entrance examination;

(3) A closed hard fence shall be installed on the road section near the teaching building before construction, no lower than 1.8m;

(4) During school hours, the road construction must be paused until all students leave the road.

### **6.1.4 Noise impact**

According to noise prediction, during the construction, the daytime noise of the area 150m and the night noise of the area 200m away from the main construction machines will easily exceed the requirements of the Category 2 standard in *Acoustical Environment Quality Standard* (GB3096-2008), without adequate mitigation measures.

To mitigate noise impacts on nearby communities, a series of mitigation measures have been developed in the EMPs, including:

(1) High-noise construction sites shall be located in areas far away from the environmental sensitive points;

(2) The organization of the construction can be well designed by appropriate layout of construction machines and proper arrangement of the construction intensity. Try to place construction machines far away from surrounding sensitive points, appropriately position high-noise machines on the construction site, and erect fences around the construction site; temporary machine rooms should be arranged for strong-noise machines on the site like air compressors and diesel engines.

(3) Choose low-noise equipment that meets national standards, strengthen the maintenance of such equipment, and avoid the high noise pollution caused by the abnormal working of such equipment;

(4) In accordance with the *Emission Standard of Environment Noise for Boundary of Construction Site* (GB12523—2011), the construction time shall be appropriately arranged and the construction machines with strong noise are forbidden to work near residential areas at night (22:00 to 6:00); where under special circumstances it is necessary to conduct continual construction, the prior approval of relevant departments must be obtained and the prior communication with residents shall be conducted;

(5) Night construction operations which may emit noise pollution other than urgent repair and emergent rescue shall be prohibited at the area with dense noise sensitive buildings within 15 days before and during the college entrance examination and the senior high school entrance examination, and the construction operations which may produce environmental noise pollution shall be prohibited within the area of 100m around the examination rooms during the college entrance examination and the senior high school entrance examination;

(6) The passing time of the construction vehicles should be coordinated during the construction phase. With busy existing traffic, the construction unit, the construction party and the traffic administration shall strengthen their communication and coordination to avoid traffic jams. During the transportation at night, measures of slowing down and no honking will be taken. Strengthen the maintenance of construction machines;

(7) Some existing roads within the project area will be used to transport construction materials, earth and stone during project construction, and attention should be paid to the appropriate arrangement of the construction material transportation time. When vehicles pass the road sections of residential areas and schools, measures of slowing down and no honking should be taken.

(8) The supervision unit shall supervise the noise during the construction phase, be equipped with a certain amount of simple noise measuring instruments and monitor the residential areas near the construction site to ensure that they will not be impacted by the noise exceeding the standard.

### **6.1.5 Impacts on ambient air quality**

The impact of the project construction phase on ambient air is mainly manifested itself in the transportation of project materials, the construction of supporting road works, etc., and the main pollutants during materials transportation are TSP and the exhaust gas from transport vehicles and motive power machines. The road engineering involves the excavation and filling of earthwork, asphalt paving and other operations, and the main pollutants are stive.

To mitigate such impacts, a series of mitigation measures have been developed in the EMPs, including:

(1) Promoting the wet operation during the construction, erecting the watering for dust prevention supporting devices on the construction site, and strengthening the watering for dust prevention. The entrance and exit for transport vehicles should be properly arranged on the construction site, the tires of the vehicles out of the construction site must be washed for soil at the exit, and the wastewater from such washing should be treated by establishing sedimentation tanks.

(2) Building hard enclosed fences before the construction of the road section involving sensitive points, which shall be not lower than 1.8m.

(3) The enclosures of not lower than the height of the stacked materials shall be erected for such materials easy to rise or scatter as cement, mortar and plaster stacked in the open air or the construction wastes which cannot be cleared and transported within 48h, which shall also be covered; it is forbidden to throw construction wastes or materials easy to rise or scatter from a places higher than 3m; bulk materials (cement, river sand, etc.) shall be enclosed (covered or sheltered) for transportation.

(4) The construction site should be equipped with the watering cart for watering in dry weather on the construction site, and focus on the communities and sub-districts affected by the project construction.

### **6.1.6 Impacts on the water environment**

During the construction phase, the wastewater produced in the construction site, sewage from machinery/vehicle cleaning and workers is limited. The main pollutants in the construction wastewater are suspended solids (SS) and minor oil. Adverse impacts will be caused due to improper collection and dispose of the random discharged wastewater, especially those produced by the construction around the rivers.

To mitigate the impact of wastewater on the environment, the environmental management plan prepares some mitigation measures, including:

(1) The sanitary sewage produced by the constructors is strictly forbidden to be discharged directly into the natural water body. If it is impossible to connect with the existing municipal sewage pipe network, the sewage should be regularly sucked by the fecal suction truck to the sewage treatment plant for treatment after being collected and pretreated by the biochemical pool; if the municipal sewage pipe network can be connected, the sewage shall be discharged to the municipal sewage pipe network after being collected and pretreated by the biochemical pool. It is suggested that the construction unit should try to rent the local residences during the construction phase. If it is indeed necessary to construct temporary construction residences, the construction camp should be arranged within the permanently acquired land.

(2) The construction wastewater will be reused or used for reducing dust in the construction site and roads after the treatment of the oil separation and grit chamber erected in the construction site, without being discharged outside.

### **6.1.7 Solid waste management**

The solid waste during the construction mainly contains waste slag, building waste and domestic garbage.

To mitigate the impact of solid waste on the environment, the environmental management plan prepares some mitigation measures, including:

(1) Disused earth and stone and construction waste will be directly transported to surrounding legal waste slag disposal fields. Meanwhile, transport vehicles for waste earth and stone are prohibited from over-speed and overload; at the same time, fences and covering measures will be taken to prevent the waste slags from falling on the road to intensify the impact of the rising dust.

(2) The domestic waste shall be collected at fixed points and be regularly cleared and delivered to the nearby refuse treatment station for treatment. The waste shall be prevented from scattering on the way to the station during transportation. At the same time, special attention should be paid to the maintenance and management of the temporary dump sites, and prevention of the wastes from scattering everywhere caused by stacking wastes randomly, and at the same time, spray germicides and pesticides to the stacking point to reduce the breeding of mosquitoes

and germs.

### **6.1.8 Impact on Physical Cultural Resources**

As analyzed in Section 4.4, in Nan'an district, Nanbin Road historical buildings, a Laojun Temple by Longhuang Road and Anti-Japanese War (WWII) historic site museum will be potentially impacted by pedestrian improvements activities in Nan'an district. Construction will be very simple works like paving on the existing road, which will not encroach the boundary of those PCRs. Design of the pedestrian has incorporated into the coordination with the landscape of those historical sites. To minimize potential residual impacts, the environment management plan includes a series of mitigation measures, including:

- 1) Within the protection scope of cultural relics protection units, no other construction works or blast, drilling, excavation, etc. shall be conducted;
- 2) Training and awareness raising to contractors must be carried out before and during the construction;
- 3) Enhance construction supervision near those historical sites to avoid careless construction practices;

Further, chance-find procedure has been included in the EMPs. Namely, during construction, if any underground cultural relics are newly discovered, the construction unit shall suspend construction and, according to related laws of cultural relics, notify the cultural management department for rescue and treatment in a timely manner to guarantee the safety of cultural relics.

### **6.1.9 Impact on the ecological environment**

According to field investigations, there are no protected or endangered species of wildlife in the affected zone. The impact of the project on the ecological environment is mainly reflected in the limited clearing of existing plant resources and vegetation associated with park and connection roads construction. During construction, excavation and filling activities may result soil erosion. The plant species in the project area are widely distributed, so the project construction will not cause the species diversity to decrease, and the influence on the regional plant diversity is not significant. Restoration and re-vegetation will be conducted. Local and native species should be used to prevent the invasion of harmful alien species.

### **6.1.10 Cumulative Impacts**

The project is expected to bring about long-term significant environmental and social benefits as it aims to improve urban environment and build more livable neighborhoods. No significant cumulative impacts are anticipated because, i) a majority of the proposed activities are of small scale and will be implemented over 3-5 years at community level. Thus construction stage cumulative impacts would not be significant; II) When it comes to planning (future overlapping of effects) side, the project's objective is to promote rehabilitation of old neighborhood and improvement of details and against greenfield development that involves any significant land acquisition or structure demolition. Analysis three road connections in Nan'an District indicated that potential induced impacts will be limited given their scale (769m, 1403m and 647m long respectively), which will be effectively mitigated by sound planning and mitigation measures such as reasonably scheduling construction activities and timing will help avoid or minimize potential cumulative impacts.

## **6.2 Impacts during Operation Stage**

### **6.2.1 Noise Impact**

The noise sources in the operational phase are mainly the noise in the public space and the

traffic noise of the road. The strength the former is about 70 to 80dB (A), which can generally meet the requirements of the corresponding acoustic environment function area, and has little outside impact. In terms of traffic noise, if the no mitigation measures are adopted, in different years of prediction, with the increase of traffic flow, the operation of the road will have increasing impact of noise in the daytime and at night on all the sensitive objects.

To mitigate noise impacts on nearby communities, a series of mitigation measures have been developed in the EMPs, including:

(1) This Environmental Impact Assessment suggests that the project should plant protective green belts along both sides of the road;

(2) When the land along the two sides of the road is developed, the first row of the buildings near the road should be designed for those with low noise standards, such as commercial, industrial and trading, public places, etc. as barriers. The plane structure of the buildings near streets should be designed as the u-shaped structure against the road. It should be avoided that the bedroom faces the road. The non-residing rooms of kitchens, toilets, and the like should be arranged to face the road.

(3) Special noise monitoring and treatment funds should be reserved, and the monitoring should be strengthened during the operational phase. If the noise of the operational phase disturbs people, the residences and schools affected by excessive noise should be additionally equipped with sound insulation windows which can reduce noise by 15 to 20dB(A) and thus the impact of the traffic noise of the operational phase on residents and schools can be reduced greatly.

### **6.2.2 Impact on Air Quality**

The air pollution source of the project during the operational phase is mainly the vehicle exhaust emission on the road of the road projects. The type of the pollution source is dispersed and flowing line source. The height of the emission source is low. The pollutants diffuse within a small area. Due to the change of traffic flows in the day and at night, the pollution in the day will be heavier than that at night. It is suggested that relevant departments should strengthen their management and strictly implement the provisions of the state pertaining to vehicle exhaust emission standards, reduce the emission of vehicle exhaust pollutants, and plant green belts outside the side ditches along the two side of the road, so as to purify the air. The amount of vehicle exhaust produced during the operational phase is limited, which will not change the level of the atmospheric environment function zone, and will have small impact.

### **6.2.3 Impacts on Water Environment**

The new wastewater during the operational phase is mainly the sanitary sewage produced by urban residents at the public space. The sanitary sewage produced will be collected and then flow into the municipal sewage pipe network under the action of gravity flow, and finally flow into the sewage treatment plant for discharge after reaching standards, which will not have impact on the water environment.

### **6.2.4 Waste Management**

Wastes generated during the project operation will include domestic wastes at parks and public spaces. The EIA predicted that in Nan'an district, 0.24 ton of wastes will be produced daily; in Jiulongpo, 0.36 ton will be produced daily. The wastes will be collected and disposed by municipal sanitation units timely that will not cause waste management problem.

## 6.3 Impacts on Sensitive Areas

### (1) Nan'an District

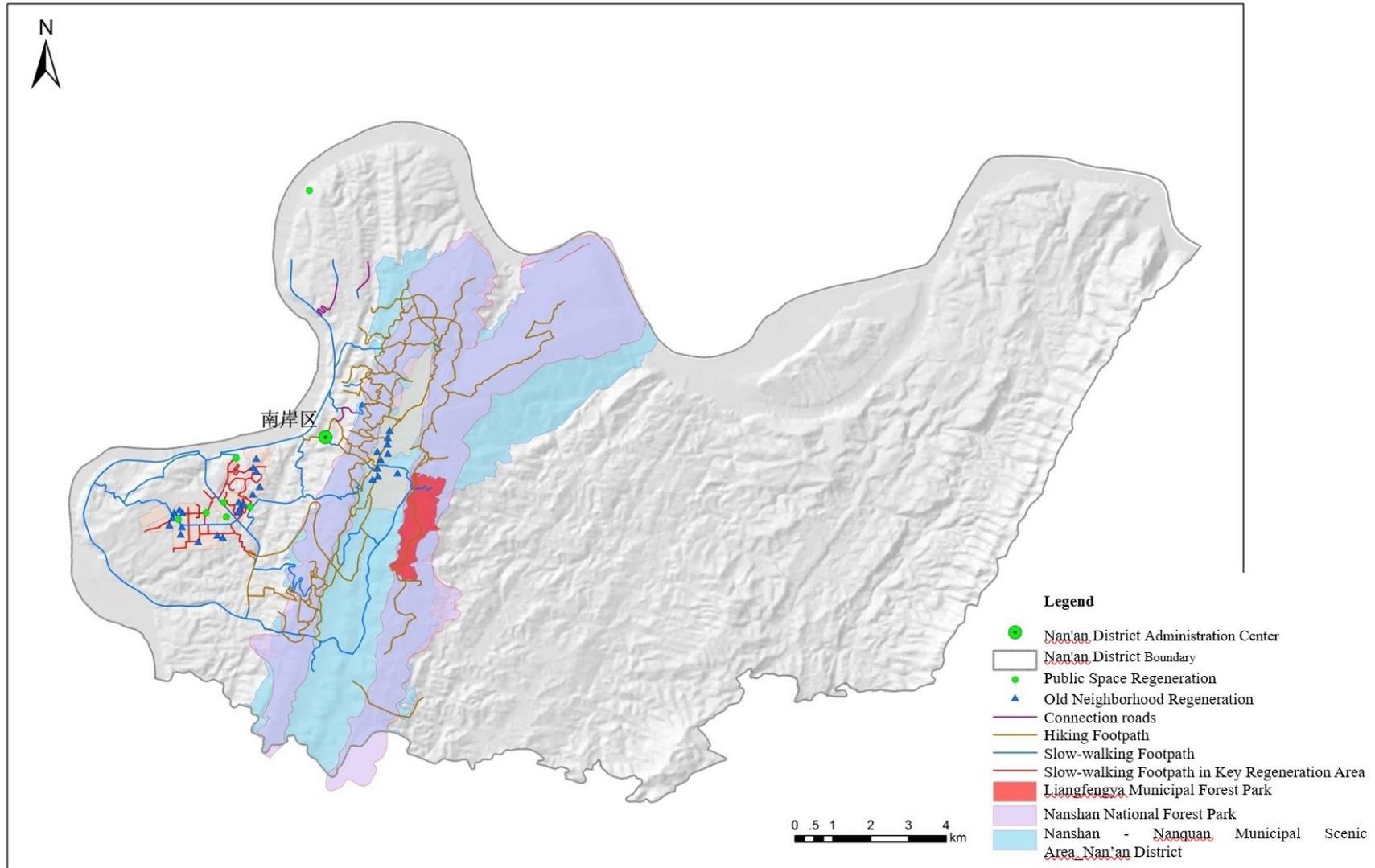
The project will involve such three sensitive areas, including:

- Nanshan National Forest Park,
- Liangfengya Municipal Forest Park; and
- Nanshan-Nanquan Municipal Scenic Area.

See Figure 6-1 for the positional relation between the project and the sensitive areas. See Figure 6-2 for the site survey of the sensitive areas.

The project supported neighborhood revitalization, hiking footpaths, and slow-walking footpaths fall into the sensitive areas. Specifically,

- On top of the Nanshan Hill the topography is relatively flat and it holds Nanshan Street Committee (Nanshan), in which the project will support neighborhood revitalization of 2 old communities involving 1740 households. Though the two old communities are located within Nanshan-Nanquan Scenic Area, the construction activities will take place in fully built-up area and won't impact the ecology or landscape of the scenic area;
- Hiking footpaths are existing trails (1-2m wide) connecting communities living on top and below Nanshan Hill on a daily basis. They also provide recreational function. The project will support connection of trails at certain segments, pavement, resting facilities, and illumination where needed. Design of the works have taken into account surrounding landscape and ecological conditions. The works are rather small and are not expected to impact the sensitive areas substantial either.
- Slowing walking footpaths are normally wider than trails with better walking conditions. Likewise, all the slowing walking paths falling into the sensitive areas are existing and the works are not anticipated to impact the sensitive areas significantly.



**Figure 6-1 Positional relation diagram of the project and the sensitive points**

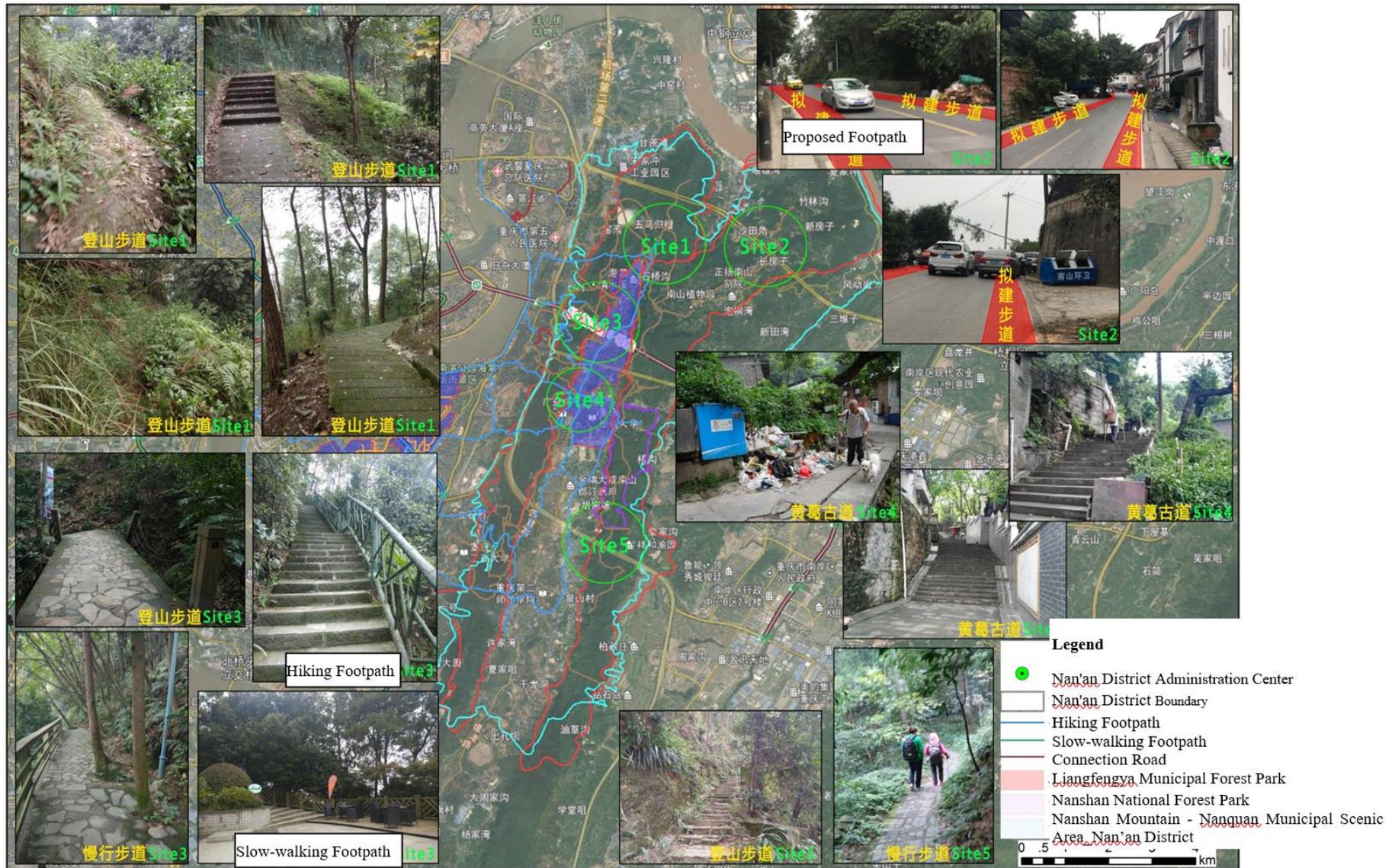


Figure 6-2 Site survey of the sensitive points

## (2) Jiulongpo District

The project includes subproject "improvement to Caiyun Lake Wetland Park". The subproject is located in Caiyun Lake National Wetland Park. Other sub-projects don't involve the wetland park. Proposed activities include landscape building (landscape corridor and landscape pavilion); protection works; activity site, square construction; water and electricity pipe network and facilities; landscape art (sculpture accessories, landscape wall, entrance landscape); function building and facilities (toilet and finished product management room); public furniture; road pavement and lineation; signage, etc. The park is for public recreational purpose. Similarly facilities have been built around the core area of the park. The project will expand such facilities in the park.

The park reconstruction will have no impact on the park's nature and objective, its functional and service functions and landscape; the construction period has an short-term impact on the environment, which will disappear once building completed. Plantation of peach trees and other kinds of plants, the project highlights the "Taoyuan (Peach Flower Origin) culture", enhances the landscape ornamental value of the wetland park, and improves the biodiversity of the park through various plant combinations, which has an obvious positive effect on the natural environment and the humanistic environment of the wetland park. Native species will be planted to avoid potential threats from invasive alien species.

## 7 ENVIRONMENTAL AND SOCIAL IMPACT MANAGEMENT

### FRAMEWORK

The framework applies to the project Component 1 *District Regeneration Planning and Implementation*, under which in addition to regular ‘soft’ activities, subcomponent 1e “*Nan'an District to pilot a Community-Led Bottom-Up (CLBU) Approach for regeneration of three pilot neighbourhoods (Nanping, Huayuanlu and Nanshan)*” intends to develop an innovative approach and apply it to three neighborhoods’ regeneration in Nan’an District. Budget of the three neighborhoods’ regeneration is included in Component 2.

Screening of the technical assistance activities has been carried out during the project preparation, it is concluded that these technical assistance activities are upstream or macro-level that are not directly linked to time-bound downstream investments. Further, the fundamental guiding principle of the “new urbanization approach” adopted by the project is not to conduct a traditional “green field” development that seeks to expand, demolish and build. Rather, it seeks to a “people-centered” urbanization pattern that aims to improve details of existing facilities and services, promote community participation in the process of planning and implementation. Thus, incorporating environmental and social considerations into the scope of work and TORs of these technical assistance activities is considered proper and adequate.

Since Subcomponent 1e *Nan'an District to pilot a Community-Led Bottom-Up (CLBU) Approach for regeneration of three pilot neighbourhoods (Nanping, Huayuanlu and Nanshan)* will be linked to physical works of 3 neighborhoods’ regeneration, the ESMF include management procedures for addressing environmental and social impacts associated with the urban regeneration interventions, including screening, safeguard documentation, consultation and disclosure, review, implementation and monitoring reporting. Capacity building plan is included in the ESMF as well.

## 8 PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Public consultation and information disclosure have been conducted following national laws and regulations, as well as World Bank safeguards policies. Two rounds of consultation and information disclosure were carried out during preparation through a combination of public meetings, field interviews and questionnaire surveys in the project affected communities.

Prior to consultations, brief project information, environmental impacts and mitigation measures as well as link of full environmental impact assessment reports were disclosed through the website (<http://www.cqmsy.com/>). Meanwhile, posters were placed in main communities of the project areas. Following the information disclosure, public consultations were conducted among project affected communities, including field interviews, public meetings and questionnaire surveys among the public.

Overall, the project received broad support from the public consulted, most of which expressed strong wishes to speed up this infrastructure and environmental improvement project. The noise pollution problem concerns the public most, followed by the ecological environment, waste residues, exhaust gas and wastewater, which the proposed project has taken corresponding actions to address. The project owners shall strictly take the prevention and control measures proposed in this Environmental Impact Assessment for treatment and mitigate the environment pollution brought about by the construction of the project as far as practicable. The public concerns have been considered in the project design and environment protection measures.

These public concerns have been given due considerations in the project design and EIA, and necessary mitigation measures have been developed in the Environmental Management Plans (EMPs) to avoid, minimize, mitigate or compensate the adverse impacts.



Figure 8-1 Full EA disclosure of EAs



**Figure 8-2 Public Consultation Meetings**

The Chinese version of the draft Nan'an EA documents were disclosed on internet on Dec 21, 2017 and hardcopies disclosed at all community offices involved in the project. The Chinese version of the draft Jiulongpo EA documents were disclosed on internet on Jan 11, 2018 and hardcopies disclosed at all community offices involved in the project. The ESMF was disclosed on Jan 28, 2018 through hardcopies in communities' offices.

## 9 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

A stand-alone Environmental Management Plan (EMP) has been developed for Nan'an and Jiulongpo District respectively.

### 9.1 Roles and Responsibilities

The implementation of the EMP requires the involvement of multi stakeholders (Figure 9-1), each fulfilling a different but vital role to ensure effective environmental management for the project. See Table 9-1 for key environment management responsibilities of each environment management organization.

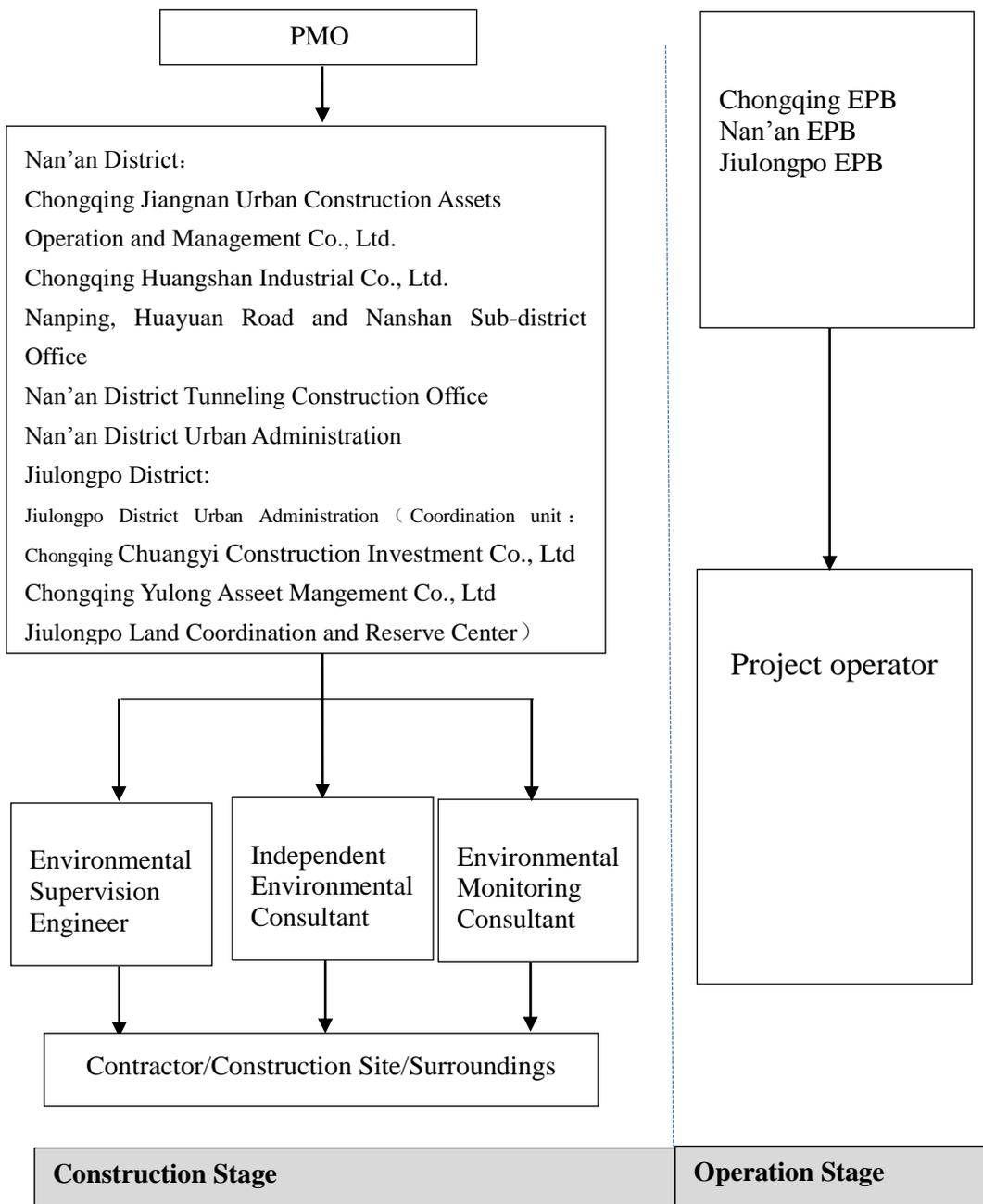


Figure 9-1 Environmental Management Structure of the Project

**Table 9-1 Environmental supervision and management responsibility list**

SN	Organization/unit	Responsibilities
1	PMO	<p>Responsible for all the environment management work of the project, including effective implementation of mitigation measures, supervision and monitoring, budget security and report to the World Bank and the local environment bureau;</p> <p>Ensure that measures in the Environmental Management Plan have been included in the bidding documents and the construction contract;</p> <p>Supervise the construction unit to implement the pollution control measures, and timely report any violations to the construction unit;</p> <p>Guarantee that the supervised content of the environmental protection agency is included in the bidding documents and the contract concluded with the Supervision Engineer, supervise and participate in the supervision of the project;</p> <p>Entrust the environment monitoring organization with environment monitoring during the construction phase, and cooperate in the environment monitoring during the construction phase.</p> <p>Organize environmental trainings for the Contractor and the Environment Supervision Engineer.</p>
2	Nan'an EPB Jiulongpo EPB	<p>Nan'an District Environmental Protection Bureau is responsible for the environmental management and supervision within the development area. Implementation of the monitoring and supervision over environment protection on behalf of Chongqing Municipal Environmental Protection Bureau during the construction and operational phases. Investigate and address the resident disturbance complaints during the construction and operational phases. Guarantee the "three simultaneous". Guarantee the normal operation of environment protection facilities.</p>
3	Project Owners	<p>The Project Owner is going to implement the World Bank funded infrastructure construction, including procurement, construction management, implementation of safeguards policies and compliance, monitoring and reporting, etc.</p>
4	Project operator	<p>Operation of environment protection facilities, environment management and other activities during the operational phase of the project.</p>
5	Environment Supervision Engineer (ESE)	<p>Review and assess whether the construction design meets the requirement of the environmental impact assessment and the Environmental Management Plan, and in particular review and assess the site environmental management and the required measures used to mitigate impacts;</p> <p>Supervise the site environmental management of the Contractor and provide accurate guidance;</p> <p>Review the Contractor's implementation of the Environmental Management Plan, and verify and confirm the environment supervisory process, parameters, monitoring locations, equipment and results;</p> <p>Report the implementation of the Environmental Management Plan;</p> <p>Examine and approve invoices or expenditures according to the implementation of the Environmental Management Plan.</p>
6	Contractor	<p>Develop detailed Contractor Environment Protection Plan which shall be a component of the construction contract.</p> <p>Report new environmental issues or any cultural relics discovered during the construction phase to the Supervision Engineer. Conduct ongoing public consultation during the construction.</p>
7	Independent Environmental	<p>The municipal PMO will employ the IEMC independent from the</p>

SN	Organization/unit	Responsibilities
	Management Consultant (IEMC)	Environment Supervision Engineer and the Contractor. The IEMC's task is to assess the implementation of the Environmental Management Plan during the project construction phase, advise the Project Owner on management and finally guarantee that the project conforms with the requirements of the Environmental Management Plan.
8	Environment Quality Monitoring Consultant (EQMC)	The Environment Quality Monitoring Consultant refers to the professional monitoring organization to implement environment quality monitoring in accordance with the Environment Monitoring Plan contained in the Environmental Impact Assessment Report. The Project Owner will employ the Environment Quality Monitoring Consultant to implement the monitoring plan.

## 9.2 Environmental mitigation measures

Mitigation measures have been developed for each component covering the full cycle of project preparation, construction and operation. The development of mitigation measures follows national laws/regulations, technical guidelines and construction norms, with references to previous similar project experiences and World Bank safeguards policies and Environmental, Health, and Safety General Guidelines, Environmental, Health, and Safety Guidelines for Water and Sanitation, Environmental, Health, and Safety Guidelines for Toll Road and Sanitation and Environmental, Health, and Safety Guidelines for Waste Management Facilities.

These mitigation measures are developed in separate EMPs for Nan'an and Jiulongpo components, and will be incorporated into the bidding documents and contracts to ensure effective implementation. For details of the mitigation measures, please refer to the EMPs in the project file.

## 9.3 Management of Contractors

Contractors will play a key role in environmental management, pollution control and impact mitigation during construction. During the construction period, contractors are mainly responsible for effective implementation of environmental protection and pollution mitigation measures. Therefore, environmental awareness and capacity of contractors are critical for the good environmental performance of the project.

In order to ensure strong environmental capacity and smooth implementation of environmental protection measures, the following contractor management measures will be implemented:

- 1) During pre-qualification, environmental management will be included in the authentication clause when the contractor's qualification is reviewed. Under the same condition, priority shall be given to the bidders who have passed the ISO9000 and ISO14000 authentication;
- 2) In preparation of bidding documents, the project owner will ensure mitigation measures included in the EMP are fully incorporated, and require the potential bidders to prepare the bids that fully cover the budgetary estimates for EMP implementation. Therefore, the implementation of the environmental protection measures will become the obligation and responsibility of the successful bidder;
- 3) Every Contractor will be required to provide dedicated environmental staff on each section of the Project. In order to be qualified for the job, the environmental staff will receive an environmental training program prior to construction;
- 4) Prior to construction, the Contractors are required to submit site-specific Environmental Protection Implementation Plan and Environmental Protection Construction Organization Plan for key project activities with potential impacts (if any). The Plans shall demonstrate compliance with domestic environmental regulations, the mitigation measures specified in the

EMP. The plans shall provide details such as commitment to environmental protection by the Contractor's project management team; methodology of implementing the project EMP; detailed designs and installation of pollution control facilities (e.g. drainage channel, settling tank, etc.); environmental control mechanism; detailed earthworks management plans and site operation plans outlining the measures that are proposed to minimize, mitigate and manage the effects, for the duration of the construction works; and environmental monitoring program during different stages of construction period.

- 5) Prior to the commencement of construction, the Contractor shall receive adequate training on EMP and relevant regulations.

## 9.4 Environmental Monitoring Plan

An environmental monitoring plan has been developed to monitor ambient environmental quality and pollution discharge during construction and operation. Project owners will hire licensed environmental monitoring consultants to conduct monitoring, and provide monitoring results to local EPBs and the World Bank.

The monitoring plans for Nan'an and Jiulongpo are summarized in **Table 9-2**.

**Table 9-2 Environmental Monitoring Plan for Nan'an and Jiulongpo**

Category	Item	Monitoring plans by phases	
		Construction phase	Operational phase
Acoustic environment	Monitoring location	The operation site with a large amount of operating equipment, especially in the area near the main sensitive areas.	Nan'an District: International New City (Guoji Xincheng) of Sunshine 100 (Yangguang 100), Yangguang Lvzhou, Danzishi New Street, Dormitory Building of No. 11 Middle School, Teaching Building of Longmenhao Primary School, R&F Modern Plaza, Xingxin Jiayuan, Shangxin Shanshui, Shenghuiyuan, etc.  Jiulongpo District: Lighting UP, Better Life, Caise Aolin, Zhigao Garden, Yuanyang Xiangpai, Chongqing Dafei LVzhou, Huayu Jiayuan
	Monitoring factors	Equivalent continuous sound level ( $L_{Aeq}$ )	Equivalent continuous sound level ( $L_{Aeq}$ )
	Monitoring frequency	Once/Month	Once/Quarter
Air quality	Monitoring location	The operation site with a large amount of operating equipment, sensitive areas or non-paved road or open space near sensitive environment.	Nan'an District: Nanping Regular Monitoring Point Chongwen Road  Jiulongpo District: Xietaizi Regular Monitoring Point Yangjiaping Regular Monitoring Point
	Monitoring factors	PM <sub>10</sub>	NO <sub>2</sub> , CO, PM <sub>10</sub>
	Monitoring frequency	To perform random sampling during the peak construction period	1 day per quarter

## **9.5 Environment monitoring report**

During project implementation, with assistance of the Independent Environmental Consultant, the PMOs/project owners are required to provide environmental monitoring reports to the Nan'an and Jiulongpo Environmental Protection Bureau (EPB) and the World Bank. The purpose of such reporting is to ensure effective implementation of EMP mitigation measures, identify any inadequacy or problems at early stages in order to implement timely remedial action, and learn experiences/lessons to guide future works.

The main contents of the report include:

- 1) Description of project progress;
- 2) Environmental management organization setup and responsibilities;
- 3) Key construction activities, associated environmental impacts and actual implementation of EMP mitigation measures, including any problems and remedial actions or plans;
- 4) Implementation of environmental monitoring plan and key results;
- 5) Any public complaints (records, resolution and public feedback);

During construction, contractors and supervision engineers are required to provide periodic environmental reports to the project owners.

## **9.6 Environmental Training Plan**

Environmental capacity training is an important part of the environmental management of the project, which will be provided to environmental management and supervision staff in the PMO, project owners, contractors, supervision engineers. Prior to commencement of construction, Chongqing PMO shall organize environmental training for contractors and workers, as well as supervision engineers and project management staff in project owners.

## **9.7 EMP Budget**

Budget has been made for implementing Environmental Management Plan during the construction and operational phases. Total budget of environmental investment covers environmental mitigation measures, environmental protection monitoring and management and main works, as well as mitigation and elimination of negative impacts on environment. Notes that many mitigation measures are management practices, and the budget is included in the whole contract and may not be indicated specifically.

The environmental protection investment estimate of the Project in Nan'an District is totally RMB 8.5 million and the total investment of the Project is RMB 1,942,460,000, so the environmental protection investment occupies 0.44% of total investment.

The environmental protection investment estimate of the Project in Jiulongpo District is totally RMB 3.7 million and the total investment of the Project is RMB 25,270,000, so the environmental protection investment occupies 1.46% of total investment.

The environmental protection project and investment estimate of the Project: is shown in **Table 9-3**.

**Table 9-3 List of environmental protection investment**

SN	Phase	Environmental factors	Pollution sources	Environmental protection measures	Environmental protection investment (RMB 10 thousand)	
					Nan'an District	Jiulongpo District
1	Construction phase	Sewage and wastewater	Flushing wastewater	Set the oil separation and sand settlement pond, and recycle wastewater after treatment rather than discharging out.	50	50
2			Domestic sewage	Try to rent local houses. If it is necessary to establish construction camp, then set a biochemical pool for collection pretreatment. For the construction camp with conditions, sewage can be directly connected with municipal sewage pipe network; and for the construction camp without conditions, sewage shall be regularly extracted to the sewage treatment plant for treatment by a fecal truck.	30	30
3		Atmospheric pollutants	Dust	Enhance management, promote wet method operation, set baffle, materials storage yard fence and cover it along the construction site; prohibit throwing materials from high places	60	60
4		Noise	Noise	Select low-noise equipment; reasonably arrange construction schedule, avoid night construction; reasonably arrange construction machinery and equipment on the site; and set a fence	30	30
5		Solid waste	Spoil, domestic garbage	Transport spoil to specified slag disposal pit; collect domestic garbages at fixed points and regularly clean and transport it	40	40

6		Ecological environment	Ecological environment	Arrange construction activities within the construction land scope; before construction, strip surface in the land scope and use it as greening soil after construction.	40	40
7			Water and soil conservation	Excavated materials shall be transported for backfilling; set retaining wall, drainage ditch, ecological protection slope, intercepting drain and sand settlement pond and plant trees and grass	Included in investment for main project	Included in investment for main project
8	Operational phase	Air pollutant	Dust, off-gas	Enhance detection and repairing of motor vehicle, prohibit passage of vehicle with off-gas exceeding standard, maintain road conditions and use plants to purify air	20	20
9		Noise	Noise	Build asphalt pavement, plant trees and grass, limit speed in residential area and school road sections, set honking prohibition signs, set acoustic screen, reserve noise monitoring and allocate special fund for governance	500	20
10		Risk prevention measure	/	Speed limit and formulation of emergency plan	/	/
11	Environmental management	/	Environmental monitoring during the construction phase, environmental management maintenance during the operational phase, etc.		80	80
12	Total				850	370

Note: the investment is only the environmental assessment estimate, and the actual investment depends on project estimation.