**Chuzhou-Nanjing Intercity Railway Project**

**with World Bank Loan**

**Environmental and Social Management Plan**

**Owner: Chuzhou-Nanjing Intercity Railway Development and Construction Co., Ltd.**

**Environmental Assessor: China Railway SIYUAN Survey and Design Group Co., Ltd.**

**May 2019**

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**Preface**

Based on the *Environmental Impact Report of the World Bank Loan Project of Chuzhou-Nanjing Intercity Railway*, the environmental and social management plan is prepared through proper supplementation and modification. Such plan, as an independent document, comprises all the actions to be carried out for environmental protection during the design, construction and operation periods of the Project, providing an action code and a working framework for taking mitigation measures, environmental management and environmental monitoring during the construction and operation periods of the Project.

The environmental and social management plan is recognized and confirmed by Wantong Intercity Railway Co., Ltd. (Project Company for Phase I Project at Chuzhou Section) which promises to implement various mitigation measures and management contents in the document during implementation of the Project. The project company of the follow-up Phase II project at Chuzhou Section and the project at Nanjing Section shall follow such plan after appropriate update.

**1 Project Overview**

**1.1** **Project Background**

Located at the edge of the Yangtze River delta and the area where the Southeast coast borders the mainland, the Chuzhou-Nanjing Intercity Railway runs through Chuzhou, Anhui and Nanjing, Jiangsu.

Only 40 minutes will be taken for traveling from Chuzhou to Nanjing after the Chuzhou-Nanjing Intercity Railway is built, thus shortening the spatial distance of both areas effectively. Such railway is of great significance in relieving the transportation pressure in such area, meeting the needs for fast traveling of passengers among towns and townships along the line, promoting urbanization and urban-rural integration progress in such area and enhancing the economic radiation of the “Nanjing Metropolitan Area” urban agglomeration.

With the establishment of the national-level Nanjing Jiangbei New Area, Chuzhou ushers new opportunities for rapid development and Chuzhou - Nanjing urban integration has become the development tendency in the future. In September 2015, the National Development and Reform Commission (NDRC) released FGJC [2015] No.2182 Document to approve the Construction Planning (2015-2020) of Wanjiang Intercity Railway (Construction Planning) and propose to construct this Project, i.e. Chuzhou-Nanjing section of Bozhou-Bengbu-Chuzhou-Nanjing Intercity Railway.

**1.2** **Project Composition**

Tthe line starts from Chuzhou High-speed Railway Station in Anhui Province, goes along Hongwu Road, Fengle Avenue, Xijian Road, Longpan Avenue, Huizhou Road, Yangzi Road and G104 and finally ends at Nanjing North Railway Station under planning. It passes by Chuzhou downtown, Suzhou-Chuzhou Industrial Park, Laian County and Pukou District of Nanjing and is divided by Chu River into the Chuzhou Section and Nanjing Section.

The line is about 54.4km in full length, including 46.255km for the Chuzhou section and 8.145km for the Nanjing section. In total, 16 stations are designed, including three underground stations and 13 elevated ones. One lot is designed at each section along the whole line, and Xiangguan vehicle depot is designed in the northern Xiangguan Town and Hongwu Road Stabling Yard is designed between Hongwu Road, the starting point, and the Beijing-Shanghai High-speed Railway. In total, two main substations are designed around the Vocational and Technical College Station and Xiangguan Town Station and one control center is designed in the southeast of the intersection between the Huizhou Road and the Yangzi Road.

See Table 1-1 for the project overview.

Table 1-1 Project Overview

|  |  |  |
| --- | --- | --- |
| Category | Description | Specifics |
| Main works | Line works | The line is 54.4km long and can be divided into Chuzhou and Nanjing sections. Specifically, the Chuzhou section is 46.255km long, including 5.648km for underground lines, 40.448km for elevated lines and 0.159km for ground lines. The Nanjing section is 8.145km long, including 2.14km for underground lines, 5.93km for elevated lines and 0.075km for ground lines. |
| Station | In total, 16 stations are designed along the whole line, including 3 underground stations (Longpan Avenue Station, City Hall Station and Nanjing North Railway Station) and 13 elevated stations. Specifically, 14 stations (2 underground ones and 12 elevated ones) are designed at Chuzhou section, while 2 stations (1 underground one and 1 elevated one) are designed at Nanjing section. |
| Vehicle depot and the entrance-exit depot line | One depot, i.e. the Xiangguan vehicle depot in the south of G104 at Gaogangliu Village and surroundings; the floor area is about 27.2ha; the vehicle depot joins the railway at the Xiangguan North Station and the entrance-exit depot line is about 1.4km long. |
| Stabling yard and the entrance-exit lot line | One lot, i.e. the Hongwu Road Stabling yard to be reserved in the far term between Hongwu Road and the Beijing-Shanghai High-speed Railway on the east of the South Rulin Road; the floor area is about 14.8ha; the entrance-exit lot line is about 1.2km long. |
| Main substation | Two 110kV substations, i.e. the main substation of the Technical College and that of the Xiangguan Town; the installed capacity is 2×16MVA. |
| Control center | One control center at the southeast of the intersection between Huizhou Road and Yangzi Road; the floor area is about 30mu; such center is adjacent to the Suzhou-Chuzhou Industrial Park Station; the land parcel is now vacant and the total building area is 58,000m2. |
| Temporary  works | Borrow area | One borrow area, i.e. the Hucao Alley Borrow Area in the northeast quadrant at the intersection between the Century Avenue and the Huizhou Avenue in Nanqiao District; the earth volume is 182,300 m3; the floor area is 7.88hm2; the reserve at the borrow area is larger than 200,000 m3, so the needs for borrowing can be met. |
| Beam fabrication yard | Two beam fabrication yards, i.e. the Xishui Village Beam Fabrication Yard and the Yeying Beam Fabrication Yard. |
| Construction and  living areas | 13 construction and living areas; the total floor area is about 9.43hm2, including the reinforcement yard, the storage site of machinery, warehouse, the storage yard of materials and the land for construction and living etc. The land occupied mainly includes the vacant land, dry land and other forest lands. |
| Utilities  works | Ventilation and A/C | The ventilation and A/C system is made up of the ventilation and A/C system of buildings such as the station, vehicle depots, stabling yards, control centers and the main substation as well as the ventilation system of the tunnel. The ventilation and A/C system in the public area is adopted for the underground stations, while natural smoke exhaustion is adopted for the stations on the ground. |
| The A/C is adopted for the staff canteen and the office building of the vehicle depot, stabling yard and control center; natural ventilation is adopted for the garage for train parking and inspection supplemented by mechanical ventilation. |
| Landscaping | Landscaping is adopted for the Xiangguan vehicle depot and the Hongwu Road Stabling yard and around various stations. |
| Drainage system | Since no municipal pipeline networks are designed around the Laian South Station, Xiangguan North Station, Xiangguan Town Station and Xiangguan vehicle depot along the line, the sewage shall be reused for car washing or site greening after being treated via a piece of equipment. The sewage from other stations, Hongwu Road Stabling yard and the control center can be drained to the municipal sewage pipeline network of surroundings, and then be delivered to corresponding urban sewage treatment plant for treatment. |
| Spoil area | Two spoil areas, i.e. the Erlang Mountain landfill for building garbage and the Guanshan spoil area for muck. The former (the abandoned Erlang Mountain Quarry) is located on the opposite side of the Erlang Village Clinic about 6km away from the southwest of DK2+500 along the line, and is planned as a landfill for building garbage in Chuzhou, with a planned floor area of 384mu. The latter (the abandoned Guanshan Quarry; above 2,000,000 m3) is around the Guanshan Village in the north about 8km away from the left of DK20+400 along the line, and is planned as a spoil area for muck in Chuzhou, with a planned floor area of 179mu. Both spoil areas are replied by Chuzhou Development and Reform Commission at present, and are designed and are to be commenced. |
| Environmental protection  Project | Noise control | Vertical or semi-closed sound barriers shall be set at the elevated section, and rubber floating-slab ballast beds or vibration mitigation measures of equivalent effect shall be provided on the track for comprehensive noise reduction. |
| Sewage treatment | The domestic sewage from the Laian South Station, Xiangguan North Station and Xiangguan Town Station shall be reused for station greening after being treated via an anaerobic pool and the artificial wetland. The sewage from other stations shall be delivered to the surrounding municipal pipeline network after being treated via a septic tank, and then to corresponding sewage treatment plant for treatment. |
| The wastewater generated at the Xiangguan Vehicle Depot shall be used for car washing and greening within the section through the SBR technology together with the domestic sewage treated via a septic tank after oil removal and sedimentation. The sewage from the Hongwu Road Stabling Yard treated can be drained to the municipal sewage pipelines and then be delivered to the urban sewage treatment plant for uniform treatment. |
| Vibration mitigation measures | Seamless lines and integrated ballast beds are adopted along the whole line, and function replacement and rubber floating-slab ballast beds shall be used at the sections with out-of-standard vibration for vibration mitigation. |
| Disposal of solid wastes | Trash cans shall be provided at the stations, yards and office areas etc. and temporary storerooms shall be set for a small number of dangerous wastes at the stabling yard and the vehicle depot. Local sanitation departments shall be entrusted with centralized and uniform disposal of household garbage. |
| Treatment of waste gas | The piston air shaft and ventilation shafts shall be misaligned to sensitive points such as the residential areas. The purification devices for oily fume with a purification and removal rate larger than or equal to 85% shall be installed in the kitchen of the staff canteen at the vehicle depot, stabling yards and the control center. |

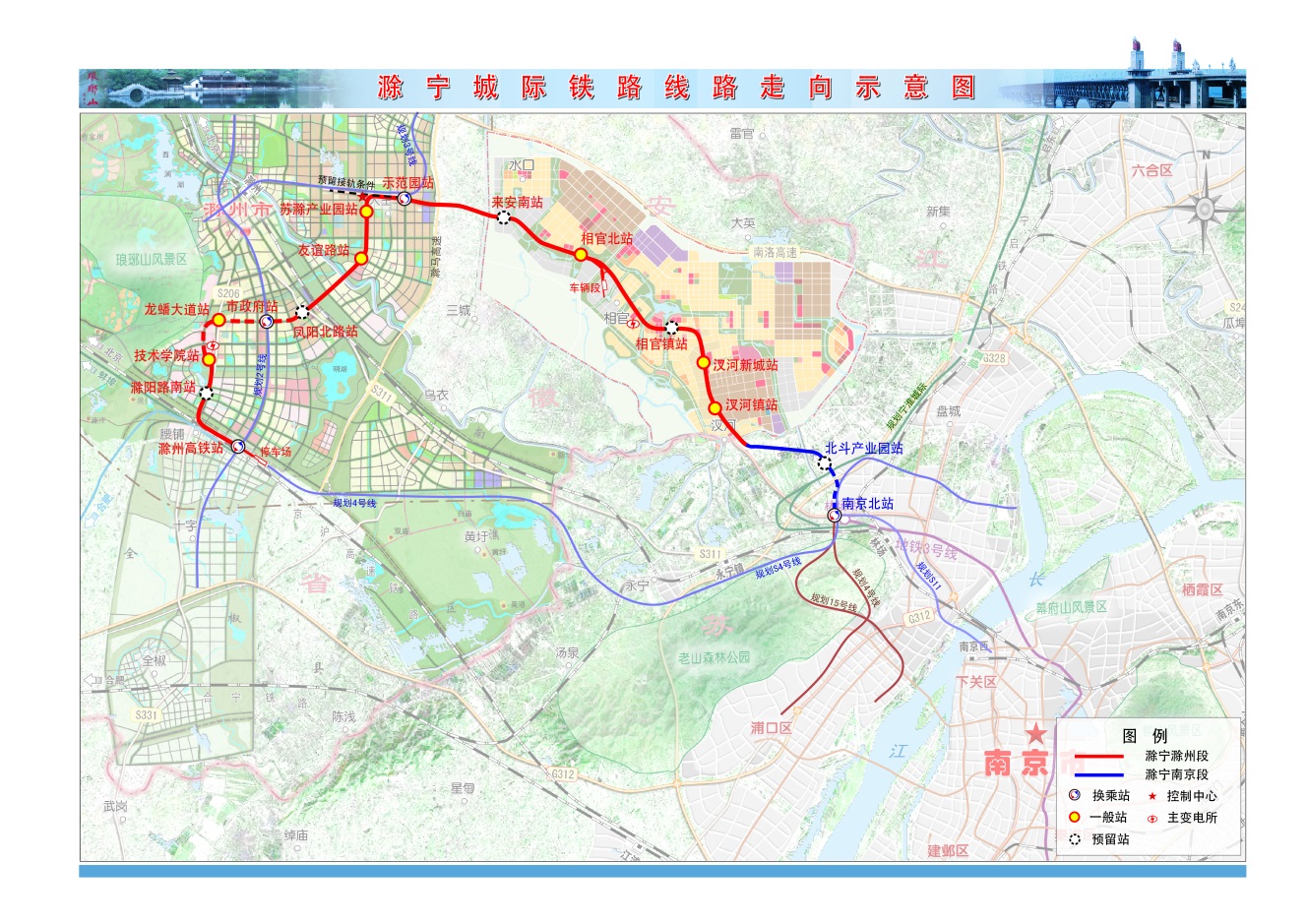


Chuzhou-Nanjing Intercity Railway

Legend

Chuzhou-Nanjing Intercity Railway

Figure 1.2-1 Schematic Diagram for Geographic Location of the Project



Legend

Control center

Main substation

Transfer station

General station

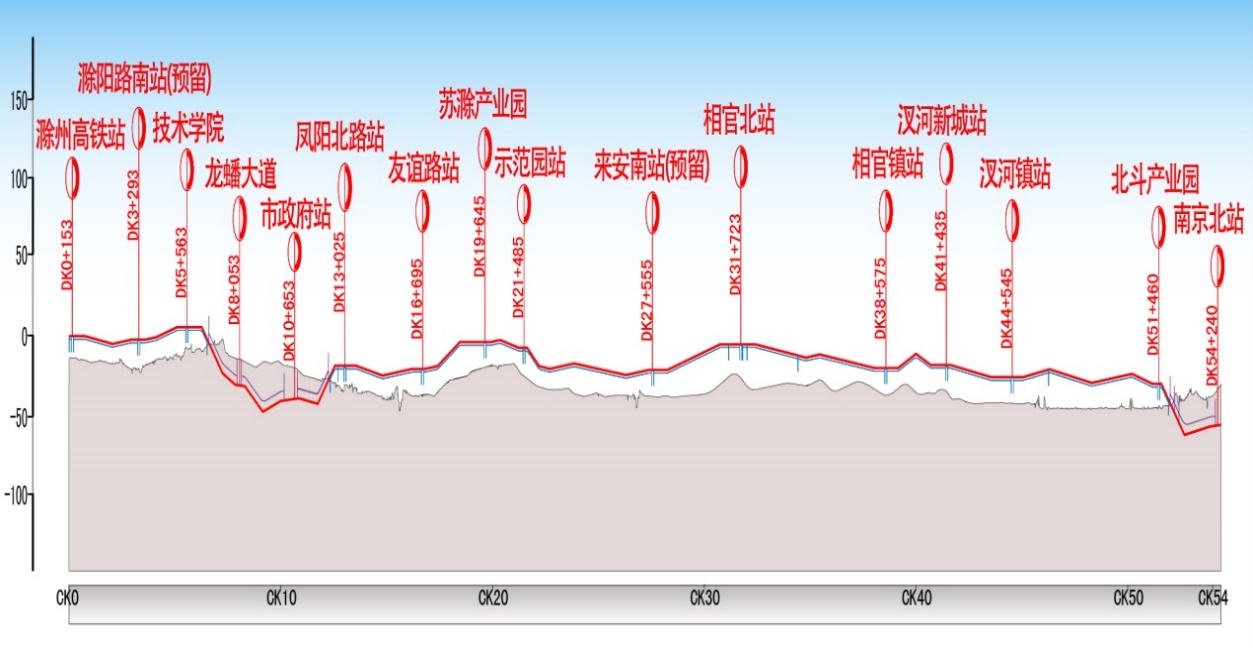
Reserved station

Chuzhou section of Chuzhou-Nanjing Intercity Railway

Nanjing section of Chuzhou-Nanjing Intercity Railway

Route Direction Diagram of Chuzhou-Nanjing Intercity Railway

Figure 1.2-2 Horizontal Section Diagram of Route



Youyi Road Station

Fengyang Road North Station

Demonstration Park Station

Suzhou-Chuzhou Industrial Park

Vocational and Technical College

Beidou Industrial Park

Chahe Town Station

Chahe New Town Station

Xiangguan Town Station

Laian South Station (reserved)

Xiangguan North Station

City Hall Station

Longpan Avenue

Chuyang Road South Station (reserved)

Chuzhou High-speed Railway Station

Nanjing North Railway Station

Figure 1.2-3 Longitudinal Section of the Route

**1.3** **Main Objectives of Environmental Protection**

1. Noise

In total, there are 40 objectives (36 residential areas, three schools and one hospital) for environmental protection of noise within the evaluation scope of the Project, including 38 on both sides of the line at the elevated section and 2 around the vehicle depot. There are no noise sensitive points within the evaluation scope of the environmental-control equipment at the underground stations, main substations, control centers and the stabling yard. See Table 1-2 for details.

Table 1-2 Objectives for Environmental Protection of Noise

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | Sensitive Objectives | Scale within the Evaluation Scope | Building  Storey | Building Age | Section | Closest Distance with the Line (m) | Height Difference  (m) |
|
| 1 | Pai Fang | 28 households | 1~3 storeys | 1990s | Chuzhou High-speed Railway Station~  Vocational and Technical College Station | 46.2 | -11.3 |
| 2 | Yaopu Village | 10 households | 1~2 storeys | 1990s | Chuzhou High-speed Railway Station~  Vocational and Technical College Station | 72.8 | -11.9 |
| 3 | Dadun | 60 households | 1~2 storeys | 1990s | Chuzhou High-speed Railway Station~  Vocational and Technical College Station | 8.6 | -13.3 |
| 4 | Jianghuayuan and Dongxiang | 1,170 households | 2~18 storeys | 2011 | Chuzhou High-speed Railway Station~  Vocational and Technical College Station | 88.7 | -13.1 |
| 5 | Chuzhou Vocational and Technical College | Teachers and students  13000 persons | 4~11 storeys | 2002 | Vocational and Technical College Station~  Longpan Avenue Station | 78.6 | -7.4 |
| 6 | Guxiafan and Wanqiao Village | 100 households | 1~4 storeys | 1990s | City Hall Station~  Youyi Road Station | 9.0 | -10.8 |
| 7 | Zhizihuawang | 22 households | 1~3 storeys | 1990s | City Hall Station~  Youyi Road Station | 106.2 | -15.5 |
| 8 | Geyoufang | 20 households | 1 storey | 1990s | City Hall Station~  Youyi Road Station | 145.0 | -15.6 |
| 9 | Dongsheng Garden | 1,500 households | 15~18 storeys | 2014 | Suzhou-Chuzhou Industrial Park Station~  Demonstration Park Station | 45.9 | -13.7 |
| 10 | Linlouxiaoqu | 350 households | 11~18 storeys | 2017 | Suzhou-Chuzhou Industrial Park Station~  Demonstration Park Station | 81.6 | -15.0 |
| 11 | Suyuan | 980 households | 22~26 storeys | 2017 | Suzhou-Chuzhou Industrial Park Station~  Demonstration Park Station | 59.7 | -16.4 |
| 12 | Dawang Junior Middle School | Above 300 teachers and students  No resident students at night | 3 storeys | 1965 | Suzhou-Chuzhou Industrial Park Station~  Demonstration Park Station | 33.5 | -11.1 |
| 13 | Suzhou-Chuzhou Branch School of Nanjing Langya Road Primary School | Above 750 teachers and students; no resident students at night | 2~4 storeys | 2015 | Suzhou-Chuzhou Industrial Park Station~  Demonstration Park Station | 92.2 | -11.4 |
| 14 | Lvying | 63 households | 1~2 storeys | 1990s | Demonstration Park Station~  Xiangguan North Station | 30.8 | -12.9 |
| 15 | Zhuzhuang | 15 households | 1 storey | 1980s | Demonstration Park Station~  Xiangguan North Station | 33.9 | -13.5 |
| 16 | Luowei | 7 households | 1~2 storeys | 1990s | Demonstration Park Station~  Xiangguan North Station | 13.0 | -13.9 |
| 17 | Zhuyuanzhuang and Panzhuang | 15 households | 1~3 storeys | 1990s | Demonstration Park Station~  Xiangguan North Station | 81.0 | -13.4 |
| 18 | Dazhuang | 20 households | 1~2 storeys | 1990s | Demonstration Park Station~  Xiangguan North Station | 66.6 | -12.5 |
| 19 | Shuangmiaoliu | 20 households | 1~2 storeys | 1990s | Demonstration Park Station~  Xiangguan North Station | 47.9 | -13.3 |
| 20 | Xiaoliuying | 33 households | 1~2 storeys | 1990s | Demonstration Park Station~  Xiangguan North Station | 54.0 | -10.8 |
| 21 | Pengying | 24 households | 1~2 storeys | 1990s | Xiangguan North Station~  Chahe New Town Station | 51.3 | -24.4 |
| 22 | Dianzhuang, Xiaobuzhuang and Caoxiaoying | 30 households | 1~3 storeys | 1990s | Xiangguan North Station~  Chahe New Town Station | 27.7 | -13.2 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Continued | | | | | | | |
| S/N | Sensitive Objectives | Scale within the Evaluation Scope | Building  Storey | Building Age | Section | Closest Distance with the Line (m) | Height Difference  (m) |
| 23 | Chengzhuang | 21 households | 1~2 storeys | 1990s | Xiangguan North Station~  Chahe New Town Station | 40.7 | -12.8 |
| 24 | Jinying | 18 households | 1~2 storeys | 1990s | Xiangguan North Station~  Chahe New Town Station | 38.3 | -12.4 |
| 25 | Xiangguan Village 1 | 17 households | 1~3 storeys | 1990s | Xiangguan North Station~  Chahe New Town Station | 48.7 | -12.9 |
| 26 | Linying | 11 households | 1~2 storeys | 1990s | Xiangguan North Station~  Chahe New Town Station | 41.1 | -13.6 |
| 27 | Xiangguan Village 2 | 15 households | 1~2 storeys | 1990s | Xiangguan North Station~  Chahe New Town Station | 44.7 | -11.2 |
| 28 | Luozhuang | 89 households | 1~2 storeys | 1990s | Xiangguan North Station~  Chahe New Town Station | 36.9 | -11.2 |
| 29 | Jinghua | 30 households | 1~3 storeys | 1990s | Xiangguan North Station~  Chahe New Town Station | 28.4 | -10.9 |
| 30 | New Town at Mingfa North Station | 2,230 households | 5~6 storeys | 2013 | Xiangguan North Station~  Chahe New Town Station | 53.9 | -13.4 |
| 31 | Kongquecheng, Laian Xuefu Yinxiang | 3,200 households | 22~30 storeys | Under construction | Xiangguan North Station~  Chahe New Town Station | 43.8 | -16.8 |
| 32 | Country Garden·- Meiguiyuan, Country Garden·- Chengshi Huayuan | 3,000 households | 3~30 storeys | 2015 | Chahe New Town Station~  Chahe Town Station | 74.8 | -12.9 |
| 33 | The Second  People’s Hospital of Laian | Above 150 sickbeds | 5 | 2017 | Chahe New Town Station~  Chahe Town Station | 83.4 | -12.9 |
| 34 | Duhui Yijing | 400 households | 14~28 storeys | 2018 | Chahe New Town Station~  Chahe Town Station | 92.3 | -13.6 |
| 35 | Mengta Kali | 45 households | 2 storeys | 2015 | Chahe New Town Station~  Chahe Town Station | 88.2 | -13.6 |
| 36 | Chahe Town | 105 households | 1~6 storeys | 1990s | Chahe Town Station~  Nanjing North Railway Station | 30.9 | -15.4 |
| 37 | Jintaiytang – Yangguangcheng | 260 households | 3~28 storeys | 2017 | Chahe Town Station~  Nanjing North Railway Station | 41.9 | -17.4 |
| 38 | Daqiao Community Road West | 150 households | 1~2 storeys | 1980s | Chahe Town Station~  Nanjing North Railway Station | 17.1 | -23.4 |
| 39 | Luowei | 18 households | 1~2 storeys | 1990s | Xiangguan Vehicle Depot | Entrance-exit depot line: 15.2m; commissioning line: 62.0m | -9.4 |
| 40 | Baozhuang | 20 households | 1~2 storeys | 1990s | Xiangguan Vehicle Depot | Outside of the eastern boundary: 6.3m; Periodical & temporary repair shed: 31.6m | 0 |

2. Vibration

There are totally 40 points sensitive to environmental vibration within the assessment scope along the line, 37 of which are in Chuzhou and three of which are in Nanjing, including one school, five office buildings and 34 residential areas (villages or communities). There are respectively 26 points at both sides of bridge and line and 14 points over the tunnel section. See Table 1-3 for details.

Table 1-3 Objectives for Environmental Protection of Vibration

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| S/N | Sensitive Objectives | Mileage Location | Section | Closest Horizontal Distance (m) | Height Difference  (m) | Number of Households within the Evaluation Scope |
| 1 | Pai Fang | Left saide of DK1+650~ DK1+840 | Chuzhou High-speed Railway Station~Vocational and Technical College Station | 46.2 | -11.3 | 23 households |
| 2 | Dadun | Both sides of DK2+300~ DK2+710 | Chuzhou High-speed Railway Station~Vocational and Technical College Station | 8.6 | -13.3 | 50 households |
| 3 | Longpan Huijing | Right side of DK8+090~DK8+270 | Longpan Avenue Station~City Hall Station | 57.1 | 15.9 | 3 buildings |
| 4 | Longpan Xiyuan | Right side of DK8+290~DK8+410 | Longpan Avenue Station~City Hall Station | 43.7 | 16.2 | 2 buildings |
| 5 | Chuzhou Local Tax Bureau | Left side of DK8+535~DK8+600 | Longpan Avenue Station~City Hall Station | 49.6 | 17.8 | 1 building |
| 6 | Entry-Exit Inspection and Quarantine of Chuzhou | Left side of DK8+620~DK8+820 | Longpan Avenue Station~City Hall Station | 49.4 | 19.7 | 2 buildings |
| 7 | Saina Hepan | Right side of DK8+900~DK9+180 | Longpan Avenue Station~City Hall Station | 46.8 | 27.3 | 6 buildings |
| 8 | Tianyihuafu | Left side of DK8+900~DK9+180  Left side of DK9+560 | Longpan Avenue Station~City Hall Station | 47.4 | 29.7 | 5 buildings |
| 9 | Faneng International City | Right side of DK9+610~DK10+000 | Longpan Avenue Station~City Hall Station | 47.5 | 26.8 | 5 buildings |
| 10 | Municipal Bureau of Quality and Technology Supervision | Left side of DK10+700~DK10+820 | City Hall Station~Youyi Road Station | 53.0 | 19.0 | 1 building |
| 11 | Municipal Administration of Land Resources and House Property | Left side of DK10+620~DK10+725 | City Hall Station~Youyi Road Station | 54.4 | 16.2 | 1 building |
| 12 | Chuzhou Public Security Bureau | Left side of DK10+990~DK11+120 | City Hall Station~Youyi Road Station | 54.2 | 15.1 | 1 building |
| 13 | Zuoan Xiangsong | Left side of DK11+230~DK11+540 | City Hall Station~Youyi Road Station | 47.2 | 14.6 | 6 buildings |
| 14 | Guxiafan and Wanqiao Village | Both sides of DK12+520~DK12+910 | City Hall Station~Youyi Road Station | 9.0 | -10.8 | 80 households |
| 15 | Dongsheng Garden | Right side of DK19+500~DK20+000 | Suzhou-Chuzhou Industrial Park Station~Demonstration Park Station | 45.9 | -13.7 | 1,224 households |
| 16 | Suyuan | Right side of DK20+520~DK20+860 | Suzhou-Chuzhou Industrial Park Station~Demonstration Park Station | 59.7 | -16.4 | 880 households |
| 17 | Dawang Junior Middle School | Right side of DK21+020~DK21+100 | Suzhou-Chuzhou Industrial Park Station~Demonstration Park Station | 33.5 | -11.1 | Above 300 teachers and students; no resident students at night |
| 18 | Lvying | Both sides of DK24+620~DK24+910 | Demonstration Park Station~Xiangguan North Station | 30.8 | -12.9 | 54 households |
| 19 | Zhuzhuang | Both sides of DK26+720~DK26+760 | Demonstration Park Station~Xiangguan North Station | 33.9 | -13.5 | 13 households |
| 20 | Luowei | Right sides of DK26+860~DK26+890 | Demonstration Park Station~Xiangguan North Station | 13.0 | -13.9 | 5 households |
| 21 | Shuangmiaoliu | Left sides of DK29+650~DK29+830 | Demonstration Park Station~Xiangguan North Station | 47.9 | -13.3 | 12 households |
| 22 | Xiaoliuying | Right side of DK31+460~DK31+770 | Demonstration Park Station~Xiangguan North Station | 54.0 | -10.8 | 22 households |

| Continued | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| S/N | Sensitive Objectives | Mileage Location | Section | Closest Horizontal Distance (m) | Height Difference  (m) | Number of Households within the Evaluation Scope |
| 23 | Pengying | Left side of DK32+700~DK32+940 | Xiangguan North Station~Chahe New Town Station | 51.3 | -24.4 | 18 households |
| 24 | Dianzhuang, Xiaobuzhuang and Caoxiaoying | Both sides of DK33+630~DK33+900 | Xiangguan North Station~Chahe New Town Station | 27.7 | -13.2 | 25 households |
| 25 | Chengzhuang | Left side of DK34+400~DK34+590 | Xiangguan North Station~Chahe New Town Station | 40.7 | -12.8 | 15 households |
| 26 | Jinying | Both sides of DK34+810~DK34+890 | Xiangguan North Station~Chahe New Town Station | 38.3 | -12.4 | 13 households |
| 27 | Xiangguan Village 1 | Right side of DK35+630~DK35+770 | Xiangguan North Station~Chahe New Town Station | 48.7 | -12.9 | 10 households |
| 28 | Linying | Left side of DK36+500~DK36+610 | Xiangguan North Station~ Chahe New Town Station | 41.1 | -13.6 | 9 households |
| 29 | Xiangguan Village 2 | Right side of DK37+500~DK37+840 | Xiangguan North Station~ Chahe New Town Station | 44.7 | -11.2 | 10 households |
| 30 | Luozhuang | Right side of DK37+900~DK38+230 | Xiangguan North Station~Chahe New Town Station | 36.9 | -11.2 | 86 households |
| 31 | Jinghua | Left side of DK39+350~DK39+480 | Xiangguan North Station~Chahe New Town Station | 28.4 | -10.9 | 25 households |
| 32 | New Town at Mingfa North Station | Right side of DK39+700~DK40+910 | Xiangguan North Station~Chahe New Town Station | 53.9 | -13.4 | 1,680 households |
| 33 | Kongquecheng, Laian Xuefu Yinxiang | Left side of DK41+600~DK42+050 | Xiangguan North Station~Chahe New Town Station | 43.8 | -16.8 | 3,200 households |
| 34 | Chahe Town | Right side of DK44+800~DK45+500 | Chahe Town Station ~Nanjing North Railway Station | 30.9 | -15.4 | 80 households |
| 35 | Jintaiytang – Yangguangcheng | Left side of DK45+140~DK45+580 | Chahe Town Station ~ Nanjing North Railway Station | 41.9 | -17.4 | 60 households |
| 36 | Daqiao Community Road West | Left side of DK46+070~DK46+270 | Chahe Town Station ~Nanjing North Railway Station | 17.1 | -23.4 | 71 households |
| 37 | Luowei | Right side of CDK0+840~CDK1+200 | Chahe Vehicle Depot | Entrance & exit depot line: 15.2 | -9.4 | 18 households |
| 38 | Zaoshuchen | Both sides of DK52+800~DK53+150 | Chahe Town Station ~Nanjing North Railway Station | 0 | 26.8 | 60 households |
| 39 | Chali Village | Right side of DK53+230~DK53+300 | Chahe Town Station ~Nanjing North Railway Station | 53.0 | 24.1 | 10 households |
| 40 | Yujiaying | Both sides of DK53+680~DK54+020 | Chahe Town Station ~Nanjing North Railway Station | 0 | 12 | 30 households |

3. Electromagnetism

The targets for environmental protection of electromagnetism along the line mainly include the affected sensitive points of TV on both sides along the elevated line and the sensitive points around the main substation. According to field survey, there are no sensitive points around the two newly-built 110kV main substations. See Table 1-4 for the sensitive points for TV on both sides of the elevated line.

Table 1-4 Electromagnetic Environmental Protection Objectives

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| S/N | Sensitive Objectives | Mileage Location | Closest Horizontal Distance (m) | Scale  (Households) | Access Rate of Cable TV (%) |
| 1 | Pai Fang | Left side of DK1+650~DK1+840 | 46.2 | 23 | 100 |
| 2 | Dadun | Both sides of DK2+300~DK2+710 | 8.6 | 50 | 100 |
| 3 | Guxiafan and Wanqiao Village | Both sides of DK12+520~DK12+910 | 9.0 | 80 | 100 |
| 4 | Dongsheng Garden | Right side of DK19+500~DK20+000 | 45.9 | 1224 | 100 |
| 5 | Dawang Junior Middle School | Right side of DK21+020~DK21+100 | 33.5 | 300+ teachers and students | 100 |
| 6 | Lvying | Both sides of DK24+620~DK24+910 | 30.8 | 54 | 100 |
| 7 | Zhuzhuang | Both sides of DK26+720~DK26+760 | 33.9 | 13 | 100 |
| 8 | Luowei | Right sides of DK26+860~DK26+890 | 13.0 | 5 | 100 |
| 9 | Shuangmiaoliu | Left sides of DK29+650~DK29+830 | 47.9 | 12 | 100 |
| 10 | Dianzhuang, Xiaobuzhuang  and Caoxiaoying | Both sides of DK33+630~DK33+900 | 27.7 | 25 | 100 |
| 11 | Chengzhuang | Left side of DK34+400~DK34+590 | 40.7 | 15 | 100 |
| 12 | Jinying | Both sides of DK34+810~DK34+890 | 38.3 | 13 | 100 |
| 13 | Xiangguan Village 1 | Right side of DK35+630~DK35+770 | 48.7 | 10 | 100 |
| 14 | Linying | Left side of DK36+500~DK36+610 | 41.1 | 9 | 100 |
| 15 | Luozhuang | Right side of DK37+900~DK38+230 | 36.9 | 86 | 100 |
| 16 | Jinghua | Left side of DK39+350~DK39+480 | 28.4 | 25 | 100 |
| 17 | Kongquecheng, Laian Xuefu Yingxiang | Left side of DK41+600~DK42+050 | 43.8 | 3200 | 100 |
| 18 | Chahe Town | Right side of DK44+800~DK45+500 | 30.9 | 80 | 100 |
| 19 | Jintaiytang – Yangguangcheng | Left side of DK45+140~DK45+580 | 41.9 | 60 | 100 |
| 20 | Daqiao Community Road West | Left side of DK46+070~DK46+270 | 17.1 | 71 | 100 |
| 21 | Luowei | Right side of CDK0+840~CDK1+200 | 15.2 | 18 | 100 |

4. Ecological and Environmental Protection Objectives

The Project is basically located in the central urban area and the towns, it is proven that there are no rare and endangered animals and plants and old trees and famous wood species within the evaluation scope through field survey and visits, or cultural relics protection units and historical buildings. There are 152 tombs within the land occupied at the Xiangguan Vehicle Depot.

5. Water Environment Protection Objectives

Four surface rivers are involved in the Project, i.e. the Qingliu River, the Laihe River, the Chuhe River and the Zhujiashan River. See Table 1-5 for the positional relationship between the Project and the four rivers.

Table 1-5 Water Environment Protection Objectives

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| River | Central Chainage | Railroad section | Line Form | Width of the Riverbed at the Crossing Area | Regionalizing function |
| Qingliu River | DK15+355.8 | Fengyang Road North Station~  Youyi Road Station | Bridge | 30m | IV, transition area |
| Laihe River | DK26+790.0 | Demonstration Park Station~  Laian South Station | Bridge | 50m | IV, area for agricultural water |
| Chuhe River | DK45+650.0 | Chahe Town Station~  Beidou Industrial Park Station | Bridge | 100m | IV, transition area |
| Zhujiashan River | DK50+097.8 | Beidou Industrial Park Station~ Nanjing North Railway Station | Tunnel | 12m | IV, area for industrial water |

**2 Framework of Laws and Regulations**

The preparation basis of the Project mainly includes the *Law of the People's Republic of China on Environmental Impact Assessment*, the *Regulations on the Administration of Environmental Protection for Construction Projects*, the *Notice on Strengthening the EIA Administration of the Loan Construction Projects of International Finance Organizations* and the Safeguard Policies of the World Bank. The environmental assessment is carried out in accordance with the related laws, regulations and standards of China and the related policies of the World Bank.

**2.1**  **Related laws and regulations on environmental protection of China**

(1) *Environmental Protection Law of the People’s Republic of China* (2014 revision)

(2) *Law of the People's Republic of China on Environmental Impact Assessment* (2018 revision);

(3) *Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution* (2018 revision);

(4) *Law of the People's Republic of China on the Prevention and Control of Ambient Noise Pollution* (2018 revision);

(5) *Law of the People's Republic of China on the Prevention and Control of Water Pollution* (2017 revision);

(6) *Law of the People's Republic of China on Prevention of Environmental Pollution Caused by Solid Waste* (2015 revision);

(7) *Law of the People's Republic of China on Water and Soil Conservation* (2011 revision);

(8) *Law of the People's Republic of China on the Protection of Cultural Relics* (2017 revision);

(9) *Law of the People's Republic of China on the Protection of Wildlife* (2018 revision);

(10) *Regulations of the People’s Republic of China on the Protection of Wild Plants* (2017 revision);

(11) *Regulations on the Administration of Construction Project Environmental Protection* (2017 revision);

(12) *Measures on the Administration of Electromagnetic Radiation Environmental Protection* (1997);

(13) *Catalogue for the Classified Administration of Environmental Impact Assessments for Construction Projects* (2018 revision)*;*

(14) *Measures for the Public Participation and Administration of Environmental Impact Assessment* (2019);

(15) *Regulations of Anhui Province on the Environmental Protection* (2018 revision);

(16) *Regulations of Anhui Province on the Prevention and Control of Atmospheric Pollution* (2015);

(17) Notice on the Issuing the Regulations on the Implementation of the Construction Engineering Dust Pollution Prevention and Control of Chuzhou (JG [2014] No.87);

(18) *Notice of the People’s Government of Chuzhou on Issuing the Implementation Scheme of the Atmospheric Pollution Prevention and Control Plan of Chuzhou* (CZ [2014] No.21);

(19) *Measures for the Administration of Urban Construction Waste Disposal of Chuzhou* (CZ [2015] No.4);

(20) *Regulations of Jiangsu Province on the Prevention and Control of Ambient Noise Pollution* (2018);

(21) *Regulations of Jiangsu Province on the Prevention and Control of Atmospheric Pollution* (2018);

(22) *Measures for the the Prevention and Control of Dust Pollution of Nanjing* (2013);

(23) *Adjustment Scheme of Regionalizing Environmental Noise Function of Nanjing* (NZF [2014] No.34);

(24) *Notice on Strengthening the EIA Administration of the Loan Construction Projects of International Finance Organizations* (HJ [1993] No.324);

(25) *Notice on Further Strengthening the Administration of the Loan Construction Projects of International Finance Organizations* issued by the NDRC (FGWZ [1998] No.1269).

**2.2**  **Technical Guidelines and Specifications of EIA**

(1) *Technical Guidelines for Environmental Impact Assessment - General Principle* (HJ2.1-2016);

(2) *Technical Guidelines for Environmental Impact Assessment - Urban Rail Transit* (HJ453-2018);

(3) *Technical Guidelines for Environmental Impact Assessment - Atmospheric Environment* (HJ2.2-2018);

(4) *Technical Guidelines for Environmental Impact Assessment - Surface Water Environment* (HJ2.3-2018);

(5) *Technical Guidelines for Environmental Impact Assessment -Groundwater Environment* (HJ610-2016);

(6) *Technical Guidelines for Noise Impact Assessment* (HJ2.4-2009);

(7) *Technical Guidelines for Environmental Impact Assessment - Ecological Impact* (HJ19-2011);

(8) *Technical Guidelines for Environmental Risk Assessment on Projects* (HJ169-2018);

(9) *Technical Specifications for Regionalizing Environmental Noise Function* (GB/T15190-2014);

(10) *Technical Guidelines for Environmental Impact Assessment - Power Transmission Project* (HJ24-2014);

(11) *Guideline on Management of Radioactive Environmental Protection - Methods and Standards for Environmental Impact Assessment of Electromagnetic Radiation* (HJ/T10.3-1996);

(12) *Specification for Environmental Protection of Catering Trade* (HJ554-2010);

(13) *Technical Guidelines for Environmental Noise and Vibration Control Engineering* (HJ2034-2013);

(14) *Controlling Limits for Electromagnetic Environment* (GB8702-2014).

(15) *Technical Regulation on Water and Soil Conservation of Development and Construction Projects* (GB50433-2008).

**2.3** **Standards for Environmental Quality and Pollutants Discharge**

Applicable domestic standards for environmental quality and pollutants discharge of the Project and the standards for pollutants control in the *Environmental, Health, and Safety (EHS) Guidelines General EHS Guidelines* issued by the World Bank are compared and analyzed in the EIA, and the more stringent ones shall serve as the basis of assessment.

(1) *Environmental Quality Standards for Surface Water* (GB3838-2002);

(2) *Environmental Quality Standards for Groundwater* (GB/T14848-93);

(3) *Integrated Wastewater Discharge Standard* (GB8978-1996);

(4)  *Reuse of Urban Recycling Water - Water Quality Standard for Urban Miscellaneous Water Consumption* (GB/T18920-2002);

(5) *Environmental Quality Standards for Noise* (GB3096-2008);

(6) *Emission Standards and Measurement Methods of Railway Noise on the Boundary Alongside Railway Line* (GB12525-90) and the revised scheme;

(7) *Emission Standard of Environment Noise for Boundary of Construction Site* (GB12523-2011);

(8) *Emission Standard for Industrial Enterprises Noise at Boundary* (GB12348-2008);

(9) *Standard of Environmental Vibration in Urban Area* (GB10070-88);

(10) *Ambient Air Quality Standards* (GB3095-2012);

(11) *Integrated Emission Standards for Atmospheric Pollutants* (GB16297-1996);

(12) *Emission Standard of Cooking Fume* (Trial) (GB18483-2001);

(13) *Emission Standards for Odor Pollutants* (GB14554-93);

(14) *Controlling Limits for Electromagnetic Environment* (GB8702-2014).

(15) *Identification Standards for Hazardous Wastes* (GB5085-2007);

(16) *Standard for Pollution Control on Hazardous Waste Storage* (GB18597-2001) and the modification list;

(17)  *General EHS Guidelines*, *General EHS Guidelines for Water and Sanitation* and *General EHS Guidelines for Waste Management Facilities* issued by the World Bank;

(18) *Performance Standards on Social and Environmental Sustainability* of the International Finance Corporation.

**2.3.1**  **Environment Quality Standards**

See Table 2-1~Table 2-5 for the extracts for limit value of the standards for environmental quality adopted for EIA.

Table 2-1 *Environmental Quality Standards for Surface Water* (GB3838-2002) (mg/L, excluding pH)

|  |  |
| --- | --- |
| Assessment factor | Class-IV standard limits |
| pH | 6~9 |
| Dissolved oxygen | ≥3 |
| COD | ≤10 |
| BOD5 | ≤6 |
| TN | ≤1.5 |
| NH3-N | ≤1.5 |
| TP | ≤0.3 |
| Petroleum | ≤0.5 |
| Sulfide | ≤0.5 |
| Fecal coliform | ≤2,000 |
| Applicable river | Qingliu River, Laihe River, Chuhe River and Zhujiashan River |

Table 2-2 *Environmental Quality Standards for Groundwater* (GB/T14848-93) (mg/L, excluding pH)

|  |  |
| --- | --- |
| Assessment factor | Class-III standard limits |
| Permanganate index | ≤3.0 |
| Ammonia nitrogen | ≤0.2 |
| Total hardness | ≤450 |
| Chloride | ≤250 |
| Sulfate | ≤250 |
| Total dissolved solids | ≤1,000 |
| Nitrate | ≤20 |
| Nitrite | ≤0.02 |
| Iron | ≤0.3 |
| Lead | ≤0.05 |
| Total coliform group | ≤3.0 |

Table 2-3 *Environmental Quality Standards for Noise* (GB3096-2008) (Unit: dBA)

|  |  |  |  |
| --- | --- | --- | --- |
| Category of noise functional area | In the daytime | At night | Basis |
| 1 | 55 | 45 | *Regionalizing Noise Function of Chuzhou* (2012-2020) and *Adjustment Scheme of Regionalizing Environmental Noise Function of Nanjing* (NZF [2014] No. 34) |
| 2 | 60 | 50 |
| 3 | 65 | 55 |
| 4a | 70 | 55 |
| 4b | 70 | 60 |

Table 2-4 Environmental Quality Standards for Vibration (Unit: dB)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functional area | Daytime | Nighttime | Scope of application | Basis of selection |
| Residential and cultural and educational areas | 70 | 67 | Sensitive points in “Class 1” noise functional area | Refer to the category of noise functional area |
| Mixing area and business center | 75 | 72 | Sensitive points in “Class 2” noise functional area |
| Industrial concentration area | 75 | 72 | Sensitive points in “Class 3” noise functional area |
| Both sides of arterial traffic | 75 | 72 | Sensitive points in “Class 4” noise functional area |

Table 2-5 *Ambient Air Quality Standard* (Unit: μg/m3)

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Concentration limit of Class II standards | | |
| 1h average | 24h average | Annual average |
| SO2 | 500 | 150 | 60 |
| NO2 | 200 | 80 | 40 |
| TSP | - | 300 | 200 |
| PM10 | - | 150 | 70 |
| PM2.5 | - | 75 | 35 |

**2.3.1** **Pollutant Discharge Standards**

According to the characteristics of the Project and the pollutants discharge, for the stations, Hongwu Road Stabling Yard and control center which can meet the conditions for access to the urban sewage treatment plant during the operation period, the class-3 standards as specified in the *Integrated Wastewater Discharge Standard* (GB8978-1996) shall be followed. For the stations and Xiangguan Vehicle Depot which cannot meet the conditions for access to the urban sewage treatment plant, the standards for car washing and greening in *Reuse of Urban Recycling Water - Water Quality Standard for Urban Miscellaneous Water Consumption* (GB/T18920-2002)shall be followed. See Table 2-6~Table 2-11 for other standards related to noise and atmosphere etc. during the construction period.

Table 2-6 *Integrated Wastewater Discharge Standard* (Unit: mg/L, excluding pH)

|  |  |  |
| --- | --- | --- |
| Pollution factor | Concentration limit | Scope of application |
| pH | 6~9 | 13 stations (e.g. Chuzhou High-speed Railway Station and Chuyang Road South Station), control center and stabling yard of Hongwu Road |
| SS | 400 |
| BOD5 | 300 |
| COD | 500 |
| Petroleum | 30 |

Table 2-7 Standard Limits Specified by the *Reuse of Urban Recycling Water - Water Quality Standard for Urban Miscellaneous Water Consumption*

(Unit: mg/L, excluding pH)

|  |  |  |  |
| --- | --- | --- | --- |
| Pollution factor | Concentration limit | | Scope of application |
| Urban landscaping | Vehicle washing |
| pH | 6~9 | 6~9 | Laian South Station, Xiangguan North Station and Xiangguan Town Station and Xiangguan Vehicle Depot |
| BOD5 | 20 | 10 |
| Ammonia nitrogen | 20 | 10 |

Table 2-8 Standard Limit Value for Noise Emission (Unit: dB(A))

|  |  |  |  |
| --- | --- | --- | --- |
| Standard | Emission Grade and Standard Limit Value | | Scope of application |
| Announcement on the Release of the Revised Scheme of *Emission Standards and Measurement Methods of Railway Noise on the Boundary Alongside Railway Line* (GB12525-90) (2008 No.38 Announcement of the Former Ministry of Environmental Protection) | In the daytime: 70dB; at night: 60dB | | Limit of noise on the railway boundary 30m away from the center line of outer rail |
| *Emission Standard for Industrial Enterprises Noise at Boundary* (GB12348-2008) | Class 1 area | In the daytime: 55dB; at night: 45dB | Boundary on the east, west, south and north sides of the main substation of the technical college |
| Class 2 area | In the daytime: 60dB; at night: 50dB | East, west and south boundaries of pStabling yard of Hongwu Road; boundary of Xiangguan Vehicle depot; south boundary of the main substation of Xiangguan Town |
| Class 4 area | In the daytime: 70dB (A); at night: 55dB (A) | North boundary of Stabling yard of Hongwu Road; east, west and north boundaries of the main substation of Xiangguan Town |
| *Emission Standard of Environment Noise for Boundary of Construction Site* (GB12523-2011) | In the daytime: 70dB; at night: 55dB | |  |

Table 2-9  *Integrated Emission Standards for Atmospheric Pollutants* (Unit: mg/m3)

|  |  |  |  |
| --- | --- | --- | --- |
| S/N | Pollutants | Standards for Limit Value of Monitored Concentration under Unorganized Discharge of New Source of Pollution | Remarks |
| 1 | Particular matters | 1.0 | During the construction period, the monitored point is the point with the highest concentration outside the circumference |
| 2 | Sulfur dioxide | 0.40 |
| 3 | Oxynitride | 0.12 |
| 4 | TSP | 5 |

Table 2-10 *Emission Standard of Cooking Fume*

|  |  |  |  |
| --- | --- | --- | --- |
| Scale | Small | Medium | Large |
| Benchmark number of cooking ranges | ≥1, <3 | ≥3, <6 | ≥6 |
| Corresponding total power of cooking ranges (108J/h) | ≥1.67, <5.00 | ≥5.00, <10 | ≥10 |
| Corresponding total projected area of exhaust hood on cooking surface (m2) | ≥1.1, <3.3 | ≥3.3, <6.6 | ≥6.6 |
| Maximum allowable emission concentration (mg/m3) | 2.0 | | |
| Minimum removal rate of purification equipment (%) | 60 | 75 | 85 |

Note: benchmark air output of single cooking range: 2,000m3/h uniformly for the large, medium and small sizes

Table 2-11 Standard Value in *Emission Standards for Odor Pollutants* (Unit: mg/m³)

|  |  |  |
| --- | --- | --- |
| Controlling item | Unit | Class 2 standard value (dimensionless) |
| Odor concentration | dimensionless | 20 |

**2.4** **Safeguard Policies and Guidelines of the World Bank**

The dependency between the Project and the safeguard policies/procedures of the World Bank is analyzed in the EIA. See Table 2-12 below for the results.

Table 2-12 Analysis on the Correlation Between the Project and the Safeguard Policies of the World Bank

|  |  |  |
| --- | --- | --- |
| Business Policies/Procedures of the World Bank | Related or not | The Cause for Getting Involved in Business Policies of the World Bank |
| OP/BP4.01 EIA | √ | Related Certain impact will be exerted on environment during the construction and operation periods of the Project, so EIA is required. According to the environmental screening results, the Project is defined as a Class A project. |
| OP/BP4.04 Natural Habitats | × | Not related No natural habitat is within the assessment scope of the Project. |
| OP/BP 4.36 Forestry | × | Not related The Project will neither cause any impact on the forest health and quality nor impair the interests of the forest owners and the symbiosis between them and the forest. |
| OP/BP 4.09 Pest Management | × | Not related The Project requires of no insecticide and pesticide application equipment and is not related to the pest management policies. |
| OP/BP 4.11 Physical Cultural Resources | √ | Related The graveyard will be occupied for the purpose of the Project. The underground cultural relics may be found during the construction period. |
| OP/BP 4.10 Minority | × | Not related The project site is not an area of aborigines or minorities. |
| OP/BP 4.12 Involuntary Resettlement | √ | Related The land will be temporarily or permanently occupied for the purpose of engineering construction. |
| OP/BP 4.37 Dam Safety | × | Not related The Project involves no and is independent of any dam in being or under construction. |
| OP/BP 7.50 International Waters | × | Not related The project site is located in Chuzhou (Anhui Province) and Nanjing (Jiangsu Province) and is free of any international waters. |
| OP/BP 7.60 Disputed Regions | × | Not related The project site is free of any disputed regions. |
| BP17.50 Information Disclosure | √ | Related The EIA documents of the Project is open to public consultation and information disclosure. |
| The *General EHS Guidelines* of the International Finance Corporation (IFC) | √ | The *General EHS Guidelines* of the International Finance Corporation (IFC) are applicable to the Project. |
| The *General EHS Guidelines for Water and Sanitation* of the International Finance Corporation | √ | The *General EHS Guidelines for Water and Sanitation* of the International Finance Corporation are applicable to the Project. |
| The *General EHS Guidelines for Waste Management Facilities* of the International Finance Corporation | √ | The *General EHS Guidelines for Waste Management Facilities* of the International Finance Corporation are applicable to the Project. |
| The *Performance Standards on Social and Environmental Sustainability* of the International Finance Corporation | √ | The *Performance Standards on Social and Environmental Sustainability* of the International Finance Corporation are applicable to the Project. |

The OP/BP4.01, OP/BP4.11, OP/BP4.12 and BP17.50 under the Safeguard Policies/Procedures of the World Bank are applicable to the Project, with the IFC’s *General Environment, Health and Safety Guidelines* (*General EHS Guidelines*), *General EHS Guidelines for Water and Sanitation, General EHS Guidelines for Waste Management Facilities* and *Performance Standards on Social and Environmental Sustainability* as the technical references of the Project.

**3 Environmental and Social Management System**

The Project is located in Chuzhou, Anhui and Nanjing, Jiangsu. As the environmental management organizations at the project site, Chuzhou Ecological Environment Bureau and Nanjing Ecological Environment Bureau are mainly responsible for coordinating the work concerning management of environmental protection among departments as per the requirements for environmental protection proposed in the EIR. The Project Office of the World Bank takes charge of managing implementation of the entire project, and the project company takes charge of specific matters. To guarantee smooth progress of the actions concerning environmental management, several full-time or part-time staff for environmental management will be assigned for the project company, the Contractor and the Operator. Such staff will take charge of implementing the environmental and social management plan.

**3.1** **Environmental Management Organization**

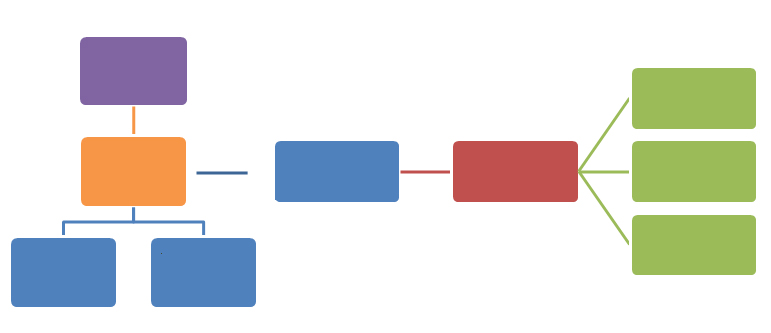
Since the management contents during the construction and operation periods vary and the working time limit of both is temporary or long-term, the Contractor and the Operator shall set up their own organizations at different stages for phased responsibilities. Corresponding management organizations shall be revoked immediately upon completion of construction, and that during the operation period shall start operating. Overlapping of certain time periods is allowed as appropriate.

Table 3-1 List of Relevant Organizations

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Functions | Relevant Organizations | | | |
| Phase I of Chuzhou Section | Phase II of Chuzhou Section | | Nanjing section |
| Project Office | Chuzhou Intercity Railway Office | Chuzhou Intercity Railway Office | | Hub Economic Development Management Office of Nanjing Jiangbei New Area |
| Employer | Wantong Intercity Railway Co., Ltd. (SPV1) | - | | - |
| Designer | China Railway Siyuan Survey and Design Group Co., Ltd. | | | |
| EIA organization | China Railway Siyuan Survey and Design Group Co., Ltd. | | | |
| Supervision Organization | Chuzhou Ecological Environment Bureau | Chuzhou Ecological Environment Bureau | Nanjing Ecological Environment Bureau | |
| Contractor | China Tiesiju Civil Engineering Group and China Railway 12 Bureau Group Co., Ltd. | - | - | |
| Supervisor | Jiangsu Jianke Engineering Consulting Co., Ltd., Shanghai Metro Consultation Supervision Science Technology Co., Ltd., ARTS Group Engineering Consulting Co., Ltd. | - | - | |

Note: “-” indicates that such item is not determined at the current stage.

According to the table above, see Figure 3-1 and Figure 3-2 for the environmental management organization during the construction and operation periods.



World Bank

Municipal Ecological Environment Bureau

Supervisor

Designer

Organization entrusted with monitoring

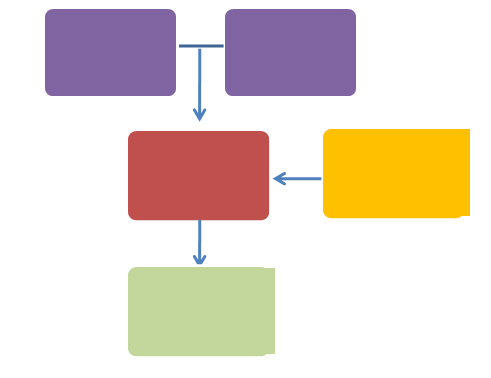
Contractor

Wantong Intercity Railway Co., Ltd.

Chuzhou Project Office

EIA organization

Figure 3-1 Environmental Management Organization during the Construction Period



Municipal Ecological Environment Bureau

Organization entrusted with monitoring

Chuzhou Project Office

World Bank

Wantong Intercity Railway Co., Ltd.

Figure 3-2 Environmental Management Organization during the Operation Period

**3.2** **Responsibilities and Contents of Environmental and Social Management**

Since the contents of environmental and social management during the construction and operation periods vary greatly, different responsible departments shall take charge of implementing the environmental and social management plan. See Table 3-2 for the contents of phased management and staffing of each such organization.

Table 3-2 Contents of Phased Environmental and Social Management

|  |  |  |  |
| --- | --- | --- | --- |
| Stage | Interested Parties | Main Contents of Environmental Management | Staffing |
| Design and preparation | Employer | Specially-assigned management staff for environment shall be staffed to take charge of environmental protection at the planning, design and implementation stages of the Project, confirming that the working procedures meet the requirements of the World Bank and domestic authorities for EIA and environmental and social management and coordinating and supervising implementation of the environmental and social management plan.  1. Take charge of series of work concerning management of environmental protection at the design and preparation stages;  2. Take charge of the expenses concerning environmental protection;  3. Take charge of coordinating the matters concerning environmental management with the competent government authorities for environment;  4. Take charge of the work related to supervision and monitoring for environmental protection. | 2 |
| Designer | 1. Include the environmental protection measures in the design scheme and budget;  2. Include the mitigation measures in the environmental and social management plan in the technical specifications of the bid. | 2 |
| EIA organization | 1. Provide technical support for environmental protection designed;  2. Prepare the EIA documents;  3. Formulate the environmental and social management plan. | 5 |
| Municipal Ecological Environment Bureau | 1. Take charge of routine environmental supervision and management of the Chuzhou-Nanjing Intercity Railway. | 1 |
| Construction period | Employer | 1. Take charge of series of work concerning management of environmental protection during the construction period, and the expenses concerning environmental protection;  2. Manage and supervise the work concerning environmental protection during the construction period; investigate and tackle the concerns related to residents disturbance or pollution during construction;  3. Take charge of coordinating the matters concerning environmental management with the competent government authorities for environment protection;  4. Trace the execution of the environmental and social management plan; regularly report to the competent authorities of the same level, the municipal Project Office and the World Bank.  5. Accept and handle with the public complaints. | 3 |
| Contractor | 1. Formulate the ESMP-based environmental and social management plan on site, to become an integral part of the Contract;  2. Perform the responsibilities for environmental protection under the Contract, including the environmental, social, health and safety measures;  3. Accept the guidance and supervision of the Employer’s environmental management staff, the construction supervision engineer and relevant functional departments of the government;  4. Accept the technical support provided by the consultant institutions for environmental protection;  5. Take protection measures concerning environmental protection and safety etc., such as informatory signs on the construction site and fences at the boundary of the construction site; establish the communication channels with the public, to guarantee construction safety. | 3 |
| Supervisor | 1. Supervise the Contractor’s execution of the Contract and the environmental and social management plan on site; perform the environmental mitigation measures in the Contract;  2. Conduct field supervision on the implementations of the Contractor;  3. Coordinate with the Employer in environmental management;  4. Record the execution of the environmental and social management plan, forming a report; regularly report to the Employer. | 5 |
| Entrusted monitoring organization | 1. Complete the environmental monitoring during the construction period of the Project as per the authorization of the Employer and the environmental monitoring plan proposed in the EIA;  2. Conduct environmental monitoring immediately in case of any abnormalities in construction. | To be determined as per the scope of entrusted tasks |
| Municipal Ecological Environment Bureau | 1. Supervise and check the environmental protection measures of the Employer and the construction unit;  2. Accept the report for execution of the environmental and social management plan submitted by the Employer and the Project Office; conduct administrative management as per the report;  3. Go to the site immediately in case of any abnormal environmental pollution in construction and arrange for emergency measures;  4. Accept the public complaints and coordinate in handling. | 2 |
| Technical support/consultant | 1. Provide technical support for the environmental protection during the construction period of the Project as per the authorization of the Employer, the EIR and the design achievements for environmental protection;  2. Provide technical guidance for environmental protection to the Contractor and provide trainings for environmental protection during the construction period. | Unlimited |

| Continued | | | |
| --- | --- | --- | --- |
| Stage | Interested Parties | Main Contents of Environmental Management | Staffing |
| Operation period | The Employer or the Operator | 1. Take charge of management of environmental protection after the Project is under operation; implement the mitigation measures and environmental monitoring in the environmental and social management plan during the operation period;  2. Contact with the competent government authorities, and coordinate in implementing the matters concerning environmental management;  3. Emergency handling of environmental accidents;  4. Provide trainings for the working staff regularly to improve their working capabilities; conduct exchange activities for techniques and experience in environmental protection actively, to further improve the work concerning environmental management. | 3 |
| Entrusted monitoring organization | 1. Complete environmental monitoring during the operation period as per the authorization of the Employer and the environmental monitoring plan;  2. Conduct conventional monitoring related to environmental protection regularly during the operation period. | To be determined as per the scope of entrusted tasks |
| Municipal Ecological Environment Bureau | 1Manage and supervise the up-to-standard of environmental quality during the operation period; | 2 |
| The mass or organization | Social supervision | Unlimited |

**3.3** **Supervision Plan for Environmental Protection**

Implementation of the environmental protection measures is not only subject to supervision by local bureaus for ecological environment, but also the supervision by relevant departments of the World Bank. The construction supervisor shall be staffed during the construction period to assist with the Employer in on-site supervision. Corresponding competent authorities for environmental protection shall be established during the operation period for supervising the Project.

See Table 3-3 for the supervision plan for environmental protection.

Table 3-3 Supervision Plan for Environmental Protection

|  |  |  |  |
| --- | --- | --- | --- |
| Stage | Organization | Supervision Contents | Supervision Purpose |
| Feasibility study stage | Municipal Ecological Environment Bureau | Review relevant chapters for environmental protection in the feasibility study documents | 1. Guarantee comprehensive contents, proper subjects and outstanding key points in the EIA  2． Guarantee that the major and potential possible concerns of the Project are reflected  3． Guarantee feasible plans of the mitigation measures of the impact of environment on society |
| Design and construction stages | Municipal Ecological Environment Bureau | 1. Review preliminary design and ESMP for environmental protection  2. Check the control measures for dust and noise pollution and the approval on the construction time etc.  3. Check discharge and disposal of the production wastewater and domestic sewage on the construction site | 1. Perform the “Three Simultaneities Principle” of the Project strictly  2． Guarantee that the construction site can meet local requirements for environmental protection  3． Reduce the impact during the construction period for surroundings and execute relevant regulations and standards for environmental protection |
| Municipal bureau for culture and tourism | Archaeological work for cultural relics before construction | Protect the cultural relics from being damaged |
| Operation stage | Municipal Ecological Environment Bureau | 1. Check implementation of the environmental protection measures during the operation period  2． Check implementation of the monitoring plan  3． Check the sensitive points requiring further environmental protection measures (with possible unpredicted environmental concerns)  4． Check the environmental quality of the environmental sensitive points to see whether the requirements of corresponding quality standards are met  5． Enhance supervision, to prevent emergency; formulate the emergency plan in advance, so that the environmental risks can be eliminated timely in case of any accident | 1. Take environmental protection measures  2. Implement the monitoring plan  3. Practically protect the environment  4. Enhance environmental management and practically protect the health of the mass  5. Guarantee that the pollutants can meet the discharge standards |

**3.4** **Evaluation of the Wantong Company on the Environmental Management System**

At present, Wantong Intercity Railway Co., Ltd., the Project Company of the Phase I project at the Chuzhou Section, is established. The evaluation on the environmental management system of such company is as follows:

1. System for Environmental Protection, Safety and Occupational Health

Wantong Company has a complete system for environmental protection, safety and occupational health, mainly including:

(1) Full-time management departments for environmental protection, safety and occupational health are established for the Company and one full-time personnel is staffed.

(2) The Vice General Manager takes charge of leading the departments and personnel above.

(3) The Company’s environmental management system is integrated into various business departments and flow, including project approval, design, construction, and operation management.

2. Safety certificate

At present, Wantong Company has obtained the ISO14001 Environment Management System Certificate and the ISO45001 Occupational Health and Safety Management System Certificate.

3. Contents of environmental and safety management

The training contents of environmental and safety management include but not limited to:

(1) National, Anhui and Chuzhou governments’ regulations, documents and requirements in respect of environmental protection, water and soil conservation, social impact, occupational health and safety during management and operation of construction projects;

(2) the World Bank’s requirements for environmental and social management; the clauses for environment, health and safety in the loan agreement of the World Bank;

(3) the environmental protection measures proposed in engineering design and the requirements for environmental protection during the construction period;

(4) Guidelines for environmental protection, safety and occupational health during the construction and operation period;

(6) Trainings on ESMP of the Project;

(7) Responsibilities and mutual relationship among the environment management staff, the supervisors and the Contractor;

(8) Preparation of the report for environmental and social management work and the report for environmental monitoring and the monthly reports.

4. Capabilities and trainings of the management departments

For trainings during the construction period, the followings can be invited: local bureaus for ecological environment and water conservancy; the person in charge of design of environmental protection of the Designer; relevant experts of the EIA unit and the monitoring unit; the experts for environmental protection of the World Bank. For trainings during the operation period, relevant experts for environmental protection of the college, relevant institutions for scientific research and the operation management unit can be invited for teaching.

5. Emergency plan

Wantong Company shall take charge of formulating corresponding emergency plan for management to handle with the emergency of the Contractor and that on the construction site, including the incidents related to environmental pollution, safety and occupational health. The contact person and responsible persons, requirements for tackling time and progress, events concerning external liaison and specific emergency response measures shall be included in the emergency plan, so that the emergency can be responded to for the first time once being identified.

6. Monitoring, supervision and appraisal

A third-party monitoring organization is entrusted by Wantong Company with environmental monitoring of the Project, such as monitoring on sewage, noise and dust during the construction period, forming a report. Such report shall be copied to the Project Office and the competent authorities for environmental protection regularly.

The entire working process and flow shall be subject to supervision and appraisal by the Project Office, local departments for ecological environment and the World Bank. Besides, the execution plan of the Company shall be revised timely as per the evaluation results.

7. Handling procedures and mechanism for complaints

Any affected personnel, team or organization can appeal through calls, correspondence or E-mail etc. The contact person of each link accepting complaints within the Company will be determined by Wantong Company before commencement. The specific contact information (such as the phone number, address and E-mail etc.) will be published on the information bar on the construction site or the website of local governments.

The Environmental Management Dept. will mainly establish one set of tracing and recording system for the complaining mechanism of the public for the following purposes: (1) Establish the tracing table and tracing procedures to gather information from the project staff and the complaining party; (2) Appoint specially-assigned personnel for regular updating of the information in the database; (3) Establish the information analysis system, to identify the cause of complaints and to improve the transparency of handling procedures of complaints, with regular evaluation on the overall operation of such mechanism; (4) Establish the procedures notifying interested parties for handling; (5) The handling progress of complaints shall be regularly reported to the Project Office, local departments for ecological environment and the World Bank.

**4 Environmental and Social Impacts and Mitigation Measures**

According to national laws and regulations and those stipulated by Anhui and Jiangsu as well as the *General EHS Guidelines* issued by the World Bank, in combination with the EIR of the Project, all major environmental and social impact and corresponding mitigation measures/action plans involved in the Project are summarized in the Chapter, forming the measures and plans of the Chuzhou-Nanjing Intercity Railway. The implementing time, budget, organization and the supervision organization of various measures are clearly specified in such measures and plans. Besides, monitoring indexes and frequency are set for monitoring on the implementing effect of corresponding measures, so that necessary actions can be formulated and taken timely for enhancing or adjusting such measures, so as to achieve the established environmental and social objectives of the Project. The mitigation measures will be included in detailed design, tender documents and the project management manual by the Designer, the Contractor and the implementing organization under the supervision by the Project Office, local departments for environmental protection and the expert team for environment of the Project. The validity of these measures will be evaluated as per the environment inspection and monitoring results, to determine whether such measures need to be executed or improved/adjusted continuously.

**4.1 Environmental Impacts and Mitigation Measures**

Considering long construction cycle and complicated composition of the Project, different project areas (elevated sections and elevated stations; tunnel sections and underground stations; vehicle depots and stabling yards; control center and the main substation etc.) will be illustrated in the chapter as per three stages, i.e. planning and design, the construction period and the operation period. The Contractor may implement corresponding environmental and social management plan as per the contents of corresponding table at the implementation stage.

Table 4-1 Environmental and Social Management Plan of the Chuzhou-Nanjing Intercity Railway (Planning and Design Period)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Environmental Impact/Risks | Management/Mitigation Measures | Budget Source | Implementer | Supervisor |
| Site selection | ①As for site selection of the Project, crossing of the existing concentrated residential areas (villages and communities), schools and hospitals and those under planning shall be avoided as much as possible;  ② As less arable land and basic farmland as possible shall be occupied;  ③ The environment-sensitive areas shall be avoided as much as possible;  ④ As for route selection of the Project, the existing roads and galleries of towns and townships and those under planning shall be utilized as much as possible. | Included in the design expenses | Designer | The implementer (Wantong Intercity Railway Co., Ltd.) and the Project Office |
| Design of borrow area | ①Formulate the design scheme of the borrow area and detailed management and reclamation plan.  ② After the plan is submitted to the Employer and the Supervisor for review or upgrading, submit the review and approval opinions of local authorities for land, environmental protection and water affairs etc.  ③ All the spoil of the Project shall be delivered to the spoil area for muck in Erlang Village, Chuzhou and the Guanshan spoil area for muck for disposal. The areas above are handed over to the Project after the Chuzhou section is built. | Included in the expenses of detailed design | Designer | The implementer (Wantong Intercity Railway Co., Ltd.), the Project Office and local authorities for land, environmental protection and water affairs etc. |
| Environmental responsibilities of the Contractor in the tender and contractual documents | ①Include the requirements for environmental and social management in the bidding documents;  ② Include the environmental mitigation measures and monitoring clauses defined in the environmental and social management plan in the construction contract. | Included in the expenses of detailed design and invitation for bids | The Designer and the bidding agency | The implementer (Wantong Intercity Railway Co., Ltd.) and the Project Office |
| Setup of the environmental and social management department of  the Project | The environmental and social management department shall be established within the Project Office. | Included in the expenses of project management | Project Office | The implementer (Wantong Intercity Railway Co., Ltd.) and the Project Office |
| Consultant for  project implementation | Include relevant contents of environmental and social management of the Project in the working outline of consultant for project implementation. | Included in the expenses of project management | The implementer and the Project Office | The World Bank |
| Update the environmental and social management plan and detail the environmental and social management plan as for a specific construction site | Update the mitigation measures defined in the environmental and social management plan as per the final detailed design, and formulate specific environmental and social management plans as for a specific construction site. Submit the plan to the Project Office and the World Bank for review and approval. | Included in the expenses of project management | Environmental and social management department and the consultant for  project implementation | The Project Office, local bureau for ecological environment; the World Bank |
| Internal environmental monitoring and supervision plan | Prepare the internal plan for environmental monitoring in line with the requirements of the EIR and the environmental and social management plan | Included in the project investment | The Contractor and the construction supervisor | The Project Office, local bureau for ecological environment and the consultant for project implementation |
| External (compliance) environmental and social monitoring | Before construction, local qualified environmental monitoring stations and monitoring teams for resettlement shall be hired, to take charge of external monitoring on compliance specified in the environmental and social management plan during the construction and operation periods. | Included in the project investment | The implementer and the Contractor (according to the contractual requirements) | The World Bank |
| Trainings on environmental management | The consultant for project implementation or the environmental experts and/or officials invited from local departments for environmental protection shall provide trainings in respect of environmental management, implementation and supervision for project construction and operation for the staff of the Contractor, the construction supervisor and the implementer as per the defined training program. | Included in the expenses of the environmental and social management plan | The Project Office and the  consultant for project implementation | Local bureau for ecological environment and the World Bank |
| Establish the public complaining mechanism for the environmental and social concerns | Establish the public complaining mechanism for the environmental and social concerns as per the environmental and social management plan of the Project and the requirements of the resettlement plan | Included in the expenses of project management | The Project Office and the environmental and social management department | Local bureau for ecological environment, the consultant for project implementation and the World Bank |
| On-site environmental engineer | Assign one on-site environmental engineer for each contract before commencement and after signing of the construction contract | Included in the expenses of the Contract | Contractor | The construction supervisor and the Project Office |
| Assignment of the environmental supervision engineer | Assign the environmental supervision engineer within the construction supervisor, to take charge of routine inspection and internal monitoring and evaluation on implementations of the environmental mitigation measures at the construction stage. | Included in the supervision costs | Construction supervisor | The implementing organization and local bureau for ecological environment |

Table 4-2 Main Environmental Impact and Mitigation Measures at Elevated Sections and Elevated Stations

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental/Social Factor | | Environmental Impact/Risks | Management/Mitigation Measures | Budget (CNY 10,000) | Implementer | Supervisor | Monitoring Index | Monitoring Time/Frequency |
| 1 | | Construction period | | | | | | |
| Land acquisition and resettlement | | The permanent land occupied by the Project is about 1,684.4*mu* and the demolition area is 89,380.53m2. The plant buildings and residential areas are to be built for the Project. | (1) Prepare the plan and social evaluation for resettlement with full public participation and consulting. The public shall participate in engineering design, so that the interest appeal can be manifested.  (2) Those affected shall be reasonably compensated, and it is worth mentioning in particular that the women and the vulnerable shall be subsidized during house rebuilding. Resettlement activities shall be carried out in combination with trainings on skills and techniques of local government.  (3) A favorable complaining mechanism shall be established, and the concerns in compensation of the affected personnel and resettlement shall be timely solved. | See the Resettlement Action Plan (RAP) for details | The Project Office, the Contractor, the agricultural bureau, the land and resources bureau, the forestry bureau, towns and townships, village committees or neighborhood committees involved in | The Project Office, local government and local  departments for land and resources | See the Resettlement Action Plan (RAP) of the Project for details | See the Resettlement Action Plan (RAP) of the Project for details |
| Basic farmland | | As less basic farmland as possible shall be occupied | See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures | Included in the budget | The Project Office, people’s government at local county and district | Local government and local authorities for land and resources | See the Resettlement Action Plan (RAP)  of the Project for details | See the Resettlement Action Plan (RAP) of the Project for details |
| Water and soil loss | | The original water and soil loss volume of the terrain at the predicted time periods is 820t (18,228t after surface disturbance), and the added value is 17,408t. | Implement the engineering measures, vegetation measures and temporary protection measures in the *Water and Soil Conservation Plan* of the Project and see Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | The Contractor and the construction supervisor | The Project Office, municipal bureau for ecological environment and for water conservancy | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. |
| Ambient air | Construction dust | (1)Excavation and backfilling during construction; (2) Dust pollution during handling of the sand and lime | (1) See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures; (2) Provide 1 set of automatic sprinkling system for the construction site at 9 stations (Chuzhou High-speed Railway Station; Fengyang Road North Station; Youyi Road Station; Suzhou-Chuzhou Industrial Park Station; Demonstration Park Station; Laian South Station; Beidou Industrial Park Station)  (3) Provide one set of automatic sprinkling system and one set of air-assisted sprayer for the construction site at Vocational and Technical College Station, Xiangguan Town Station, Chahe New Town Station and Chahe Town Station | 142 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | PM10 | Twice/year |
| Tail gas and transportation dust of vehicles | (1)Exhaust gas emitted from construction machinery and transporting vehicles; (2) The dust arising from construction and transporting vehicles will affect the residents around the construction site |

| Continued | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental/Social Factor | | | Environmental Impact/Risks | Management/Mitigation Measures | Budget (CNY 10,000) | Implementer | Supervisor | Monitoring Index | Monitoring Time/Frequency |
| Noise | | | The noise of construction machinery has wide influence. According to the prediction, the predicted noise in the daytime/at night at the sensitive points around the construction site is out-of-standard | (1) See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures.  (2) High-noise construction operations on the construction site around the residential areas at night are prohibited | 52 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | Leq | Twice/year |
| Vibration | | | The vibration generated from construction operations such as crashing and excavation as well as that arising from transportation and handling of transporting vehicles | See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures | 26 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | Vertical Z-vibration level VL10 | Once/year |
| Surface water | Domestic sewage | | The domestic sewage includes the water from washing of the construction personnel, from the canteen and from the toilets | See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures | 13 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | Domestic sewage:  COD, BOD5, ammonia nitrogen  Production wastewater: SS  Water quality during the construction period:  pH, SS, BOD, CODCr | Domestic sewage: 4 times/year  Production wastewater: 4 times/ year  (during production of the concrete mixing system)  Water quality during the construction period: once/ year |
| Construction wastewater | | The construction wastewater includes the muddy water generated from excavation and drilling as well as the cooling and washing water from mechanical equipment | Reused for site watering for dust removal or greening etc. after up-to-standard disposal | 26 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment |
| Sewage from surface runoff | | The sewage from surface runoff will pollute surroundings or block the urban drainage pipeline system if without proper management | See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures | 6.5 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment |
| Construction at the sections crossing surface water body | | Lifting after the steel cofferdam is submerged and after construction will disturb the water body, leading to floating of local sediments. Sludge sucking, foundation clearing and bottom sealing after the cofferdam is in-place and the muck and water drained from drilling will affect the quality of the water body in rivers | Included in the project cost | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment |
| Solid  wastes | Construction spoil | | The spoil volume of the Project is 1,012,800 m3 and all such spoil will be delivered to the spoil area for muck in Erlang Village, Chuzhou and the Guanshan spoil area for muck for disposal | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses for water and soil conservation | The Contractor and the construction supervisor | The Project Office, municipal bureau for ecological environment and water conservancy | / | / |
| Domestic wastes | | The domestic wastes is mainly generated from the construction, production and living areas, and will pollute the environment if without proper treatment | Regular centralized and uniform disposal by local departments for sanitation departments | Included in the project cost | Local departments for sanitation departments | The Project Office and municipal departments for sanitation departments | / | / |
| Ecology | Vegetation deterioration | | Occupying of urban green land and trees during the construction period | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the project cost | The Contractor | Municipal bureau for parks and woods | / | / |
| Terrestrial animal | | Temporary land occupation and construction behaviors of the Project will narrow the habitats and activity space of wild animals and cut off the migration route of some terrestrial animals | (1) Enhance management and publicity during the construction period, to reduce the impact on the zootope and behaviors;  (2) Hunting of animals during construction is prohibited | Included in the project cost | / | / | / | / |
| Aquatic organism | | Construction at the areas crossing the surface water body and adjacent surface water body as well as improper layout of construction site, improper treatment of the sewage during the construction period and of the spoil will pollute the water quality, thus affecting the aquatic organism | (1) Water piers will not be designed for the bridges crossing the Laihe River and the Qingliu River and cast-in-situ box girders are used for the bridges. Temporary facilities such as trestles will not be designed for the water body and both banks during construction, without direct disturbance on the water body  (2) One water pier will be set at the area crossing the Chuhe River. The impact from construction of bridges on the aquatic organism and the fish is temporary, and will vanish upon completion of construction. | / | / | / | / | / |
| Material cultural resources | Cultural relics | | Cultural relics or ruins may be identified during construction, thus damaging valuable ruins or crafts | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | / | / | / | / | / |
| Traffic reconciliation | | | The traffic will be deteriorated when the roads are narrowed during construction, leading to road congestion easily and unsmooth traffic etc., bringing certain impact on traveling of the mass along the line | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | The Project Office and the Contractor | Local traffic control  departments | / | / |
| Relocation of underground pipelines | | | Underground pipelines may be involved in during foundation excavation etc. of the Project, and normal life of residents will be affected in case of any accident once such pipelines are damaged | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the project cost | Contractor | The Project Office, the bureau for water affairs and for electricity | / | / |
| Social impact | | | Risks in rise of the price of commodities and of houses | See the social evaluation report of the Project for relevant mitigation measures | See the social evaluation report of the Project | See the social evaluation report of the Project | The Project Office, relevant units and the supervisor | See the social evaluation report of the Project | See the social evaluation report of the Project |
| Metro ticket price, business hours and preferential policies |
| Provide job opportunities for the vulnerable such as the women and the poverty-stricken people |
| Measures lowering potential social crisis |
| Occupational health and safety | | | Concerns and accidents related to occupational health may lead to injuries or death of the workers | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | Contractor | The Project Office and local government | / | / |
| 2 | | | Operation period | | | | | | |
| Social benefits | | | (1) Promote regional economic development, increasing job opportunities; (2) Improve the public transport infrastructure, to improve the traveling comfort of the mass; (3) Lower the traffic costs and reduce the traveling time; (4) Be conductive to reducing traffic accidents and tail gas, to protect the personal safety of residents and ecological environment; (5) Be conductive to resources flow in Chuzhou-Nanjing, to bring the geo-advantage and siphonic effect of Nanjing into full play; (6) Be conductive to improving the quality of the mass in Chuzhou, to improve the sense of personal identification and sense of pride of the residents | Positive impact, and mitigation measures are unnecessary | / | / | / | / | / |
| Noise | | | Among the 38 sensitive points on both sides of the elevated line, 33 are out-of-standard. The environmental noise at sensitive points in the daytime of the initial, near and far term is out-of-standard for 0.2~8.0dB (A), 0.2~8.1dB (A) and 0.1~8.4dB (A), while that at night is out-of-standard for 0.3~11.2dB (A), 0.1~11.2dB (A) and 0.1~11.3dB (A). | (1) Select the low-noise vehicles and equipment  (2) Finish the wheel tread regularly to keep the rail surface smooth  (3) For the newly-developed zone, it is recommended to develop as per the requirements for protection distance proposed in Table 5.2-4 of EIA. The first row adjacent to the line shall not be planned as sensitive buildings to sound environment, and the layout of buildings shall be planned in a scientific manner. Besides, the noise blocking of the back row of buildings shall be made.  (4) 3.1m high and 13,520 lm long vertical sound barriers will be provided for the sensitive spots, e. g., Jinghua Park, Dongxiang, Chuzhou Vocational College and Zhizi Huawang; semi-enclosed sound barriers (1,720 lm) will be provided for the sensitive spots as Dongsheng Gargen and Suyuan; the fully-enclosed sound barriers (60 lm) will be provided for Linlou Community.  (5) At the sections with sound barriers along the elevated line, the rubber floating-slab ballast beds or other vibration mitigation measures of rails (13,390 lm) shall be adopted for the double-track.  (6) See Table 5.2012 attached to the EIA Report for the details of the above noise mitigation measures. | 25,524 | The Contractor and the Employer | The Project Office and municipal bureau for ecological environment | Leq | Once/year |
| Vibration | | | During operation of vehicles, the predicted outdoor vibration at the sensitive points to vibration on both sides of the elevated line is up-to-standard. | (1) The rail surface shall be timely finished after the line is under operation, to enhance track irregularity management; perform strict plans for curing and maintenance  (2) At the stage of trail run, enhance tracking monitoring for the sensitive points to vibration along the line. | / | Employer | Municipal Ecological Environment Bureau | / | / |
| Surface water | | Domestic sewage | The main pollutants in the domestic sewage from the working staff and the passengers of the stations include the COD, BOD and ammonia nitrogen. Random discharge will pollute local water body. | The domestic sewage from the Laian South Station, Xiangguan North Station and Xiangguan Town Station will be delivered to the anaerobic pool and artificial wetland after pre-treatment via a septic tank, and the water quality after treatment shall reach the standards for urban landscaping in GB/T18920-2002 for station greening. The domestic sewage of other elevated stations shall be discharged to the urban sewage pipeline network directly after pre-treatment via a septic tank. | / | / | / | / | /  / |
| Ecological environment | | Animals | The bridges can meet the needs for traveling of the wild animals along the line after operation, with subtle impact on hindering of the animals along the line | No measures to be taken | / | / | / | / | / |
| Landscape | Landscape coordination and uniformity | Greening on both sides of the line and below the elevated bridge, thus relieving the impact on the landscape along the line | / | / | / | / | / |
| Solid wastes | | Domestic wastes | Mainly from the elevated stations and the domestic wastes of the working staff and passengers of the station | Deliver to the sanitation departments for uniform disposal after centralized gathering, without impact on surroundings | Included in the expenses of project management | Employer | Municipal sanitation departments | / | / |
| Electromagnetic environment | | | Operation of the vehicles on the elevated line may affect some TV users along the line | Since no adverse impact will be exerted to TV of residents along the line, special protection measures are unnecessary. | / | / | Municipal Ecological Environment Bureau | TV signal | Once during completion acceptance |
| Cumulative environmental impact | | Noise | The impact from the operation noise on both sides of the elevated line is obvious, and the predicted noise of the sound environment will be improved to a certain extent. Governance measures are not taken for the undeveloped or unplanned sections at the current stage. | (1) Reserve the conditions for vertical sound barriers along the whole line of the elevated line;  (2) Conduct continuous tracking monitoring and analyze the out-of-standard cause timely in case of noise complaints or out-of-standard noise due to operation of the Project, and take well-targeted remedial actions, such as enhancing polishing and service of the track, adding sound barriers or soundproof windows etc. | Included in the project cost | The Employer and  Project Office | The Employer and municipal bureau for ecological environment | Leq | To be determined as per the practical conditions at the later-stage operation |

Table 4-3 Main Environmental Impact and Mitigation Measures of Tunnel Sections and Underground Stations

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental/Social Factor | | Environmental Impact/Risks | Management/Mitigation Measures | Budget (CNY 10,000) | Implementer | Supervisor | Monitoring Index | Monitoring Time/Frequency/Duration |
| 1 | | Construction period | | | | | | |
| Land acquisition and resettlement | | Impact of permanent land and demolition  of the Project | See the Resettlement Action Plan (RAP) for relevant mitigation measures | See the Resettlement Action Plan  (RAP) for details | The Project Office, the Contractor, the municipal/county bureau for immigration, the agricultural bureau, the land and resources bureau, the forestry bureau, towns and townships, village committees or neighborhood committees involved in | The Project Office, the superior local government, local departments for land and resources and external monitoring unit | See the Resettlement Action Plan (RAP) of the Project for details | See the Resettlement Action Plan (RAP) of the Project for details |
| Basic farmland | | As less basic farmland as possible shall be occupied | See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures | Included in the budget | The Project Office, people’s government at local county and district | Local government and local authorities for land and resources | See the Resettlement Action Plan (RAP) of the Project for details | See the Resettlement Action Plan (RAP) of the Project for details |
| Water and soil loss | | Risks in water and soil loss due to excavation and backfilling during the construction period | Implement the engineering measures, vegetation measures and temporary protection measures in the *Water and Soil Conservation Plan* of the Project and see Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | The Contractor  and the  Supervisor | The Project Office and Chuzhou and Nanjing bureau for ecological environment  Municipal bureau for water conservancy | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | |
| Ambient air | Construction dust | Dust pollution arising from excavation, backfilling, demolition and handling of sand and lime during construction | (1) See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures  (2) Provide one set of automatic sprinkling system and one set of air-assisted sprayer for the construction site at Longpan Avenue Station, City Hall Station and Nanjing North Railway Station | 39 | The Contractor and the construction supervisor | The Project Office, Chuzhou and Nanjing bureau for ecological environment | PM10 | Twice/year | |
| Tail gas and transportation dust of vehicles | (1) Exhaust gas emitted from construction machinery and transporting vehicles; (2) The dust from transporting vehicles will pollute the residents around the construction site |
| Noise | Construction noise | The noise of construction machinery has wide influence. According to prediction, the predicted noise in the daytime/at night at sensitive points is out-of-standard, and protection measures shall be taken. | (1) See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures.  (2) High-noise construction operations on the construction site around the residential areas at night are prohibited | 12 | The Contractor and the construction supervisor | The Project Office, Chuzhou and Nanjing bureau for ecological environment | Leq | Twice/year | |

| Continued | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental/Social Factor | | Environmental Impact/Risks | Management/Mitigation Measures | Budget (CNY 10,000) | Implementer | Supervisor | Monitoring Index | Monitoring Time/Frequency/Duration |
| Vibration | | (1)The vibration generated from construction operations such as crashing and excavation as well as that arising from transportation and handling of transporting vehicles will affect the residents and buildings along the line  (2) If shield methods are adopted for construction at the tunnel sections, subtle vibration will be exerted on the ground on both sides of the line | See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures | 6 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | Vertical Z-vibration level VL10 | Once/year |
| Surface water | Domestic sewage | The domestic sewage includes the water from washing of the construction personnel, from the canteen and from the toilets | See Appendix 2 Specifications for Construction Environment of the Contractor  for relevant mitigation measures | 30 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | Domestic sewage:  COD, BOD5, ammonia nitrogen; production wastewater: SS  Water quality during the construction period:  pH, SS, BOD, CODCr | Domestic sewage: 4 times/year  Production wastewater: 4 times/ year  Water quality during the construction period: once/ year |
| Construction wastewater | The construction wastewater includes the muddy water generated from excavation and drilling as well as the cooling and washing water from mechanical equipment; |
| Sewage from surface runoff | The sewage from surface runoff will pollute surroundings or block the urban drainage pipeline system if without proper management |
| Construction at the sections crossing surface water body | Down-traverse the Zhujiashan River in the form of a tunnel, so basically no impact will be exerted | The burial depth of the shield tunnel is about 30m and the distance between the starting well of the shield and the Zhujiashan River is about 1km; the water body will not be disturbed during tunnelling | / | / | / | / | / |
| Groundwater | Groundwater quality | (1) During the construction of shields in tunnel sections, chemical grouting is required for foundation treatment, simultaneous grouting of gaps in shield-tail buildings, and secondary grouting behind of pipe walls, which may affect groundwater quality.  (2) Pollutants contained in construction sewage, oil stain, etc. may intrude into the groundwater system along with the proceeding of construction works, and domestic sewage during construction may also intrude into the aquifer, causing local water pollution.  (3) Groundwater extracted for construction dewatering may carry surface pollutants back into the groundwater system if it is improperly disposed, affecting groundwater quality. | (1) Lay drainage pipes at each construction site, so that production sewage and domestic sewage during construction can be pretreated before being discharged into the urban sewers.  (2) During foundation pit excavation and tunnel excavation, maintain the construction machinery clean, and construct strictly as per civilization and standardization standards, so as to avoid groundwater pollution due to the leakage and venting of oil and grease, oil stain, etc.  (3) Properly perform the storage and use management of construction, building and decoration materials to avoid their scouring and subsequent intruding into the groundwater.  (4) Domestic waste generated in construction should be managed and disposed of centrally, to prevent waste liquid from infiltrating into and polluting groundwater.  (5) Take anti-leakage measures for sewage treatment facilities at underground stations. | To be incorporated into engineering expenses | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | / | / |
| Groundwater volume | Dewatering and drainage measures should be taken during the construction of foundation pits of underground stations using the open-cut method; as a result, the groundwater level around the site may decrease for a short time, reducing the groundwater volume. | (1) Avoid excessive drainage of groundwater. As for the dewatering and drainage of foundation pits during construction, generally it needs to reduce the groundwater level to about 1m below the minimum construction surface to meet the construction requirements.  (2) The groundwater level should be observed at any time in the process of dewatering.  (3) Properly take dewatering measures for the support and bracing of foundation pits of continuous wall and bored piles.  (4) Under the premise of meeting dewatering requirements, fine filters should be preferred for downtake wells. (5) Strengthen the observation of the groundwater level and settlement deformation of ground buildings around the excavation site | To be incorporated into engineering expenses | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | / | / |
| Solid wastes | Construction spoil | The spoil volume of the Project is 1,012,800 m3 and all such spoil will be delivered to the spoil area for muck in Erlang Village, Chuzhou and the Guanshan spoil area for muck for disposal | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses for water and soil conservation | The Contractor and the construction supervisor | The Project Office, municipal bureau for ecological environment and water conservancy | / | / |
| Domestic waste in  construction | The domestic wastes is mainly generated from the construction, production and living areas, and will pollute the environment if without proper treatment | Regular centralized and uniform disposal by local departments for sanitation departments | To be incorporated into engineering  expenses | Local environmental sanitation departments  departments | The Project Office and municipal departments for sanitation departments | / | / |
| Ecology | Vegetation deterioration | The construction will temporarily occupy or destroy some green spaces, green belts and trees along roads in urban areas. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | To be incorporated into engineering  expenses | The Contractor | Municipal bureau for parks and woods | / | / |
| Terrestrial animal | The 3 underground stations and sections are located in the central area of the city, and there is basically no wild animals. | No effect | / | / | / | / | / |
| Material cultural resources | Cultural relics | Ancient cultural relics may be found when excavating earthwork, which can damage valuable sites or crafts. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | / | / | / | / | / |
| Traffic reconciliation | | The narrowing of roads during construction will worsen the road traffic conditions, causing traffic problems such as road congestion and poor traffic, which will affect people traveling along the line. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | The Project Office and the Contractor | Local traffic control department | / | / |
| Relocation of underground pipelines | | The foundation excavation and other works of the project may involve other underground pipelines. Once the pipeline is damaged, the normal life of the residents will be affected. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the project cost | Contractor | The Project Office, the bureau for water affairs and for electricity | / | / |
| Occupational health and safety | | Occupational health problems and accidents may cause worker casualties or other problems | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | Contractor | The Project Office and local government | / | / |
| 2 | | Operation period | | | | | | |
| Social benefits | | As shown in Table 4-2 about social benefits | Positive impact, and mitigation measures are unnecessary | / | / | / | / | / |
| Noise | | There is not acoustically sensitive point within the evaluation scope of environmental control equipment in underground stations. | (1) The final locations of wind pavilions and cooling towers shall be more than 15m from sensitive targets.  (2) For noise sources on the ground such as cooling towers, construct sound barriers, heighten enclosure walls, and lay sound absorbing materials on the inner side. Take use of open spaces within the boundaries of the station to plant green belts.  (3) For inlet and outlet wind pavilions, install mufflers before and after air pipes and fans. Increase the surface area of the air channel, and affix sound absorbing materials. Arrange anechoic louvers at the exit.  (4) Table 5.2-5 of the Environmental Impact Report (EIA) can be referred to as the planned protection distance for new sensitive building sites around the environmental control equipment. | / | The Contractor and the Employer | The Project Office and municipal bureau for ecological environment | Leq | Once/year |
| Vibration | | When the vehicle is running, the predicted values of outdoor vibration at all sensitive points along the line are up to standard. | (1) After the operation of the line, repair the track surface in time, strengthen the management of track irregularity, and implement a strict maintenance plan.  (2) Perform functional replacement for a total of 19 households in Zaoshuchen Village and Yujiaying villages within 5m at both sides from the center line of the outer track of the line above the tunnel (the number of households, area, expenses, etc. shall be subject to the final implementation plan).  (3) Adopt stricter vibration reduction measures for the above two sensitive points with a total of 1,780lm (such as laying rubber vibration isolation pad vibration reduction track).  (4) In the trial operation stage, strengthen tracking and monitoring of sensitive points along the line, and implement measures such as functional replacement of sensitive points where the monitoring results exceed the standard. | 4986 | Project Office and Contractor | Municipal Ecological Environment Bureau | / | / |
| Surface water | | The main pollutants in the domestic sewage from the working staff and the passengers of the stations include the COD, BOD and ammonia nitrogen. Random discharge will pollute local water body. | Pretreat the domestic sewage of each station by septic tanks and discharge into the municipal sewage pipe network, to flow into the urban sewage treatment plant for treatment. | To be incorporated into engineering expenses | / | / | / | / |
| Groundwater | | Tunnels and underground vehicles may cause the groundwater level on the stream face of the structure to rise to a certain extent. | The banked-up water level is extremely small, and within the limit of the natural amplitude of variation of groundwater level, can be naturally regulated by various methods of groundwater runoff, and the possibility of adverse effects on the groundwater environment is extremely small. | / | / | / | / | / |
| Atmospheric environment | Peculiar smell in wind pavilion of underground station | (1) The odor concentration of the wind pavilion can meet the Class II standard in the *Emission Standards for Odor Pollutants* (GB14554-93).  (2) At the beginning of subway operation, the smell of gas discharged from the wind pavilion is large due to interior decoration, but the smell will gradually decrease as time goes on. | (1) Do not construct sensitive points such as residential areas within 15m from the wind pavilion.  (2) Plant trees around the wind pavilion and do not align the air outlets of the wind pavilion to sensitive points.  (3) Underground stations should be decorated using materials that meet national environmental standards. | / | / | / | / | / |
| Landscape | | Landscape coordination and uniformity | The type, volume, height and color of the underground station's entrances and exits, wind pavilions and cooling towers must be coordinated and harmonized with the surrounding environment. | / | / | / | / | / |
| Domestic wastes | | Domestic waste mainly originates from the station, and the annual amount during the initial operation of the project is 27.38 tons/year. | Centrally collect the garbage, and transport to the environmental sanitation department for uniform disposal, which will not affect the surrounding environment. | To be incorporated into engineering expenses | / | / | / | / |

Table 4-3 Main Environmental Impacts and Mitigation Measures of Depots and Stabling Yards

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental/Social Factor | | Environmental Impact/Risks | Management/Mitigation Measures | Budget (CNY 10,000) | Implementer | Supervisor | Monitoring Index | Monitoring Time/Frequency/Duration |
| 1 | | Construction period | | | | | | |
| Land acquisition and resettlement | | Impact of permanent land use and demolition of the project | See the Resettlement Action Plan (RAP) for relevant mitigation measures | See the Resettlement Action Plan (RAP) for details | The Project Office, the Contractor, the municipal/county bureau for immigration, the agricultural bureau, the land and resources bureau, the forestry bureau, towns and townships, village committees or neighborhood committees involved in | The Project Office, the superior local government, local departments for land and resources and external monitoring unit | See the Resettlement Action Plan (RAP) of the Project for details | See the Resettlement Action Plan (RAP) of the Project for details |
| Basic farmland | | As less basic farmland as possible shall be occupied | See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures | Included in the budget | The Project Office, people’s government at local county and district | Local government and local authorities for land and resources | See the Resettlement Action Plan (RAP) of the Project for details | See the Resettlement Action Plan (RAP) of the Project for details |
| Water and soil loss | | Risks in water and soil loss due to excavation and backfilling during the construction period | Implement the engineering measures, vegetation measures and temporary protection measures in the *Water and Soil Conservation Plan* of the Project and see Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | The Contractor and the construction supervisor | Project Office, Chuzhou and Nanjing ecological environment bureaus, municipal Water Conservancy Bureau | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. |
| Ambient  air | Construction dust | Dust pollution arising from excavation, backfilling, demolition and handling of sand and lime during construction | (1) See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures  (2) Respectively one set of automatic sprinkling system and one set of air-driven sprayer are equipped for the 2 construction sites at the stabling yard and the depot. | 26 | The Contractor and the construction supervisor | Project Office, and Chuzhou Ecological Environment Bureau | PM10 | Twice/year |
| Tail gas and transportation dust of vehicles | (1) Vehicle exhaust emitted from construction machinery and transport vehicles  (2) Raise dust generated by transport vehicles used during construction will cause air pollution |
| Noise | | The influence of noise from construction machinery is large. As predicted, the predicted noise in the daytime and at night at each sensitive point is higher than the standard, and protective measures should be taken. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | 20 | The Contractor and the construction supervisor | Project Office, and Chuzhou Ecological Environment Bureau | Leq | 2 times / year, 2 times / day, 24 hours a day |

| Continued | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental/Social Factor | | | Environmental Impact/Risks | Management/Mitigation Measures | Budget (CNY 10,000) | Implementer | Supervisor | Monitoring Index | Monitoring Time/Frequency/Duration |
| Vibration | | | The vibration due to the crushing, excavation and other works using construction machinery, and caused by transport vehicles during transportation and loading & unloading, has an impact on the lives of nearby residents. | See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures | 10 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | Vertical Z-vibration level VL10 | Once/year |
| Surface water | Domestic sewage | | The domestic sewage includes the water from washing of the construction personnel, from the canteen and from the toilets | See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures | 50 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | Domestic sewage:  COD, BOD5, ammonia nitrogen  Production wastewater: SS  Water quality during the construction period:  pH, SS,  BOD, CODCr | Domestic sewage: 4 times/year  Production wastewater: 4 times/ year  Water quality during the construction period: once/ year |
| Construction wastewater | | The construction wastewater includes the muddy water generated from excavation and drilling as well as the cooling and washing water from mechanical equipment; |
| Sewage from surface runoff | | The sewage from surface runoff will pollute surroundings or block the urban drainage pipeline system if without proper management |
| Solid wastes | Construction spoil | | The spoil of the project will be transported to the Erlang Village slag disposal site and the Guanshan slag disposal site in Chuzhou. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses for water and soil conservation | The Contractor and the construction supervisor | The Project Office, municipal bureau for ecological environment and water conservancy | / | / |
| Domestic waste from construction | | The domestic wastes is mainly generated from the construction, production and living areas, and will pollute the environment if without proper treatment | Regular centralized and uniform disposal by local departments for sanitation departments | To be incorporated into engineering  expenses | Local departments for sanitation departments | The Project Office and municipal departments for sanitation departments | / | / |
| Ecology | Vegetation deterioration | | Occupying of urban green land and trees during the construction period | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | To be incorporated into engineering  expenses | The Contractor | Municipal Landscaping Bureau | / | / |
| Terrestrial animal | | Temporary land occupation and construction behaviors of the Project will narrow the habitats and activity space of wild animals and cut off the migration route of some terrestrial animals | (1) Strengthen management, publicity and education during construction, to reduce the impact on animal habitats and behaviors (2) It is forbidden to kill animals during construction | Included in the project cost | / | / | / | / |
| Material cultural resources | Tomb | | The Xiangguan Depot will involve the relocation of 152 tombs in one village. | (1) Before the tombs are relocated, fully consult with the tomb owners, to obtain their consent.  (2) Pay the tomb compensation directly by the township government to the affected households, and allow the affected households to choose their own locations for resettlement.  (3) Village cadres need to coordinate with the tomb owners to choose the right places for relocation.  (4) Respect for local customs and habits for the relocation of tombs  (5) For the compensation for the relocation of tombs, in addition to physical compensation, consider the expenses of the tomb migration ceremony. | See the Resettlement Action Plan (RAP) for details | Project Office, Project Contractor, involved towns, village committee or neighborhood committee | The Project Office and local government | See the Resettlement Action Plan (RAP) of the Project for details | See the Resettlement Action Plan (RAP) of the Project for details |
| Cultural relics | | Cultural relics or sites may be found during construction, which may damage valuable sites or crafts. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | / | / | / | / | / |
| Traffic reconciliation | | | The narrowing of roads during construction will worsen the road traffic conditions, causing traffic problems such as road congestion and poor traffic, which will affect people traveling along the line. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | The Project Office and the Contractor | Local traffic control department | / | / |
| Occupational health and safety | | | Occupational health problems and accidents may cause worker casualties or other problems | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | The Project Office and the  Contractor | The Project Office and local government | / | / |
| 2 | | | Operation period | | | | | | |
| Noise | | | (1) There are two sensitive points in the evaluation scope of the entrance & exit depot line of Xiangguan Depot and outside the east factory boundary - Luowei and Baozhuang, and the acoustic environment is predicted to be up to standard  (2) The noise of the factory boundary of Xiangguan Depot and Hongwu Road Stabling Yard is predicted to be up to standard | (1) Select low-noise equipment and use motor frequency conversion technology in the section  (3) Configure vibration isolation base or vibration-vibration mitigation fasteners for the equipment, provide flexible connection for pipelines, and install ventilation and exhaust equipment with silencers | Included in the project cost | / | / | / | / |
| Surface water | | Domestic sewage | The main pollutants in the domestic sewage generated by station workers and passengers are COD, BOD, animal and vegetable oil and ammonia nitrogen. If they are discharged at will, local water bodies will be polluted. | Treat domestic sewage by septic tanks | To be incorporated into engineering  expenses | / | / | / | / |
| Production sewage | Washing sewage and maintenance sewage in stabling yards and depots. | Treat the production sewage from Xiangguan Depot by oil separation, air flotation and sedimentation, and treat with SBR equipment together with domestic sewage. Treat the production sewage from Hongwu Road Stabling Yard by oil separation and sedimentation. |
| Canteen lampblack and exhaust | | | Supporting canteen lampblack | Respectively install onr set of lampblack purification system in the canteen lampblack outlet of the depot and of the stabling yard. After being purified by the treatment system, the lampblack can be discharged after reaching the emission concentration specified in (GB18483-2001). | 20 | Project Office and Contractor | Municipal Ecological Environment Bureau | / | / |
| Solid wastes | | Domestic wastes | The annual amount of domestic waste generated in the initial operation of the depot is 26.35 tons/year. | Uniformly collect domestic waste generated during the operation of this project and transport to the environmental sanitation department for unified treatment, which will not affect the surrounding environment. | Included in the expenses of project management | Employer | Municipal sanitation departments | / | / |
| Production waste | Production waste is mainly due to the repair, maintenance, cleaning of the depot and the stabling yard | The discarded parts produced by the repair and maintenance of the section shall be sorted and collected in a centralized manner, which can be recycled and utilized as "resources", without causing significant impact on the surrounding environment. | Included in the expenses of project management | Employer | Municipal Ecological Environment Bureau | / | / |
| Solid wastes | | Hazardous waste | Hazardous waste (HW08) such as oily sludge, waste oil, etc. produced by sewage pretreatment, as well as waste battery (HW49) | (1) Entrust qualified units for disposal (2) Pack hazardous wastes such as oily sludge and waste oil produced by sewage pretreatment in containers conforming to the standard. Define temporary storage of hazardous wastes in the section and configure the signs. (3) Construct the ground and skirt angles of the temporary storage of hazardous wastes by solid and impervious materials, and construct corrosion-resistant hardened ground (4) Make sure the temporary storage of hazardous wastes are "wind, rain, and sun proof", and managed and maintained by special persons.  (5) Classify hazardous wastes and general industrial solid wastes after collection, temporarily store in separate sections, and do not mix them together | 40 | Employer and Contractor | Municipal Ecological Environment Bureau | / | / |

Table 4-4 Main Environmental Impacts and Mitigation Measures of the Control Center

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental/Social Factor | | Environmental Impact/Risks | Management/Mitigation Measures | Budget (CNY 10,000) | Implementer | Supervisor | Monitoring Index | Monitoring Time/Frequency/Duration |
| 1 | | Construction period | | | | | | |
| Water and soil loss | Main works area | The water and soil loss quantity of the original landscape during the prediction period is 21t, and after the surface disturbance is 174t; therefore, the newly added water and soil loss quantity is 153t. | Implement the engineering measures, vegetation measures and temporary protection measures in the *Water and Soil Conservation Plan* of the Project and see Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | The Contractor and the construction supervisor | Project Office, Chuzhou  Municipal bureau for water conservancy | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. |
| Ambient air | Construction dust | (1)Excavation and backfilling during construction; (2) Dust pollution during handling of the sand and lime | (1) For related mitigation measures, please refer to Appendix 2: Specifications for Construction Environment of the Contractor.  (2) Configure 1 set of automatic sprinkling system and 1 set of air-driven sprayer | 13 | Project Contractor and  Supervisor | Project Office, and Chuzhou Ecological Environment Bureau | PM10 | Twice/year |
| Tail gas and transportation dust of vehicles | (1) Vehicle exhaust emitted from construction machinery and transport vehicles  (2) Raise dust generated by transport vehicles during construction will pollute the residents near the construction site |
| Construction noise | | Affect surrounding residents | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | 6 | Project Contractor and  Supervisor | Project Office, and Chuzhou Ecological Environment Bureau | Leq | Twice/year |
| Vibration | | The vibration due to the crushing, excavation and other works using construction machinery, and caused by transport vehicles during transportation and loading and unloading affects the lives of buildings and residents along the line. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | 3 | Project Contractor and  Supervisor | Project Office, and Chuzhou Ecological Environment Bureau | Vertical Z-vibration level VL10 | Once/year |
| Surface water | Domestic sewage | The domestic sewage includes the water from washing of the construction personnel, from the canteen and from the toilets | See Appendix 2 Specifications for Construction Environment of the Contractor for relevant mitigation measures | 10 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | Domestic sewage:  COD, BOD5, and ammonia nitrogen production sewage: water quality during SS construction:  pH, SS,  BOD, CODCr | Domestic sewage: 4 times/year  Production wastewater: 4 times/ year  Water quality during the construction period: once/ year |
| Construction wastewater | The construction wastewater includes the muddy water generated from excavation and drilling as well as the cooling and washing water from mechanical equipment |

| Continued | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental/Social Factor | | Environmental Impact/Risks | Management/Mitigation Measures | Budget (CNY 10,000) | Implementer | Supervisor | Monitoring Index | Monitoring Time/Frequency/Duration |
| Surface water | Sewage from surface runoff | The sewage from surface runoff will pollute surroundings or block the urban drainage pipeline system if without proper management |  |  |  |  |  |  |
| Solid wastes | Construction spoil | The engineering spoil is transported to Guanshan slag disposal site in Chuzhou City. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses for water and soil conservation | The Contractor and the construction supervisor | The Project Office, municipal bureau for ecological environment and water conservancy | / | / |
| Domestic waste from construction | The domestic wastes is mainly generated from the construction, production and living areas, and will pollute the environment if without proper treatment | Regular centralized and uniform disposal by local departments for sanitation departments | Included in the project cost | Local departments for sanitation departments | The Project Office and municipal departments for sanitation departments | / | / |
| Ecology | | During the construction period of the Control Center, about 270m2 of green spaces and about 80 green trees in the urban area will be occupied. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the project cost | The Contractor | Muncipal Landscaping Bureau | / | / |
| Material cultural resources | Cultural relics | Cultural relics or sites may be found during construction, which may damage valuable sites or crafts. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | / | / | / | / | / |
| Traffic reconciliation | | During the construction period, it will have a certain impact on the passage of Huizhou Road and Yangzi Road. It may occupy existing roads, resulting in the increase in local traffic volume, which may cause traffic congestion and have a certain impact on the travel of surrounding communities. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | The Project Office and the Contractor | Local traffic control department | / | / |
| Occupational health and safety | | Concerns and accidents related to occupational health may lead to injuries or death of the workers | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | Project Office and Contractor | The Project Office and local government | / | / |
| 2 | | Operation period | | | | | | |
| Domestic sewage | | In domestic sewage generated by workers of the Control Center, the main pollutants are COD, BOD and ammonia nitrogen. | Incorporate into the municipal sewage pipe network after treatment, and then flow into the urban sewage treatment plant for treatment | To be incorporated into engineering  expenses | / | / | / | / |
| Lampblack exhaust | | Impact of lampblack from supporting canteen | One set of lampblack purification system is installed in the canteen lampblack outlet, and after being purified by the treatment system, the lampblack can be discharged after reaching the emission concentration specified in GB18483-2001. | 10 | The Project Office and the  Contractor | Municipal Ecological Environment Bureau | / | / |
| Domestic wastes | | The amount of domestic waste produced by the workers is 13.14 tons/year at the initial operation period. | Centrally collect the garbage, and transport to the environmental sanitation department for uniform disposal, which will not affect the surrounding environment. | Included in the expenses of project management | Employer | Municipal sanitation departments | / | / |

Table 4-5 Main Environmental Impacts and Mitigation Measures of the Main Substation

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental/Social Factor | | | Environmental Impact/Risks | Management/Mitigation Measures | Budget (CNY 10,000) | Implementer | Supervisor | Monitoring Index | Monitoring Time/Frequency/Duration |
| 1 | | | Construction period |  |  |  |  |  |  |
| Water and soil loss | | | The water and soil loss quantity of the original landscape during the prediction period is 4t, and after the surface disturbance is 44t; therefore, the newly added water and soil loss quantity is 40t. | Implement the engineering measures, vegetation measures and temporary protection measures in the *Water and Soil Conservation Plan* of the Project and see Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | The Contractor and the construction supervisor | Project Office, Chuzhou  Water Conservancy Bureau | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. |
| Ambient air | Construction dust | | (1) Excavation during construction  (2) Dust pollution during sand lime loading and unloading | (1) See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures.  (2) Provide 2 air-driven sprayers | 6 | The Contractor and the construction supervisor | Project Office, and Chuzhou Ecological Environment Bureau | PM10 | Twice/year |
| Tail gas and transportation dust of vehicles | | (1) Vehicle exhaust emitted from construction machinery and transport vehicles  (2) Raise dust generated by transport vehicles during construction will pollute the residents near the construction site |
| Noise | | | The noise of construction machinery has an impact on surrounding residential areas | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | 10 | The Contractor and the construction supervisor | Project Office, and Chuzhou Ecological Environment Bureau | Leq | Twice/year |
| Vibration | | | The vibration due to the crushing, excavation and other works using construction machinery, and caused by transport vehicles during transportation and loading and unloading affects the lives of surrounding buildings and residents. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | 5 | The Contractor and the construction supervisor | Project Office, and Chuzhou Ecological Environment Bureau | Vertical Z-vibration level VL10 | Once/year |
| Surface water | | Domestic sewage | The domestic sewage includes the water from washing of the construction personnel, from the canteen and from the toilets | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | 20 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | Domestic sewage:  COD, BOD5, ammonia nitrogen  Production wastewater: SS  Water quality during the construction period:  pH, SS, BOD, CODCr | Domestic sewage: 4 times/year  Production wastewater: 4 times/ year  Water quality during the construction period: once/ year |
| Construction wastewater | Mainly include cooling water and washing water for the operation of mechanical equipment |
| Ground runoff  sewage | The sewage from surface runoff will pollute surroundings or block the urban drainage pipeline system if without proper management |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Continued | | | | | | | | |
| Environmental/Social Factor | | Environmental Impact/Risks | Management/Mitigation Measures | Budget (CNY 10,000) | Implementer | Supervisor | Monitoring Index | Monitoring Time/Frequency/Duration |
| Solid wastes | Domestic waste from construction | The domestic wastes is mainly generated from the construction, production and living areas, and will pollute the environment if without proper treatment | Regular centralized and uniform disposal by local departments for sanitation departments | Included in the project cost | Local environmental sanitation departments  departments | The Project Office and municipal departments for sanitation departments | / | / |
| Ecology | Vegetation deterioration | During the construction of two main substations, about 300m2 and about 120 green trees will be occupied in the urban area | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the project cost | The Contractor | Muncipal Landscaping Bureau | / | / |
| Material cultural resources | Cultural relics | Ancient cultural relics may be found when excavating earthwork, which can damage valuable sites or crafts. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | / | / | / | / | / |
| Traffic relief and safety | | Traffic problems such as large traffic flow and poor traffic conditions in surrounding municipal roads have a certain impact on the travel of surrounding people. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | The Project Office and the Contractor | Local traffic control department | / | / |
| Occupational health and safety | | Concerns and accidents related to occupational health may lead to injuries or death of the workers | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | Project Office and Contractor | The Project Office and local government | / | / |
| 2 | | Operation period |  |  |  |  |  |  |
| Noise | | There are no sensitive points in the evaluation scope of the two main substations, and the acoustic environment quality at the factory boundary is up to standard. | (1) Low-noise equipment  (2) Indoor substation  (3) Anechoic louver and other materials | Included in the project cost | / | / | / | / |
| Vegetation | | Permanent land occupation will destroy certain vegetation | Afforest the main substation | Included in the project cost | / | / | / | / |
| Electromagnetic environment | | After the project is operated, the sources of electromagnetic radiation pollution will be added. According to the analysis, the intensity of the generated electromagnetic radiation will not affect the health of the residents along the line, but it will cause concern among nearby residents. | It is recommended that the design of the substation should meet the requirements of the current national design standards and meet relevant environmental protection requirements. | Included in the project cost | / | / | / | / |

Table 4-6 Main Environmental Impacts and Mitigation Measures of the Temporary Works

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Environmental/Social Factor | | Environmental Impact/Risks | Management/Mitigation Measures | Budget (CNY 10,000) | Implementer | Supervisor | Monitoring Index | Monitoring Time/Frequency/Duration |
| 1 | | Construction period | | | | | | |
| Water and soil loss | | Risks of water and soil loss will be posed due to excavation and backfill during construction period. | Implement the engineering measures, vegetation measures and temporary protection measures in the *Water and Soil Conservation Plan* of the Project and see Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | The Contractor and the construction supervisor | Project Office, Chuzhou and Nanjing Ecological Environment Bureaus and Water Conservancy Bureau | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. | See the monitoring requirements in the *Water and Soil Conservation Plan* and Appendix 1 for details. |
| Ambient air | Construction dust | Dust pollution due to excavation, backfill, demolition and sand, stone and lime loading or unloading. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | / | The Contractor and the construction supervisor | Project Office, and Chuzhou Ecological Environment Bureau | PM10 | Twice/year |
| Tail gas and transportation dust of vehicles | (1) Vehicle exhaust emitted from construction machinery and transport vehicles  (2) Raise dust generated by transport vehicles during construction will pollute the residents near the construction sites. |
| Noise | Construction noises | The noise of construction machinery has a large range of impact. | (1) See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures.  (2) Construction activities with high noises are forbidden at night near residential areas. | 12 | The Contractor and the construction supervisor | Project Office, and Chuzhou Ecological Environment Bureau | Leq | Twice/year |
| Vibration | The vibration of transport vehicles due to transporting and loading will impact the buildings and residents along the line. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | 6 | The Contractor and the construction supervisor | Project Office, and municipal bureau for ecological environment | Vertical Z-vibration level VL10 | Once/year |  |
| Surface water | Construction wastewater | Mainly include muddy water due to excavation and drilling, cooling water and washing water for the operation of mechanical equipment | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | 30 | The Contractor and the construction supervisor | The Project Office and municipal bureau for ecological environment | Production wastewater: SS  Water quality during the construction period:  pH, SS, BOD, CODCr | Production wastewater: 4 times/ year  Water quality during the construction period: once/ year |
| Ground runoff  sewage | The sewage from surface runoff will pollute the surroundings or block the urban drainage pipeline system if without proper management |
| Ecology | Vegetation deterioration | The construction will temporarily occupy or destroy some urban green space, road green belts and trees. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the project cost | The Contractor | Muncipal Landscaping Bureau | / | / |
| Terrestrial animals | Since it is located at the downtown areas and connection zones of urban and suburb areas, there is no wildlife. | No impact | / | / | / | / | / |
| Material cultural resources | Cultural relics | Sites of ancient cultural relics may be found when excavating earthwork, which may damage valuable sites or crafts. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | / | / | / | / | / |
| Traffic relief | | Traffic problems such as large traffic flow and poor traffic conditions in surrounding municipal roads have a certain impact on the travel of surrounding people. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | The Project Office and the Contractor | Local traffic control department | / | / |
| Occupational health and safety | | Accidents related to occupational health may lead to injuries or death of the workers. | See Appendix 2: Specifications for Construction Environment of the Contractor for relevant mitigation measures. | Included in the expenses of project management | The Contractor | The Project Office and local government | / | / |
| 2 | | Operation Period | | | | | | |
| Drainage | | Impeded drainage after operation will lead to surface water pollution. | Drainage is specially designed for the borrow pits, spoil areas and beam fabrication fields as per the EIA Report and soil and water conservation plan. The drainage ditches for the beam fabrication fields are no less than 50 cm both in width and depth. | Included in the expenses of project management | The Contractor | The Project Office and Chuzhou Ecological Environment Bureau | / | / |
| Land use | | If without any measures for the temporary works such as borrow pits, construction camps and beam fabrication fields, it will lead to land waste and water and soil loss. | After the completion of main works, the rest temporary works except the 2 borrow pits shall be provided with reclaiming measures, which include mainly breaking the hardened ground, surface soil backfill and leveling, grass seed sowing, trees and shrubs planting or adjusting them accordingly. | / | The Contractor and the Owner | The Project Office | / | / |

**4.2 Social Impacts and Mitigation Measures**

After negotiating and discussing with the Project Office, the Owner, the Implementer, relevant organizations and the residents, a feasible social action plan and a social gender action plan have been formulated, aiming at the impacts on the society and women, as well as at possible risks. See Table 4-7 below for details.

Table 4-7 Main Social Impacts and Mitigation Measures

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Risk** | **Measures or actions** | **Actors** | **Time** | **Funding** | **Monitoring indicators** |
| 1) LA and HD risks | a) Develop a detailed RAP;  b) Pay special attention to the income restoration of vulnerable groups in the RAP;  c) Offer temporary residences to APs during the transition period. | PMOs, owner, RAP preparation agency, external M&E agency | Preparation, construction | Project budget | a) RAP |
| 2) Risks of rise of commodity and housing prices | a) Stabilize commodity prices;  b) Increase the minimum wage standard;  c) Control housing prices. | PMOs, design agency, contractor, price control bureau, housing administration bureau | Construction, operation | Project budget, government finance | a) Price levels of daily necessities;  b) Minimum wage standard;  c) Rise of housing prices |
| 3) Subway fare, runtime and discount | a) Subway fares should be 10 yuan or less;  b) The time of the last train should be 22:00-23:00 p.m.;  c) There should be a train every 5 or 10 minutes;  d) Vulnerable groups should be entitled to discounts through a simplified application process, and discount cards should have no clear identification. | PMOs, finance bureau, transport bureau, price control bureau | Operation | Project budget, government finance | a) Subway fares;  b) Subway runtime and frequency;  c) Discount policy;  d) Discount card application process |
| 4) Job opportunities for vulnerable groups | a) Recruit some female members for PMOs for the convenience of women-related work;  b) Employ a certain number of female workers for small enterprises, such as waitresses and cleaners;  c) Offer training for women’s recruitment and employment.  d) Make unskilled jobs first available to women and other vulnerable groups;  e) Ensure equal pay to equal work. | PMOs, contractor, labor and social security bureau, village committees, local women | Construction | Contractor budget | a) Number of vulnerable people doing unskilled jobs at the construction stage;  b) Number of vulnerable people doing public welfare jobs at the operation stage;  c) Location, scope and frequency of female employees |
| 5) Promoting women’s participation and preventing sexual harassment | a) Not less than 50% of participants in public participation activities at the preparation stage should be women;  b) Compensation should be received after signature by a couple;  c) Each project agency (PMOs, contractors, etc.) should have at least one female member;  d) Conduct project publicity at times and locations, and in forms suitable for women;  f) Tailor publicity to women’s cognition;  g) A public opinion atmosphere against sexual harassment should be created, a prevention and punishment mechanism established, and relevant laws and regulations amended. | Design agency, contractor, owner, PMOs, county / district agencies concerned, township governments, village committees, local women, poor people | Construction, operation | Project budget, government finance | a) Number of public participation activities, number of female participants, and minutes;  b) Number and proportion of female members, feedback and suggestions;  c) Signature of women;  d) Number of female members in project agencies;  e) Time, location and mode of publicity and training  f) Number of women trained  g) Relevant publicity and education, prevention and punishment mechanism, and relevant laws and regulations |
| 6) Social risks | a) Strengthen publicity and education on public health and AIDS prevention;  b) Include education on public health and AIDS prevention in construction contracts for effective performance;  c) Establish a physical checkup mechanism for construction staff (i.e., setting up temporary infirmaries and utilizing local medical resources);  d) Conduct diversified publicity on AIDS prevention (brochure, poster, album, etc.);  e) Conduct publicity on local social and cultural customs to reduce potential conflicts.  f) Labor agreements should be signed with temporary workers. | Contractor, health bureau, owner, enterprises, township governments, village committees | Construction, operation | Project budget, budget of health bureau | a) Provisions of construction contract, and implementation;  b) Number of participants in training on public health and AIDS prevention;  c) Number of health centers;  d) Quantities of publicity materials on AIDS prevention at the construction stage;  e) Quantities of publicity materials on local social and cultural customs at the construction stage |
| 7) Construction risks | a) Avoid construction vehicles from affecting surrounding crops and threatening personal safety;  b) Minimize the impact of construction on nearby scenic spots;  c) Take measures to control noise;  d) Sprinkle access roads regularly to prevent flying dust;  e) Set up non-horning signs in densely populated areas, and avoid overnight construction where possible. | PMOs, contractor | Preparation, construction | EMP budget | a) Deceleration strips and warning signs;  b) Number of tourists per day;  c) Grievances about environmental pollution and handling;  d) Inclusion of construction safety management in construction contracts, and safety awareness publicity and education;  e) Number of signs and repaired public facilities |
| 8) Improving the labor and working conditions to protect the lawful rights and interests of laborers | a) Project staff should be employed on the basis of equal opportunities and fair treatment, and there should be no discrimination against any personal feature unrelated to the inherent job requirements;  b) Appropriate protection and assistance measures should be taken for physical defects of certain workers, such as women, the disabled, migrant workers and children of the legal working age;  c) The Labor Law stipulates that workers have the right to establish and join worker organizations, and conduct collective bargaining. | PMOs, contractor | Preparation, construction | EMP budget | a) Percentage of vulnerable groups employed;  b) Protective measures for women, the disabled and child laborers;  c) Frequency of training and education on workers’ organization;  d) Frequency of collective bargaining |

**5 Environmental Monitoring Plan**

**5.1** **Environmental Monitoring Purpose**

Environmental monitoring includes two phases, that is, the construction period and the operation period, and is to comprehensively and timely grasp the dynamic pollution situations of the proposed project, understand the extent and scope of the project construction on environment quality locally, and the dynamic change of environment quality during the operation period, and timely provide feedback information to relevant departments, to be used as the scientific basis for the project's environmental management.

**5.2** **Environmental Monitoring Organization**

The environmental monitoring during the construction period and the operation period shall be undertaken by qualified third-party monitoring units entrusted by the Contractor or the Operator, and the monitoring units shall have corresponding qualifications and technical strength.

According to the environmental impact report, the sensitive targets affected by the construction period and the operation period will be confirmed as the monitoring points, to track the pollution sources of the project, the sewage, noise, vibration and air environment with large environmental impacts will be selected for monitoring, and the monitoring factors will be determined based on the pollution characteristics.

**5.3** **Environmental Monitoring Plan and Budget**

The environmental monitoring plan and budget for the construction period and the operation period are shown in Table 5-1.

Table 5-1 Environmental Monitoring Plan of the Project

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Environmental element | Monitoring area | Monitoring factor | Monitoring time and frequency | Estimate investment (CNY 10,000) | Relevant Organizations | |
| Organization | Supervision Organization |
| Construction period | | | | | | |
| Surface water | The line crosses 500m of the lower reaches of the Chunhe River | pH, SS, BOD5, CODCr, NH3-N and petroleum | 3 times/year, respectively once in the dry season, the wet season and the ordinary season | 6 | Third-party monitoring agency | Chuzhou Ecological Environment Bureau |
| The line crosses over the Qingliu River and 500 m downstream the Laihe River. | pH, SS, BOD5, CODCr, NH3-N and petroleum | 2 times/year, respectively once in the dry season and the wet season | 4 | Third-party monitoring agency | Chuzhou Ecological Environment Bureau |
| Groundwater | Construction sites of the foundation pits of three underground stations of Longpan Avenue Station, City Hall Station and Nanjing North Station | pH, total hardness, sulfate, Fe, Cu, ammonia nitrogen, and land subsidence | Once/year | 15 | Third-party monitoring agency | Chuzhou and Nanjing Ecological Environment Bureaus |
| Construction sites of Xiangguan Depot and Hongwu Road Stabling Yard | Once/year | 20 | Third-party monitoring agency | Chuzhou Ecological Environment Bureau |
| Foundation pit construction sites of 3 underground stations, Longpan Avenue Station, Municipal Government Station and Nanjing North Station | Ground settlement | Once/month | / | Self-monitoring | Chuzhou and Nanjing Ecological Environment Bureaus |
| The construction sites of Xiangguan Depot and Hongwu Road Stabling Yard | Ground settlement | Once/month | / | Self-monitoring | Chuzhou and Nanjing Ecological Environment Bureaus |
| Ambient air | Construction sites of 16 stations in the project | Raise dust PM10 | 1 time / month | 16 | Third-party monitoring agency | Chuzhou and Nanjing Ecological Environment Bureaus |
| Construction sites of the depot and the stabling yard | 2 | Third-party monitoring agency | Chuzhou Ecological Environment Bureau |
| Construction site of the Control Center | 1 |
| Construction sites of main substations | 2 |
| Noise | 44 acoustically sensitive points such as the Paifang, Yaopu, Dadun, Jinghuayuan, Dongxiang, and Chuzhou Vocational and Technical College, specifically as shown in Table 5.1-1 of the Environmental Impact Report (EA) | Equivalent A-weighted sound pressure level | 12 times/year | / | Self-monitoring | Chuzhou and Nanjing Ecological Environment Bureaus |
| Equivalent A-weighted sound pressure level | Once/year | 22 | Third-party monitoring agency | Chuzhou and Nanjing Ecological Environment Bureaus |
| Vibration | Vertical Z-vibration level VL10 | Once/year | 22 | Third-party monitoring agency | Chuzhou and Nanjing Ecological Environment Bureaus |
| Sewage disposal | Sewage outlets at the construction sites of 16 stations in the project | pH, SS, COD, BOD5, animal and vegetable oil | 1 time / quarter | 64 | Third-party monitoring agency | Chuzhou and Nanjing Ecological Environment Bureaus |
| Sewage outlets at the construction sites of the depot and the stabling yard | 8 | Third-party monitoring agency | Chuzhou Ecological Environment Bureau |
| Sewage outlets at the construction sites of the Control Center | 4 |
| Sewage outlets at the construction sites of the main substations | 8 |
| Water and soil loss | Areas prone to water and soil loss, such as stock yards, excavation slopes, and borrow pits | Water and soil loss | Refer to "Appendix 1 Water and Soil Conservation Plan" | Refer to "Appendix 1 Water and Soil Conservation Plan" | Refer to "Appendix 1 Water and Soil Conservation Plan" | Chuzhou and Nanjing Water Authorities |
| Operation period | | | | | | |
| Sewage disposal | Sewage outlets of each station along the line of the project | pH, SS, COD, BOD5, and petroleum | 1 time / quarter | 6.4 | Third-party monitoring agency | Chuzhou Ecological Environment Bureau and Nanjing Ecological Environment Bureau |
| Sewage outlet of Xiangguan Depot and Hongwu Road Stabling yard | pH, SS, COD, BOD5, and petroleum | 1 time / quarter | 4 | Third-party monitoring agency | Chuzhou Ecological Environment Bureau |
| Sewage outlet of the Control Center | pH, SS, COD, BOD5, and petroleum | 1 time / quarter | 2 | Third-party monitoring agency | Chuzhou Ecological Environment Bureau |
| Air quality | Exhaust pavilions of Longpan Avenue Station, City Hall Station and Nanjing North Station | Odor concentration | Trial operation period  1 times | 1.5 | Third-party monitoring agency | Chuzhou and Nanjing Ecological Environment Bureaus |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Continued | | | | | | |
| Environmental element | Monitoring area | Monitoring factor | Monitoring time and frequency | Estimate investment (CNY 10,000) | Relevant Organizations | |
| Organization | Supervision Organization |
| Air quality | Staff canteens of Xiangguan Depot and Hongwu Road Stabling Yard | Lampblack concentration | 1 time | 1 | Third-party monitoring agency | Chuzhou Ecological Environment Bureau |
| Staff canteen of the Control Center | Lampblack concentration | 1 time | 0.5 |
| Noise | 40 acoustically sensitive points such as the Paifang, Yaopu, Dadun, Jinghuayuan, Dongxiang, and Chuzhou Vocational and Technical College, specifically as shown in Table 1.8-1 of the Environmental Impact Report (EA) | Equivalent A-weighted sound pressure level | 1 time / quarter, 2 consecutive days | 20 | Third-party monitoring agency | Chuzhou and Nanjing Ecological Environment Bureaus |
| Factory boundaries of Xiangguan Depot and Hongwu Road Stabling yard | 8 | Third-party monitoring agency | Chuzhou Ecological Environment Bureau |
| Factory boundaries of the Technical College and Xiangguan Town Main Substation | 8 |
| Vibration | A total of 42 vibration sensitive points at Paifang, Dadun, Longpan Huijing and Longpan Xiyuan | Vertical Z-vibration level VL10 | 1 time | 42 | Third-party monitoring agency | Chuzhou and Nanjing Ecological Environment Bureaus |
| Electromagnetic environment | Outside the enclosure of the Technical College and Xiangguan Town Main Substation | Power frequency electric field and power frequency magnetic induction | 1 time | 4 | Third-party monitoring agency | Chuzhou Ecological Environment Bureau |

**6 Capacity Enhancement and Training**

**6.1** **Training Purpose**

The purpose of environmental management training is to ensure the smooth and effective development of environmental and social management, familiarize personnel with management contents and procedures, improve their capabilities, and ensure the effective implementation of environmental, health and safety measures. The training objects include the Contractor's environmental protection managers and supervisors, as well as the construction units and construction personnel that are to be trained during the project implementation process.

**6.2** **Staffing and Training Objects**

Wantong Intercity Railway Co., Ltd. shall arrange special personnel to be responsible for the implementation of this environmental and social management plan, who shall have certain environmental protection knowledge, and be familiar with environmental protection laws and regulations, World Bank security policies and this management plan.

During the construction period, the training objects are: relevant personnel of the Project Office in each city and of the project unit, the technical directors and full-time management personnel of the Contractor, the Supervision Engineer, and the representatives of third-party environmental monitoring agencies.

The training objects in the operation period are mainly the project operation and management personnel.

**6.3** **Training Contents**

The environmental management training during the construction period includes:

1. Regulations, documents and related requirements concerning environmental protection, water and soil conservation, social impact, health and safety in project management of the State, Anhui Province and Chuzhou City, Jiangsu Province and Nanjing City;

2. The World Bank’s requirements for environmental and social management; the clauses for environment, health and safety in the loan agreement of the World Bank;

3. The environmental protection measures proposed in engineering design and the requirements for environmental protection during the construction period;

4. Environmental protection guidelines during the construction period;

5. Before the project starts, the training about the environmental and social management plan (ESMP) provided by the Project Office to the Project Company, the Contractor and the supervisor;

6. Responsibilities and mutual relationship among the environment management staff, the supervisors and the Contractor;

7. Formulation of the environmental and social management report, supervision report, environmental monitoring report, and Contractor's monthly report.

The instructors of the training class can be from the ecological environment bureau in local place, or the environmental protection design leader of the design unit, relevant experts of the environmental assessment unit and the monitoring unit, and the environmental protection experts of the World Bank.

The environmental and social management training during the operation period includes:

1. The laws, regulations and related requirements concerning environmental protection, health and safety in project management of the State, Anhui Province, Jiangsu Province, Chuzhou City and Nanjing City;

2. Environmental protection acceptance upon the completion of the project and related requirements for three-simultaneous management;

3. Operation management of sewage treatment devices of each station, section and Control Center;

4. Operation management of relevant environmental protection measures during the operation period.

Relevant environmental protection experts can be hired from universities and related research institutes and operation management units to give lectures or short-term training courses can be participated in.

**6.4** **Personnel Training Program**

The training funds of the environmental management plan for the construction period are planned to be included in the project budget, and for the operation period are to be included in the operation and maintenance costs. Capacity building and training programs are shown in Table 6-1.

Table 6-1 Capacity Building and Training Program

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Training topics | Training objects | Specific training contents | Frequency | Days/ time | Population of items/times | Budget  (CNY 10,000) |
| Construction period | | | | | | |
| Environmental laws, regulations and policies | Project Office, Employer, Contractor, Monitoring Organization, and Supervisor | I Environmental protection laws and regulations | 1 | 1 | 3 | 9 |
| II Environmental policies and plans | 1 | 1 | 3 |
| III The World Bank's environmental management policies | 1 | 1 | 3 |
| Environmental and social management plan during the construction period | Construction unit and the Employer | I Environmental protection duties during the project's construction period | 1 | 0.5 | 4 | 7.5 |
| II Main tasks of environmental protection during the construction period of the Project | 1 | 0.5 | 4 |
| III Main contents of environmental protection during the construction period of the Project | 3 | 0.5 | 4 |
| IV Environmental and social management plan | 2 | 0.5 | 4 |
| V Improvement or revision of the environmental management plan | 1 | 0.5 | 4 |
| VI Internal environmental monitoring methods, data collection and processing, etc. | 1 | 0.5 | 4 |
| Subtotal of the construction period | | | | | | 16.5 |
| Operation period | | | | | | |
| Environmental monitoring and inspection reports | Employer | Formulation of monitoring reports of environmental protection facilities, ecological restoration, and environment quality | 2 | 1 | 2 | 4 |
| Operation of environmental protection facilities, etc. | Employer | Rules, regulations and procedures of environmental safety | 2 | 1 | 2 | 4 |
| Subtotal of the operation period | | | | | | 8 |
| Total | | | | | | 24.5 |

**7 Reporting Mechanism**

**7.1** **Information Exchange**

For the implementation of environmental and social management, necessary information exchange is required in the organization between different departments and positions of the Project Office, the Employer, the Contractor, and the Operator; in addition, relevant information should be informed to the external parties (related parties and the public).

Internal information exchange can be conducted in various ways, such as meetings and internal briefings. However, one formal meeting shall be conducted once every month, and all exchange information should be recorded and archived. External information exchange shall be conducted once every six months or one year, and the information exchange with collaborating units shall be recorded by minutes and archived.

**7.2** **Recording Mechanism**

In order to effectively operate the environmental management system, the organization must establish a comprehensive recording system and record the information of the following aspects:

(1) Legal and regulatory requirements;

(2) Administrative license;

(3) Environmental factors, related assessment documents of environmental impact and ESMP reports;

(4) Training records;

(5) Records of check, verification and maintenance activities;

(6) Monitoring data;

(7) Effectiveness of corrective and preventive measures;

(8) Information of relevant parties; complaints and processing procedures, and results records.

In addition, above records must be controlled as appropriate, including the identification, collection, cataloging, archiving, storage, management, maintenance, inquiry, shelf life, disposal, etc. of these records.

**7.3** **Reporting Mechanism**

The Contractor, the Operator, the Monitoring Organization, the Construction Supervision Engineer and the Project Office shall record the progress of the project, the implementation of ESMP, and the results of environmental monitoring during the project implementation process and report to relevant departments timely. The monitoring records of the operation status of refuse landfills, hazardous waste receiving units, and associated water plants involved in related projects and due diligence should also be regularly understood and collected. Relevant requirements should be included in the monitoring plan, mainly including the following six parts:

(1) The Supervision Engineer for project construction shall record the implementation of ESMP on a monthly basis, and submit the monthly report to the Employer and the Project Office in a timely manner. The monthly report should include the implementation situations of environmental protection measures, the situations of environmental monitoring and monitoring data.

(2) The Contractor shall record in detail the construction progress of the project and the implementation of ESMP on a monthly basis, report to the Operator and the Project Office every six months, and copy to local ecological environment bureaus. This requirement should be specified in the Contractor's contract.

(3) Report to the Project Office and copy to local ecological environment bureaus. This requirement should be specified in the Contractor's contract.

(4) After the entrusted monitoring unit has completed the monitoring, timely submit the monitoring report to the Contractor (Operator) and the Construction Supervision Engineer;

(5) The Contractor shall submit the project's environmental monitoring report to the Operator in time and submit it to the Project Office. The Project Office shall promptly submit the monthly, quarterly and annual reports of the progress and results implementing the project ESMP to local Ecological Environment Bureaus and relevant units, and submit the reports to the World Bank if necessary.

(6) If there is special violation event of the environmental protection, the Construction Supervision Engineer and the Project Office will notify local environmental protection administrative departments and report to the superior levels if necessary.

(7) Submit the ESMP implementation report of the project to the World Bank twice a year, in which there shall be the following main contents:

a. The progress of the project, such as the construction progress of the elevated bridge, the progress of shields in the underground tunnel, the construction progress of key projects, the progress of station decoration, etc.;

b. Implementation situations of the project's environmental protection measures, safety measures and health protection measures

c. Implementation situations of environmental monitoring and main monitoring results;

d. Implementation situations of the training program;

e. Continued participation situation of the public; confirm whether there are public complaints; if any, record the main contents of the complaint, the solution and public satisfaction;

f. Existing problems and solutions;

g. The next step to implement ESMP.

**8 Public Appeal Mechanism**

The project's appeal agency is related to various periods of project implementation, including the resettlement of affected residents of the project, resident disturbance during the construction period and supervision during operation.

(1) Public complaints during the construction period: The Project Office, the Project Company (Wantong Company), the Contractor and local ecological environment bureau should pay attention to the progress of the project in time, to understand the inconvenience caused by project construction to surrounding residents. The Contractor shall publish information such as the name and contact information of the person in charge of environmental protection, so that the public can supervise and appeal. The Project Office shall set up special reception windows, assign special responsible persons for such windows, and announce their contact number so as to realize the opinions of the public. For the public who appeal through telephone consultation or through door-to-door visit, the *Opinion Book of the Public* should be set up, to timely record visitors' names and contact information, as well as the impact of the project implementation thereon. The opinion shall be timely filed and reported. It is required to respond to the questions raised by the public within 3 working days, propose solutions within 10-15 working days as appropriate, and supplement the implementation progress and final coordination results to the *Opinion Acceptance Book of the Public*. If the complainant is still dissatisfied with the handling opinions of the Project Office or the Ecological Environment Bureau, he/she may, after receiving the handling opinions, file a lawsuit with the local People's Court in accordance with the *Civil Procedure Law of the People's Republic of China*, to be judged by the court.

(2) Supervision during the operation period: Any problem of the public during the operation period can be directly submitted to the Project Office or the Ecological Environment Bureau (through the mayor's hotline 12345 and the environmental complaint telephone 12369). The Project Office or the Ecological Environment Bureau will record and discuss the situations, respond within three working days and propose the solution within 10-15 working days depending on the circumstances. If the complainant is still dissatisfied with the handling opinions of the Project Office or the Ecological Environment Bureau, he/she may, after receiving the handling opinions, file a lawsuit with the local People's Court in accordance with the *Civil Procedure Law of the People's Republic of China*, to be judged by the court.

The above appeal channels will be informed to the public through meetings or other means, to enable the public to fully understand their right to appeal. At the same time, media tools will be used to strengthen publicity and reporting. The institutions that accept the appeals will not charge any fees, and the expenses incurred by the appeals will be paid by the Project Office as unforeseen expenses.

**9 Estimate of Investment in Environmental Protection**

The investment in environmental protection of this project is mainly divided into three parts: investment in environmental protection measures, environmental monitoring costs and soil & water conservation costs, as detailed in Table 9-1.

Table 9-1 Estimate of Investment in Environmental Protection of the Project

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No. | | Time period | Item | Investment |
| Investment in environmental protection measures | | | | |
| 1 | Construction period | | Treatment measures against construction sewage of 16 stations, depots and stabling yards, control centers and main substations along the line (including septic tanks, grilles, grease traps, sedimentation tanks, storage tanks and intercepting ditches) | 264 |
| 2 | Dust-reducing measures such as automatic sprinkling systems and air-driven sprayers at the construction sites of each station, section, Control Center and main substation | 226 |
| 3 | Noise reduction measures such as construction enclosures or temporary sound barriers surrounding the construction sites of each station, section, Control Centers and main substation | 100 |
| 4 | Operation period | | The sensitive points on both sides of the elevated section will be installed with vertical sound barriers that are 13,520lm long and 3.1m high; 1,720lm semi-enclosed sound barriers; and 60lm fully-enclosed sound barriers. | 9456 |
| 5 | As for the sections where sound barriers are installed on the elevated line, the double-track line will be provided with rubber floating slab ballast bed or other track vibration reduction measures for a total of 13,390lm. | 16068 |
| 6 | Functional replacement of a total of 19 households in Zaoshuchen Village and Yujiaying Village within 5m from the center line of the outer track above the tunnel | 2850 |
| 7 | Stricter vibration reduction measures (such as rubber vibration isolation pad vibration reduction track) in Zaoshuchen Village and Yujiaying Village, totaling 1,780lm of both tracks | 2136 |
| 8 | Temporary storage of hazardous wastes in Hongwu Road Stabling Yard and Xiangguan Town Depot | 40 |
| 9 | Respectively 1 set of lampblack purification system at the canteen lampblack outlets in each depot, stabling yard and control center | 30 |
| Environmental monitoring expenses | | | | |
| 10 | | Construction period | Water quality monitoring at the intersection of the line with Chunhe River | 6 |
| 11 | | Water quality monitoring at the intersections of the line with the Qingliu River and the Laihe River | 4 |
| 12 | | Construction sites of foundation pits of three underground stations of Longpan Avenue Station, City Hall Station and Nanjing North Station, Xiangguan Depot and Hongwu Road Stabling Yard | 35 |
| 13 | | Raise dust monitoring of 16 stations, depots and stabling yards, control centers and main substations along the line | 21 |
| 14 | | Acoustic environment quality monitoring at 44 environmentally sensitive points such as Paifang, Yaopu, Dadun, Jinghuayuan, Dongxiang, and Chuzhou Vocational and Technical College | 22 |
| 15 | | Vibration environment quality monitoring at 44 environmentally sensitive points such as Paifang, Yaopu, Dadun, Jinghuayuan, Dongxiang, and Chuzhou Vocational and Technical College | 22 |
| 16 | | Water environment quality monitoring at the sewage outlets of 16 stations, depots and stabling yards, control centers and main substations along the line | 84 |
| 17 | | Areas prone to water and soil loss, such as stock yards, excavation slopes, and borrow pits | Refer to "Appendix  1 Water and Soil Conservation Plan" |

|  |  |  |  |
| --- | --- | --- | --- |
| Continued | | | |
| No. | Time period | Item | Investment (CNY 10,000) |
| 18 | Operation period | Water quality monitoring of sewage outlets of 16 stations, depots, stabling yards and control centers along the line | 12.4 |
| 19 | Odor concentration monitoring of exhaust pavilions of Longpan Avenue Station, City Hall Station and Nanjing North Station | 1.5 |
| 20 | Monitoring of lampblack concentration in the staff canteens of Xiangguan Depot, Hongwu Road Stabling Yard and Control Center | 1.5 |
| 21 | Acoustic environment quality monitoring at 40 environmentally sensitive points such as Paifang, Yaopu, Dadun, Jinghuayuan, Dongxiang, and Chuzhou Vocational and Technical College | 20 |
| 22 | Noise monitoring at the factory boundaries of Xiangguan Depot, Hongwu Road Stabling Yard, Vocational and Technical College Station and Xiangguan Town Main Substation | 16 |
| 23 | Monitoring of vibration environment at 42 sensitive points such as Paifang, Dadun, Longpan Huijing and Longpan Xiyuan | 42 |
| 24 | Electromagnetic environmental monitoring outside the enclosure of the Vocational and Technical College and Xiangguan Town Main Substation | 4 |
| Investment in water and soil conservation | | | |
| 25 | / | Engineering measures | 1,271.58 |
| 26 | Plant measures | 2,573.53 |
| 27 | Temporary measures | 1,433.11 |
| 28 | Independent expenses | 544.34 |
| 29 | Basic reserve expenses | 349.35 |
| 30 | Water and soil conservation compensation | 135.60 |
|  |  |  |  |
| Total | | | 37,768.91 |

**Appendix 1: Water and Soil Conservation Plan**

**1** **Overview**

In June 2018, Chuzhou-Nanjing Intercity Railway Development and Construction Co., Ltd. entrusted China Railway Siyuan Survey and Design Group Co., Ltd. to undertake the preparation of the water and soil conservation program for the Phase I Project of Chuzhou-Nanjing Intercity Railway (Chuzhou Section), and in December 2018, Anhui Provincial Water Resources Department approved the water and soil conservation program. This plan is formulated in conjunction with the approved Water and Soil Conservation Program for the Phase I Project of the Chuzhou-Nanjing Intercity Railway (Chuzhou Section). The Project Company of the Phase I of Chuzhou Section, that is, Wantong Intercity Railway Co., Ltd., and the Contractor shall strictly implement various water conservation measures in this plan during the implementation process of this Project. The project companies and corresponding contractors of the Phase II of the Chuzhou Section and of the Nanjing Section shall implement according to this plan.

According to the plan, the implementation level of the water and soil loss prevention and control standards for the whole project is the first-level standard for construction projects.

**2** **Prediction Results of Water and Soil Loss**

**2.1** **Scope of Prevention and Control Responsibilities**

The area of the scope of prevention and control responsibilities for water and soil loss of this project is 167.27hm2, of which the project construction area is 135.60hm2, and the directly affected area is 31.67hm2.

**2.2** **Prediction Results of Water and Soil Loss**

(1) The area of disturbed ground surface of the project is 112.14hm2.

(2) The area of damaged water and soil conservation facilities is 112.14hm2.

(3) The amount of spoil (slag) is 1.0128 million m3.

(4) The water and soil loss quantity of the original land is 820t, and after surface disturbance is 18,228t; therefore, the newly added water and soil loss quantity is 17,408t. The interval line work area, the depot area, and the construction & production and living area are key parts for water and soil loss. The construction period is the key period leading to water and soil loss.

**3** **Prevention Areas of Water and Soil Loss and Overall Layout of Measures**

According to the characteristics of the project, the layout of main works and the water and soil loss characteristics of different units, the project's construction area is divided into three primary prevention and control areas, including the main works area, the auxiliary works area and the temporary works area, as well as eight secondary prevention and control areas, including the station works area, the interval line work area, the depot area, the Control Center area, main substation area, borrow pit, construction & production and living area and temporary dumping area.

**3.1** **Prevention and Control Area of Main Works**

1. Prevention and Control Area of Station Works

(1) Measure layout

Before the works, strip off the topsoil of the forest land in the land area; during construction, construct drainage ditch and sedimentation tank, mud sedimentation tank, and slag pit in the enclosure construction site, install vehicle washing troughs at the entrances & exits, and cover temporary mound and exposed surface by dense mesh screens. After the completion of construction, the afforested sites at the entrances and exits and in the office areas should be leveled, the topsoil backfilled and the land greened, and the rainwater pipelines in the station area shall be built.

(2) Quantities of Measures

Engineering measures: topsoil stripping 5,000 m3, topsoil backfilling 7,300 m3, site leveling 2.42 hm2, and rainwater drainage pipe 2,280 m;

Plant measures: integrated greening 2.42 hm2;

Temporary measures: temporary drainage ditches 4,160m, temporary sedimentation tanks 24 pcs, mud sedimentation tanks 24 pcs, slag pits 24 pcs, vehicle washing troughs 24 pcs, and dense mesh screens for exposed surface 2.72hm2.

2. Prevention and Control Area of Interval Line Work

(1) Measure layout

Interval line works mainly include bridge works. Before the works, strip off the topsoil of the forest land in the land area; during construction, construct mud sedimentation tanks and slag pits, and cover temporary mound and exposed surface by dense mesh screens; after the completion of the construction, recover the temporarily damaged vegetation with topsoil backfilling, site leveling and vegetation restoration.

(2) Quantities of Measures

Engineering measures: topsoil stripping 14,100 m3, topsoil backfilling 22,200 m3, and site leveling 7.40 hm2;

Plant measures: vegetation restoration 7.40 hm2;

Temporary measures: mud sedimentation tanks 162 pcs, slag pits 65 pcs, and dense mesh screen for exposed surface 8.28hm2.

**3.2** **Prevention and Control Area of Auxiliary Works**

1. Prevention and Control Area of Xiangguan Depot

(1) Measure layout

Before the works, strip off the topsoil of the farmland, garden plot and forest land in the land area; during the construction period, arrange combined mode of drainage on site with permanent and temporary measures -- temporary drainage shall be realized using permanent drainage ditches as much as possible, and temporary sedimentation tanks shall be arranged at the end of the drainage ditch, cover exposed surface by dense mesh screens, and install vehicle washing troughs at the entrance and exit; and during the later stage of construction, recover the land with topsoil backfilling, site leveling and greening, lay the skeleton slopes for the protection of the roadbed section, and sound permanent drainage ditches and drainage troughs in the field.

(2) Quantities of Measures

Engineering measures: topsoil stripping 53,100m3, topsoil backfilling 19,600m3, site leveling 6.54hm2, concrete for skeleton slope protection 5,362m3, longitudinal drainage ditch 10,493m, and lateral drainage channel 400m;

Plant measures: integrated greening 6.54hm2;

Temporary measures: four temporary sedimentation tanks, two slag pits, two vehicle washing troughs, and dense mesh screen for exposed surface 6.56hm2.

2. Prevention and Control Area of the Control Center

(1) Measure layout

During the construction period, construct temporary drainage ditch and sedimentation tank on site, install vehicle washing troughs at the entrance and exit, and cover temporary mound and exposed excavation surface with dense mesh screens; and after the completion of the construction, recover the site by site leveling, topsoil backfilling and greening in the designed green area, and lay rainwater drainage pipelines in the field.

(2) Quantities of Measures

Engineering measures: rainwater drainage pipe 584m, topsoil backfilling 3,700m3, and site leveling 1.25hm2;

Plant measures: comprehensive greening 0.29hm2, and greening by shrubs and grasses 0.96hm2;

Temporary measures: temporary drainage ditch 480m, one temporary sedimentation tank, one slag pit, one vehicle washing trough, and dense mesh screen for exposed surface 0.27hm2.

3. Prevention and Control Area of Main Substations

The project is constructed with two 110kV substations, i.e. the Technical College Main Substation and Xiangguan Town Main Substation.

(1) Measure layout

Before the works, strip off the topsoil of the farmland in the land area; during construction, construct temporary drainage ditch and sedimentation tank on site, install vehicle washing troughs at the entrance and exit, and cover temporary mound and exposed excavation surfaces with dense mesh screens; and after the construction is completed, lay rainwater drainage pipelines on site.

(2) Quantities of Measures

Engineering measures: topsoil stripping 700m3 and rainwater drainage pipe 260m;

Temporary measures: temporary drainage ditch 290m, one temporary sedimentation tank, one vehicle washing trough, and dense mesh screen for exposed surface 880m2.

**3.3** **Prevention and Control Area of Temporary Works**

1. Prevention and Control Area of Borrow Pits

This project is constructed with one borrow pit - Hucaoxiang borrow pit, and its prevention and control work is:

(1) Measure layout

Before soil borrowing, strip off the topsoil for concentrated piling. Surrounding the soil borrowing site, brick drainage ditches and sedimentation tanks, and cover exposed excavation surface with dense mesh screens. After soil borrowing, level the site, backfill the topsoil and plant grass for greening.

(2) Quantities of Measures

Engineering measures: topsoil stripping 23,600m3, topsoil backfilling 11,600m3, site leveling 7.88hm2, drainage ditch 856m, and two sedimentation tanks;

Plant measures: grass greening 7.76hm2;

Temporary measures: dense mesh screen for exposed surface 1.58hm2.

2. Prevention and Control Area of Construction & Production and Living Areas

(1) Measure layout

Before the works, strip off the topsoil of the farmland and the forest land in the land area; during construction, construct temporary drainage ditch and sedimentation tank on site; and upon the completion of construction, recover the site with topsoil backfilling, site leveling, second ploughing or greening by shrubs and grasses.

(2) Quantities of Measures

Engineering measures: topsoil stripping 41,300m3, topsoil backfilling 72,700m3, site leveling 20.29hm2, and second ploughing 59,200m3;

Plant measures: greening by shrubs and grasses 14.37hm2;

Temporary measures: temporary drainage ditch 9,420m, ten temporary sedimentation tanks, and eight vehicle washing troughs 8.

3. Prevention and Control Area of Temporary Dumping Area

(1) Measure layout

Construct temporary drainage ditch and sedimentation tank surrounding temporary dumping areas, and block them by woven bags, and cover the mound surface with dense mesh screens. After the construction, recover the site with topsoil backfilling, site leveling and greening by shrubs and grasses.

(2) Quantities of Measures

Engineering measures: topsoil stripping 8,400m3, topsoil backfilling 9,100m3, and site leveling 3.03hm2;

Plant measures: greening by shrubs and grasses 3.03hm2;

Temporary measures: temporary drainage ditch 2,550m, seven temporary sedimentation tanks, temporary mound block 2,550m3, and dense mesh screen for exposed surface 5.28hm2.

**4** **Water and Soil Conservation Monitoring**

1. Monitoring Contents

Mainly include land disturbance, the quantity of borrowed soil, water and soil loss situations, and water and soil conservation measures.

2. Monitoring Period

The monitoring period is from the construction preparation period to the design level year, that is, from February 2019 to December 2022, for a total of 46 months.

3. Monitoring Methods

Combine field survey and positional observation of the ground.

4. Frequency of Monitoring

The background value of each fixed monitoring point should be monitored once before construction; and during the construction period, the water and soil conservation measures being implemented shall be monitored at least once every 10 days. The area of the disturbed surface and the blocking effect of water and soil conservation measures should be monitored and recorded at least once every month. The construction progress of main works, the impact factors of water and soil loss, and the growing situations of water and soil conservation plants shall be monitored at least once every three months. The monitoring of plant measures and water and soil conservation projects can be carried out twice a year. The water and soil loss disaster should be monitored within one week after the event occurs. The monitoring of water and soil loss quantity should be determined according to different monitoring methods, and should be intensified in case of heavy rain or strong wind.

5. Layout of Monitoring Points

There are 16 water and soil loss monitoring points in the project, including three in the station works areas, four in the interval line work area, two in the depot area, one in the control center area, one in the main substation area, and one in the borrow pit, two in the construction & production and living area and two in the temporary dumping area. Key areas to be monitored include the interval line work area, the depot area and the construction & production and living area.

**5** **Investment Estimate in Water and Soil Conservation**

The total investment in water and soil conservation in the Phase I of the Chuzhou Section is CNY 63,075,100, including CNY 12,715,800 for engineering measures, CNY 25,735,300 for plant measures, CNY 14,331,100 for temporary measures, and CNY 5,443,400 as independent costs (including CNY 1,815,300 for water and soil conservation monitoring, and CNY 601,900 for water and soil conservation supervision), CNY 3,493,500 as the basic reserve fund and CNY 1,356,000 as the water and soil conservation compensation.

**Appendix 2: Specifications for Construction Environment of the Contractor**

1 General

These Regulations specify the general environmental protection measures for the main works, including the lines (elevated lines and underground tunnels), stations (elevated stations and underground stations), Xiangguan Depot, Hongwu Road Stabling Yard, Control Center, and two main substations, and for temporary measures such as the construction camps, and are the environmental and social management guidelines that the Contractor must follow during the construction process. The Contractor and its employees shall strictly follow the environmental protection measures in these Regulations, to minimize the adverse impact of construction activities on the environment. As a guidance document, these Regulations should be used in conjunction with national and local regulations. The measures and procedures for water and soil conservation shall be carried out in accordance with "**Appendix 1: Water and Soil Conservation Plan**". After the completion of the project, the following measures must be completed before the completion of the acceptance:

(1) All areas directly affected by the construction should be landscaped, and the vegetation should be restored as soon as possible by planting trees and grasses;

(2) All rivers, drainage pipes and canals in the affected area should be cleaned, and the smoothness of drainage pipes shall be checked;

(3) Clean all construction sites, and properly dispose of all remaining materials;

(4) Complete the reclamation and second ploughing of temporary land occupation;

(5) Repair borrow pits.

**2** **Construction Camp Management Plan**

Along the Chuzhou-Nanjing Intercity Railway project is established cities and urban areas, and 13 construction camps (construction and living areas) are designed.

**2.1** **Environmental Management Measures**

The pollution of the construction camps is mainly from construction workers, including the pollution caused by site leveling, and the impact of domestic sewage, waste gas and solid waste. A series of measures are needed to mitigate the environmental impact:

(1) The waste slag generated by site leveling shall be cleared and transported timely. For the transportation of earthwork, muck and construction waste, closed transport vehicles must be used.

(2) Regularly (usually once a day) sprinkle water to suppress dust and reduce dust pollution.

(3) Canteens in the construction camp should use clean energy such as natural gas and electric power. It should be equipped with grease traps, and clearing and transportation units should be entrusted for timely cleaning, which must have the qualification certificate and business licenses.

(4) Temporary toilets shall be constructed in the construction camps with septic tanks. Temporary toilets and septic tanks shall be prevented from seepage. Corresponding sanitation companies should be entrusted, for regular cleaning of septic tanks.

(5) Drainage ditches and sedimentation tanks shall be provided in the construction camp. Filters shall be installed in the sewers of the canteens, washrooms and showers. At the same time, the drainage ditches shall be clean and the drainage shall be smooth.

(6) It is forbidden to dump or discharge domestic sewage or domestic waste to the agricultural irrigation canals around the camp.

(7) The construction camp shall be equipped with the classification and collection devices for domestic waste, and shall be cleared and transported in time.

**2.2** **Safety and Health Management Measures**

(1) The construction camp shall be closed and managed, to ensure safety by setting enclosures, fences or access control systems.

(2) Formulate work & rest time and entertainment time.

(3) Fire fighting equipment and portable fire extinguishers must be installed at the camp.

(4) The Contractor shall establish medical and first-aid facilities at each construction camp.

**3** **Construction Impact Management Plan**

In order to minimize the impact of construction on local communities and the environment, each Contractor of the project should strictly abide by the following conventions:

**3.1** **Air Quality Management**

(1) The construction site shall be enclosed and blocked. The height of the enclosures at the construction sites of main road sections shall not be less than 3m, and of general road sections shall not be less than 1.8m. The bottom edge of the enclosure shall be closed, anti-overflow sedimentation wells shall be provided, and mud leakage is not allowed. The enclosure shall not occupy the green belt without approval.

(2) The vehicle must be flushed and cleaned before driving out of the construction site. There must be guard rooms, vehicle washing troughs, water guns, pools, sedimentation tanks, etc. in the gate. The vehicle washing trough should be of the same width as the entrance gate, the slope should be reasonable, water accumulation should be avoided, and the sewage must flow through the sedimentation tanks before being discharged. The silt notch shall be provided with active steel mesh that meets the rigidity requirements, and the sludge in the tank shall be cleaned in time. Special persons should be assigned to flush all motor vehicles driving out of the construction site, which should be recorded, to ensure that "clean vehicles in and out". If there is no condition for constructing vehicle washing troughs, other effective flushing methods shall be adopted, such as laying jute bags at the entrance and exit of the site and appointing cleaning personnel in time, so that urban roads are not polluted.

(3) Roads in the construction site and from the gate to the municipal roads must be hardened by concrete. There should be drainage ditches on both sides of the road and hard isolation measures should be taken, to prevent vehicles from getting mud. The hardened ground shall not have raise dust or accumulated soil.

(4) The exposed sites in the construction site shall be protected by greening, and mesh and membrane covering.

(5) Bulk materials such as sand and aggregate should be centrally stacked and covered. Building materials such as cement that are prone to generate raise dust should be tightly covered or stored in the warehouse.

(6) Commercial concrete and ready-mixed mortar should be used at the construction site. Sealing and dust-reducing measures should be taken when mixing concrete and mortar.

(8) After the excavation of the earthwork at the construction site, the backfilling shall be completed as soon as possible, and the site that cannot be backfilled in time shall be protected by dust prevention measures such as covering.

(9) Construction waste on the construction site should be concentrated, classified and stacked, and covered tightly. Garbage in the floor should be bagged and transported away, and it is strictly forbidden to throw off at high places. Construction waste on the construction site shall be cleaned and disposed of regularly, and shall be transported to designated places for disposal according to the time, route and requirements stipulated by relevant departments of the municipal, county and district government.

(10) Materials that are easy to generate raise dust, such as earthwork, sand and gravel, and construction waste should be transported into or out of the construction site with closure measures. The concrete mixer trucks entering the construction site should be equipped with speed limiters.

(11) Sprinklers and dust-reducing facilities shall be constructed at the construction site, and special personnel shall be arranged to regularly sprinkle water to reduce dust.

(12) It is forbidden to burn linoleum, rubber, plastics or other substances that produce soot and malodorous gases on the construction site.

(13) When Class III (yellow) warning is started or the wind speed of the weather forecast reaches five degree or above, it is not allowed to perform earthwork excavation, transshipment, demolition, soot blowing of the road surface by blowers, which are easy to generate dust.

**3.2** **Construction Noise Management**

(1) During the construction period, it must be supervised and inspected by local environmental protection departments, and according to the provisions of the *Emission Standard of Environment Noise for Boundary of Construction Site* (GB12523-2011), effective vibration and noise reduction measures shall be taken, to avoid disturbing residents.

(2) During construction on the road sections with sensitive targets, high-noise mechanical equipment should be used within 8:00-12:00 and 14:00-22:00. If it is necessary for continuous construction out of special reasons, especially for nighttime construction, it must be approved by the local environmental protection department with the *Night Construction Permit*.

(3) Machinery with large noise such as pile drivers, concrete pumps, and wheel loaders should be placed in remote places or tunnels as far as possible, and away from sensitive targets such as residential areas, schools and hospitals. In addition, they should be regularly repaired strictly in accordance with the operating procedures.

(4) During construction at road sections with acoustically sensitive targets within 150m, the site shall be provided with construction enclosures or sound barriers not lower than 3m.

(5) Concrete mixers are not allowed on the construction site.

(6) Half a month before and during the middle or high school entrance examinations, construction work involving noise exceeding the standard and disturbing residents should be prohibited.

**3.3** **Construction Vibration Management**

(1) Concentrate the processing workshops and stock yards at the construction site, to minimize the scope of vibration interference. Make full use of natural conditions such as terrain and features, to reduce the impact of vibration on surrounding sensitive points;

(2) Construction vehicles, especially heavy-duty transport vehicles, should avoid environmentally sensitive targets as far as possible.

(3) Works with high vibration should be scheduled within 8:00-12:00 and 14:00-22:00, and the works with strong vibration pollution are restricted at night.

(4) Investigate and record the vehicle sensitive points around the construction site in detail in advance. For the construction of underground stations, take precautions such as reinforcement of sensitive buildings around the construction site of the station.

**3.4** **Water Environment Management**

(1) Construct intercepting ditches, sedimentation tanks and drainage pipes in the construction site, to intercept and collect the washing sewage and slurry sewage in the construction site, and recycle slurry sewage after sedimentation and evaporation.

(2) Sewage in foundation pits should be firstly neutralized before settlement; oily sewage shall maintain standing for oil separation, and treated sewage can be recycled after treatment; and the sediment residue shall be regularly cleaned and transported away; The recycled water should be preferentially used for material flushing and sprinkling and dust reduction at the construction site and temporary dumping areas, and non-recycled water should be discharged into surrounding municipal sewage pipe networks.

(3) Oily sewage generated by construction machinery shall be treated with the sewage cleaning and collection system and recycled after treatment.

(4) It is strictly forbidden to carry out excavation and filling works during heavy rain.

(5) The upper part of the construction material stacking yard shall be installed with rain-proof roof, the yard should be surrounded by enclosures, the bottom should be treated with anti-seepage concrete or treated with anti-seepage films, and other yards should be equipped with rain-proof tarpaulins and other covering items.

(6) Mobile toilets should be constructed on the site, and the domestic sewage of construction personnel should be treated by septic tanks.

(7) Properly provide supports for the foundation pit, and prevent water seepage.

**3.5** **Solid Waste Management**

(1) The muck transport vehicles shall be driven according to the route and time specified by local public security and traffic management departments. The vehicle should be transported in a sealed manner.

(2) The construction waste and muck of the construction site shall be timely cleared and transported away, to keep the construction site and the surrounding environment clean and tidy;

(3) Garbage cans should be set up in the construction site to classify and collect domestic waste, so that they could be collected by environmental sanitation departments regularly.

**3.6** **Traffic Relief and Management**

(1) The Contractor shall prepare the traffic relief plan involving relevant roads and report to the competent public security and traffic management departments for approval.

(2) Temporary bypass roads should be built before road excavation to ensure the passage of roads during construction, signboards should be erected along the roads, and special personnel should be dispatched to direct traffic diversion to ensure smooth roads.

(3) The construction organization should avoid the rush hour as much as possible, and reasonable construction time should be arranged. During construction, sufficient bypass roads should be reserved for the passage of vehicles, and the construction of such roads should be accelerated, to reduce traffic impact.

(4) Before the construction, it is necessary to install notice boards on the construction site, to explain the project contents and construction time, so that the public could understand the inconvenience caused by construction, and is informed of the contact person and hotline for complaints. If possible, notice should be given in advance by means of news media, Weibo, WeChat, etc.

(5) For construction along existing roads in urban areas, excavation shall be performed on the half breadth of the road, with the other half for traffic passage, and temporary isolation facilities and traffic guidance warning signs shall be constructed in the construction area to ensure traffic safety.

(6) During the construction period, existing roads will be occupied along the line, thus causing traffic congestion. Traffic management should be strengthened to stop or reduce vehicle transportation during peak traffic hours, to reduce traffic congestion. If serious damage is caused to local roads during construction, it should be repaired immediately, or the indemnity should be paid to local highway management departments for repair.

(7) Pipeline construction should avoid the rush hour, or traffic polices should be assigned for dredging and dispatching, to ensure the smooth flow of pedestrians and vehicles, thus reducing traffic congestion and reducing the impact on residents' travel.

(8) Strengthen construction management and training of construction personnel with respect to environmental protection.

**3.7** **Cultural Relics and Resources Management**

According to relevant investigations, the construction site and surrounding areas of the project do not involve cultural relics protection units and ancient buildings. In combination with the *Law of the People's Republic of China on the Protection of Cultural Relics*, these Environmental Protection Regulations propose the following management requirements for cultural relics or physical cultural resources accidentally discovered during construction:

(1) If cultural relics are found during construction, the works should be stopped immediately, the site should be protected, and it should not be disposed of without authorization.

(2) At the same time, it should be reported to local cultural relics management department immediately.

(3) After the cultural relics management department puts forward the handling opinions, the Contractor shall re-define the construction plan involving the cultural relics according to the handling opinions, and obtain the consent before construction.

(4) Before the end of archaeological excavation, no unit or individual can continue construction or carry out production activities in the archaeological excavation area. No unit or individual is allowed to rob, divide, or hide the cultural relics found.

**3.8** **Pipeline Relocation and Construction Management**

(1) The Contractor shall communicate with local planning, urban construction and other infrastructure departments before design and construction, and publicize the design and construction plans in local areas.

(2) According to pipeline locations and burial depth, the construction plan and emergency plan shall be formulated, and underground pipelines shall be avoided as much as possible during construction.

(3) The intersections with gas pipelines should be designed and constructed strictly in accordance with the *Law of the People's Republic of China on the Protection of Petroleum and Natural Gas Pipelines* and other laws and regulations.

(4) For the pipelines involved in excavation, relevant construction departments should be informed of the construction site and the specific construction time before excavation to facilitate emergency preparation.

**3.9** **Management of Green Space or Basic Farmland Occupation**

(1) For the project to occupy urban green space or urban greening trees, the construction unit shall, according to relevant provisions of the *Measures for the Administration of Urban Greening in Chuzhou City* and *Nanjing Urban Greening Regulations*, obtain the approval by the greening administrative departments of Chuzhou City and Nanjing City, and go through the formalities for temporary land use.

(2) The greening land occupied in urban areas shall be returned and restored by the occupying unit within the prescribed time limit. The loss, if any, shall be compensated according to law. The permanently occupied green land will be transplanted at the ratio of 1:1.

(3) For the project to occupy farmlands, the principle of taking up one and supplementing one shall be adopted, and the same amount of farmland shall be designated in Lai'an County of Chuzhou City and Pukou District of Nanjing City as basic farmlands for supplementing, to meet relevant requirements of the *Regulation on the Protection of Basic Farmland*.

**4** **Other Management Plans**

**4.1** **Safety Management**

The Contractor must comply with national and local safety requirements and other measures to avoid accidents, and ensure the safety of construction workers.

1. Production Safety

(1) The Contractor shall ensure that first-aid measures and suitable first-aid supplies are provided in accordance with the requirements. Appropriate first-aid kits should be provided at the construction site and the contingency plans should be in place, to ensure that patients can be transferred to appropriate medical facilities.

(2) All new construction workers should be trained in safety, introducing the basic working rules of the construction site, personal protection rules and how to prevent other employees from being injured.

(3) Place warning signs on all energized electric devices and wires; Inspect all wires, cables, and hand-held electric tools, check if there are broken or exposed wires, and determine the maximum allowable operating voltage of the hand-held tools according to the manufacturer's recommendations; Provide double insulation/grounding for all electrical equipment used in wet (or potentially wet) environments.

(4) Provide appropriate eye protection (such as welding goggles and/or face shields) to all welding operators or their assistants.

(5) Install protective railings on the edge of areas that are fragile and dangerous (there should be the handrail in the middle and baffle in surrounding areas), and provide construction personnel with fall prevention devices (including seat belts and distance limiting lanyards).

(6) Conduct health education for construction workers, such as implementing information exchange strategies, enhancing face-to-face consultation, addressing systemic issues affecting individual behaviors, and encouraging individuals to take protective measures; In addition, encourage the use of insect repellents, clothing, mosquito nets and other blocking methods to avoid diseases spreading due to mosquito bites.

(7) The Contractor shall prepare the Construction Health and Safety Plan (HSMP) before construction and obtain the approval of the supervision engineer.

(8) Provide occupational health and safety training for all newly hired employees, and introduce basic workplace rules, personal protection rules, and how to prevent injury to other employees; The training should include basic hazard knowledge, specific hazards in the workplace, safe work practices, fire emergency procedures, evacuation procedures, and natural disaster management procedures. The specific hazards in the workplace and the color codes used should be detailed in the training.

(9) Provide basic vocational training courses and special courses as needed to ensure that employees are aware of the specific hazards of each task. Provide training to all management personnel, supervisors, employees, and occasional visitors to risk and hazardous areas; Employees responsible for rescue and first aid should receive specialized training, to prevent themselves or other employees from being seriously affected by or suffering from more serious health risks unintentionally. The training should include how to prevent infection of pathogens in the blood by contact with body fluids or body tissues.

(10) Hazardous areas (distribution rooms, compressor rooms, etc.), installations, materials, safety measures, emergency exits, etc. should be marked with correct signs. These signs should conform to international standards, and should be easily understood by employees, visitors, and the general public (as appropriate).

2. Traffic Safety

(1) Safety education training should be regularly provided for drivers to emphasize safe driving.

(2) Limit driving time, and drive in turn to avoid excessive fatigue. Avoid driving on dangerous roads and time, to minimize accidents.

(3) Regularly maintain the vehicle, use the parts approved by the manufacturer, and purchase the parts in time to maintain the vehicle to avoid serious accidents due to equipment failure or premature component failure.

(4) Divert pedestrians and vehicles.

(5) Use traffic safety restriction measures, to remind pedestrians and vehicles of dangerous traffic conditions through road signs and signal officers. Work with local communities and authorities to improve road signs, enhance their visibility, and strengthen traffic safety comprehensively.

(6) Conduct traffic safety and pedestrian safety education in communities and schools surrounding the project.

**4.2** **Occupational Health**

The Contractor shall develop an occupational health and safety plan and submit it to the supervision company for consent. The plan must clarify the safety emergency procedures at the time of accident, ensure that all construction sites are equipped with the most basic first-aid equipment, and ensure that construction workers use labor protection equipment.

(1) At the construction site, warning signs or warning instructions should be erected in the job posts, equipment and places that are prone to occupational hazards.

(2) Occupational health training and physical examinations should be regularly provided to personnel engaged in toxic and hazardous operations, to guide operators in the correct use of occupational disease prevention equipment and personal labor protection articles (at least once a year).

(3) The construction unit shall equip the construction personnel with safety helmets, safety belts and personal protective equipment such as safety shoes and overalls that match the types of work performed.

(4) Low-noise equipment should be used at the construction site, and automated and airtight construction processes should be promoted, to reduce mechanical noise. During operation, the operators should wear earplugs for hearing protection.

(5) Forced ventilation facilities should be provided in areas where good natural ventilation is not available. Operators should wear gas masks or respirators in workplaces where toxic and hazardous gases are used.

(6) In dusty workplaces, watering facilities should be used to reduce dust concentration, and operators should wear dust masks. When welding, operators should wear personal protective equipment such as protective masks, goggles and gloves.

(7) When working at high temperature, the construction site should be equipped with heatstroke prevention and cooling supplies, with reasonable work and rest schedule.

**4.3** **Public Participation**

The Contractor shall provide sufficient information to the public to be affected, especially those residents who may be directly affected by the project construction around the project site. The main measures to be taken are as follows:

(1) A bulletin board should be set up at the entrance of the construction site to announce the project name, main construction contents, construction time and other information, and to publicize complaints, contacts and contact information.

(2) Assign special persons to answer public questions about environmental protection.

(3) If the municipal service (including water, electricity, telephone and bus lines) is interrupted due to construction, notice should be posted at the project site and affected households or enterprises at least five days in advance, and the start and end time of the service shall be indicated;

(4) All public opinions and questions should be recorded and archived. The questions raised by the public should be answered and responded timely. The results of all comments and responses should be recorded and archived, to be checked by the supervisory authority.