Zhengzhou International Logistics Hub Project

Environment Impact Assessment (EIA)

May 2021

Zhengzhou International Hub Development and Construction Co., Ltd

CURRENCY EQUIVALENTS

(as of 1 May 2021)
Currency unit - yuan (CNY)
CNY1.00 = US$0.1546
US$1.00 = CNY 6.4672

ABBREVIATIONS

AIIB	Asian Infrastructure Investment Bank
AQI	Air Quality Index
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
EMS	Environmental Monitoring Station
EEB	Ecology and Environment Bureau
EPL	Environmental Protection Law
ESF	Environmental and Social Framework
ESP	Environmental and Social Policy
ESS	Environmental and Social Standard
FSR	Feasibility Study Report
GDP	Gross Domestic Product
GHG	Green House Gas
GIP	Good International Practice
GIIP	Good International Industrial Practice
GRM	Grievance Redress Mechanism
HMT	Hub for Multi-modal Transport
IA	Implementing Agency
IT	Interim Target
MEE	Ministry of Ecology and Environment
MEP	Ministry of Environmental Protection
PAP	Project Affected Person
PCR	Physical Cultural Resources
PIU	Project Implementation Unit
PPE	Personnel Protective Equipment
PRC	People's Republic of China
WB	World Bank
WHO	World Health Organization
WWTP	Wastewater treatment plant
ZETDZ	Zhengzhou Economic and Technological Development Zone

WEIGHTS AND MEASURES

BOD_5	Biochemical Oxygen Demand, five days
cm	Centimeter
CO_2	Carbon Dioxide
COD	Chemical Oxygen Demand
dB(A)	A-weighted sound pressure level in decibels
DO	Dissolved Oxygen
kg	Kilogram
km	Kilometer
kWh	Kilowatt Hour
Leq	Equivalent Continuous Noise Level
m	Meter
m/s	Meters per Second
m^2	Square Meters
m^3	Cubic Meters
mg/l	Milligrams per Liter
mg/m^3	Milligrams per Cubic Meter
$\mu g/m^3$	Micrograms per Cubic Meter
NO_x	Nitrogen Oxides
^oC	Degrees Celsius
O_3	Ozone
pH	A measure of the acidity or alkalinity of a solution
PM	Particulate Matter
PM_{10}	Particulate Matter smaller than 10 micrometers
$PM_{2.5}$	Particulate Matter smaller than 2.5 micrometers
SO_2	Sulfur Dioxide
t/h	Tons per Hour
TSP	Total Suspended Particulates

NOTE

In this report, "$" refers to United States dollars.

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Table of Contents

List of Tables

List of Figures

EXECUTIVE SUMMARY

A. Introduction

1. This Environmental Impact Assessment (EIA), including an environmental management plan (EMP), is prepared for the proposed Zhengzhou International Logistics Hub Project (the Project) in Zhengzhou City, Henan Province of the People's Republic of China (PRC).

2. The project will build an international logistics hub for multi-modal transport (HMT) at Zhengzhou International Hub in Zhengzhou City, Henan Province of the PRC. The project will have 4 subprojects, which will be: (i) multimodal cold storage facilities (with a cold storage capacity of 50,000 tons per year); (ii) parallel vehicle imports facility; (iii) Type-B bonded logistics center; and (iv) multimodal logistics information platform upgrade. After the project is completed, China-Europe Block Train (Zhengzhou section)'s throughput capacity as well as cold chain storage transportation capacity will be increased, efficiency of logistics turnover will be increased, logistics turnover cost will be reduced, and promote the economic development and provide job opportunities to the countries along the China-Europe Block Train.

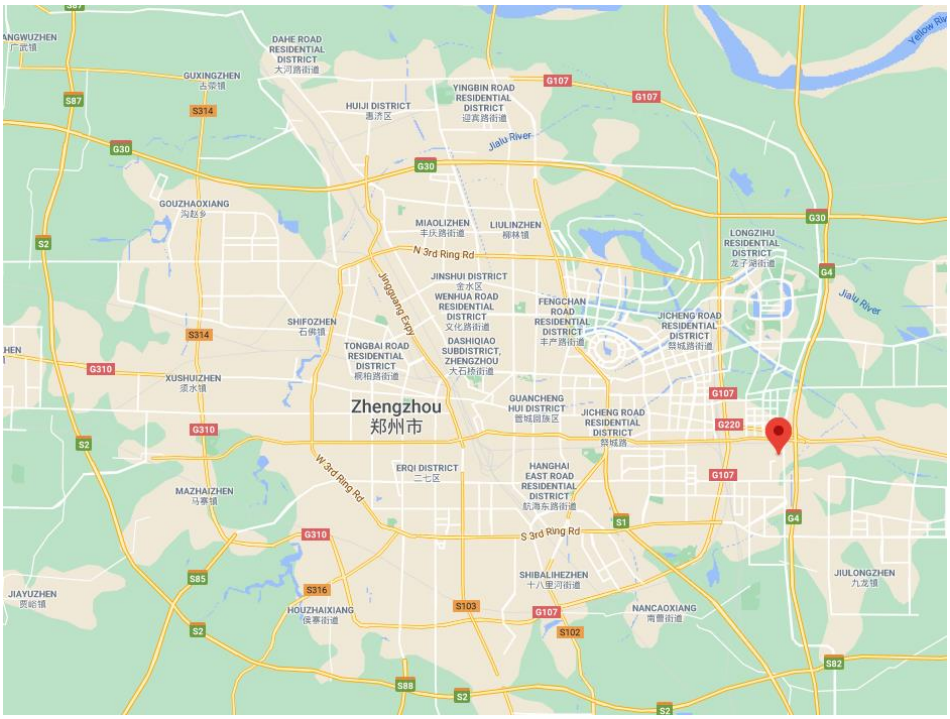

Figure 1: Project location

B. Implementation Arrangements

3. Zhengzhou International Hub Development and Construction Co., Ltd (herein after referred to as ZIH) will be the Project Implementing Unit (PIU) and responsible for implementing the project and administering, monitoring contractors and suppliers and day-to-day management of the project.

4. ZIH was jointly established by Management Committee of Zhengzhou Economic and Technological Development Zone (ZETDZ) and Henan Materials Group Corporation at 2013 with a registered capital of 500 million Chinese Yuan (CNY). ZIH is mainly responsible for the operation

of the service platform for Zhengzhou international hub and China-Europe Block Train (Zhengzhou section).

5. The total construction period for the project will be 5 years, from 2021 to 2025.

C. Project Overview

6. The key construction activities will include land leveling, land excavation, construction of buildings and multimodal cold storage facilities and installation of equipment and municipal infrastructure. The contractor will establish temporary facilities including construction camp, setting pond for vehicle cleaning wastewater, site office, and material storage area. These facilities will be established with the premises of the three plots.

7. The key operation and maintenance (O&M) activities of the proposed multimodal cold storage facilities, type B bonded logistics center and parallel vehicle imports facility would include routine inspection of the facilities and buildings, repairing or replacing any faulty equipment of imported automobiles.

D. Objectives of EIA

8. The project is classified as Category B based on Asian Infrastructure Investment Bank (AIIB) Environmental and Social Policy (ESP). This EIA has been prepared following the requirements of the ESP and Environmental and Social Standards (ESS) and procedures of the PRC. It is based upon 3 domestic environmental impact assessment reports (DEIAs), domestic feasibility study report, site visits by the consulting firm, and secondary information sources.

9. The present EIA aims to address the potentially adverse impacts of the project and its activities on the physical and biological environment – in order to make the project environmentally sustainable. The present study has been carried out in response to the requirements defined by the national regulations as well as AIIB ESP.

E. Environmental Baseline

10. The project will be located at three plots of Zhengzhou Economic and Technological Development Zone (ZETDZ). ZETDZ is located at the southeast of Zhengzhou. It was established on April 1993 and became the first national economic and technological development zone in Henan Province. Now ZETDZ boards Lanzhou-Lianyungang Railway in the north, Airport Expressway in the west, Fushan Road in the south and Wansan Road in the east. Now it has a floor area of 158.7 km^2 and 63 administrative villages including 45 administrative villages and 18 communities. After more than 20 years' development, the three leading industries of ZETDZ are vehicle industry (annual output value of 2019 was 47.84 billon CNY), modern Logistics Industry (annual business income of 2019 was more than 100 billon CNY) and equipment manufacturing industry. The population of ZETDZ is around 400,000 including permanent population and employees.

11. Baseline surveys, through sampling and analysis, were conducted at the project sites for establishing baseline conditions for surface water quality, groundwater quality, and noise and air quality. Surface water quality near the project sites met the Class III of the PRC's Environmental Quality Standards for Surface Water (GB 3838-2002). Groundwater quality monitoring data near the project sites met Class III of the PRC's Groundwater Quality Standard of GB/T14848-2017. Soil quality in the project sites met risk screen value of construction land of PRC's GB 36600-

2018. Ambient air, surface water, ground water, soil and noise quality in the project areas comply with the relevant national standards.

12. The project sites are located at developed industrial area. Natural flora within the project areas is removed due to the development activities in the past. Land types in the project areas comprise modified industrial lands. There are no known rare or endangered flora or fauna in the project area.

13. Archaeological reconnaissance reports of the three plots of the project site were prepared and submitted to local Cultural Relics Bureau for review. Based on the assessment No cultural heritage or archaeological sites have been documented in the project area. Chance Find procedures for physical cultural resources (PCR) have been included in the EIA.

F. Anticipated Impacts and Mitigation Measures

14. Anticipated positive and negative environmental impacts of the proposed project were assessed based on the domestic Feasibility Study Report (FSR), DEIAs, public consultations led by PIU and assisted by consulting firm; and site visits, surveys and consultations.

15. Pre-construction, construction and operation phases were considered separately. The results of the assessment indicate that during the pre-construction phase environmental issues are very limited and are mostly associated with ensuring appropriate incorporation of mitigation measures into the project design.

16. Potential negative environmental impacts during construction phase are short-term and localized, and are associated with soil erosion, construction noise, fugitive dust, disruption of traffic and community services, and risks to worker health and safety. The key construction activities will include land leveling, land excavation, construction of buildings and multimodal cold storage facilities and installation of equipment and municipal infrastructure. Key risks during construction phase include (i) soil erosion during the construction period; (ii) temporary noise disturbance to nearby communities and office buildings, (iii) air pollution (mainly fugitive dust), (iv) inappropriate solid waste disposal (construction materials and/or worker litter and food waste), and (v) occupational and community health and safety. These can be effectively mitigated through good construction and health and safety measures implemented by the contractors. There will be standard procedures for the control and mitigation of emissions, such as dust, noise and wastewater discharges from the construction sites and work camps.

17. During operational and maintenance (O&M) stages of the project, potential impacts are associated with noise emissions and exhaust gas emission, domestic wastewater, solid waste, and occupational health and safety risks to workers. The key operation and maintenance (O&M) activities of the proposed multimodal cold storage facilities, type B bonded logistics center and parallel vehicle imports facility would include routine inspection of the facilities and buildings, repairing or replacing any faulty equipment of imported automobiles. These risks have been minimized to the extent possible through the designs, including the use of low-noise equipment, work safety procedures, and routine health checks for workers. These can be effectively mitigated through good operation of the facility equipment, and health and safety practices implemented by the PIU.

18. Potential positive operation phase impacts are significant and long-term and are associated with emissions reductions compared to equivalent transportation by sea and road. When compared to the equivalent transportation by sea (for China-Europe route) and road (for

China- Central Asia route), once operational the project will: (i) result in annual energy savings equivalent to 40,576.5 tce, thereby providing a global public good by avoiding the annual emission of 104,554.9 tons of CO_2; and (ii) improve local air quality through the estimated annual reduction of emissions of SO_2 by 3.0 tons, NOx by 1.5 tons, and PM by 27.6 tons.

19. **Coronavirus disease outbreak (COVID-19).** The outbreak and global spread of COVID-19 since December 2019 pose new risks and management implications for most countries. For the current project, the extent of COVID-19 in Henan Province and the project area was reviewed. The requirements for a COVID-19 health and safety plan are included in the EMP. Measures include the screening of all project personal prior to admission to project sites and onsite measures for sanitation, emergency response, and the provision of personal protective equipment**.**

G. Environmental Management Plan

20. An EMP has been prepared as part of the present EIA, in order to provide implementation mechanism for the mitigation measures. The EMP has been developed to ensure (i) implementation of identified mitigation and management measures to avoid, reduce, mitigate, and compensate for anticipated adverse environmental impacts; (ii) implementation of monitoring and reporting against the performance indicators; and (iii) compliance with the PRC's relevant environmental laws, standards and regulations and the AIIB's ESP. The EMP includes an environmental monitoring plan (EMoP) to monitor the environmental impacts of the project and assess the effectiveness of mitigation measures, and a capacity building and training program focused on health, safety, and environment. Organizational responsibilities and budgets are clearly identified for implementation, monitoring, and reporting.

21. The overall responsibility of environmental performance of the project and effective EMP implementation will rest with ZIH. An Environmental and Social (E&S) Specialist will be hired in PIU. The E&S Specialist will be responsible for overall environmental and social management for the project and supervising the environmental and social performance of the project and oversee the Construction Supervision Companies (CSCs) and contractors. CSCs and contractors will also engage dedicated staff for E&S management.

22. The EMP lists all the potential impacts, the mitigation measures to address these impacts, and implementing and monitoring responsibilities for these measures – associated with each key activity of the project. The contractors and CSCs will be the important roles to implement the EMP during construction.

23. Two types of monitoring, i.e. environmental quality monitoring (or effects monitoring) and compliance monitoring will be carried out during project construction and operation phase. For the environmental quality the monitoring, parameters like dust and noise will be monitored. Compliance monitoring will focus on the monitoring of compliance of various labor and environment, health and safety (EHS) requirements and implementation of mitigation measures identified in the EMP.

24. Third-party monitoring agencies will be engaged to conduct monitoring. Semi-annual environmental monitoring reports will be prepared and submitted to AIIB for review. The environmental monitoring report will focus on the implementation of the EMP. It will (i) verify the compliance to regulations, contract agreements and EMP, (ii) summarize the environmental monitoring results, implementation of capacity building and accidents (if any), (iii) review the implementation of grievance redress mechanism (GRM); and (iv) recommend corrective actions or amendments of the project EMP.

H. Public Consultation

25. Information disclosure and public consultation were conducted during preparation of the EIA. A public meeting was held and a questionnaire survey was conducted after the meeting were held with the assistance from the consulting firm. Besides, relevant institutions were also consulted to express their views, comments on the project. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

26. The public consultations for the project were conducted in three types: (i) two separate consultation meetings with the primary stakeholders in the ZIH's office building near the project site held at 25 September, 2020 and March 23, 2021; (ii) interview with the primary stakeholders living and working near the project site at 25-26 September, 2020; and (iii) interview with the secondary stakeholders- EEB, Planning Bureau, Approval center, Supervision Bureau at 26 September, 2020.

27. The concerns raised by the residents living and working near the project sites is the noise generated during construction period and operation period. The concern is addressed by implementation of the noise mitigation measures of EMP.

28. The drivers and managers of the logistic companies working near the project sites supported the project because the project will provide more job opportunities to them. Some drivers thought that the working hours may be increased and risks from fatigue driving will be increased. Based on the communication with the managers, all the vehicles of the logistics companies are installed with GPS equipment to provide the location of the vehicles to the control system of the companies. If the drivers have dried more than 4 hours, the control system will force the driver to rest for no less than 20 minutes.

29. Based on the interview with the relevant departments of ZETDZ, the project has obtained all necessary permit for construction. If the mitigation measures from the DEIA is well implemented, the environmental impacts of the project can be accepted. The concern from the departments is the dust control during construction period and can be addressed by implementation of the dust mitigation measures of EMP including the mitigation measures of DEIA

30. This EIA document (Chinese version) will be disclosed at the website of ZIH from March 2021. The EIA will be available locally at the project site (PIU office, contractor's office).

31. Stakeholder engagement program (SEP) will be maintained with project stakeholders throughout project implementation, including: (i) before and after key works, to ensure residents are informed of and have the opportunity to respond to, pending works and procedures, (ii) broader consultations about project progress will be implemented during project period. SEP will be undertaken by the PIU, via questionnaire surveys, household visits, workshops, and public hearings.

I. Grievance Redress Mechanism

32. The existing Grievance Redress Mechanism of ZIH will be improved for the proposed project in accordance with AIIB's ESP and applicable ESSs. The GRM is designed to address concerns and complaints promptly, using an understandable and transparent process that is

culturally appropriate and readily accessible to all project affected persons as well as workers to be involved in this project. The GRM includes time-based steps for receiving, documenting, and resolving grievances. Any concerns raised through the GRM will be addressed quickly and transparently, and without retribution to the affected persons and workers.

J. Risks and Assurances

33. The ZIH has no previous experience in AIIB safeguard requirements. This may result in the limited implementation of the project EMP and inadequate operation of the project facilities. These risks will be minimized by (i) the appointment of qualified environmental officer within the ZIH to lead EMP delivery, (ii) recruitment of an environmental monitoring agency (to lead the external monitoring specified in the EMP), (iii) clear roles and responsibilities of all relevant agencies for EMP implementation, including contractors and construction supervision companies, and (iv) capacity building for EMP implementation.

34. The estimated budget for EMP implementation of the project is presented in EMP. Costs are presented for mitigation implementation, ambient monitoring, capacity building, implementation support if needed, and GRM implementation. The costs do not include salaries of PIU staff.

I. INTRODUCTION

A. The Project

1. This Environmental Impact Assessment (EIA), including an environmental management plan (EMP), is prepared for the proposed Zhengzhou International Logistics Hub Project (the Project) in Zhengzhou City, Henan Province of the People's Republic of China (PRC).

2. The project will build an international logistics hub for HMT at Zhengzhou International Hub in Zhengzhou City, Henan Province of the PRC. The project will have 4 subprojects, which will be: (i) multimodal cold storage facilities (with a cold storage capacity of 50,000 tons per year); (ii) parallel vehicle imports facility; (iii) Type-B bonded logistics center; and (iv) multimodal logistics information platform upgrade. After the project is completed, China-Europe Block Train (Zhengzhou section)'s throughput capacity as well as cold chain storage transportation capacity will be increased, efficiency of logistics turnover will be increased, logistics turnover cost will be reduced, and promote the economic development and provide job opportunities to the countries along the China-Europe Block Train.

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5. The total construction period for the project will be 5 years, from 2021 to 2025.

B. Regulatory and Policy Framework

6. According to the national regulatory requirements of the PRC, it is required to prepare three separate domestic environmental impact assessment (DEIAs) for the project. Now two DEIAs were prepared for the subproject 1 and 2 and approved by Ecology and Environment Bureau (EEB) of ZETDZ. DEIA is being prepared for the subproject 3 and no DEIA is required for subproject 4. The DEIA for subproject 3 was registered on ZETDZ's EEB's website by the end of 2020.

7. In addition, according to the AIIB's ESP and the Environmental and Social Standards (ESS), an EIA) needs to be carried out for the proposed project. The present assessment has been developed in the response to the above requirements. More details of these regulatory and policy requirements are provided later in the document.

C. Report Purpose

8. This report, including an environmental management plan (EMP) is prepared following both national regulations and AIIB's environmental safeguard requirements specified in the ESP. The EMP is presented in Appendix I.

D. Approach to Report Preparation

9. This report has been prepared based on a domestic Feasibility Study Report (FSR); two DEIAs; public consultations with key stakeholders, affected persons and relevant government agencies; and site visits, surveys.

10. The primary purpose of the EIA is to investigate and describe environmental impacts of the proposed project. Specifically, the study aims to predict the potential impacts of the project activities and recommend mitigation and abatement measures (in the pre-construction, construction, after completion of works and operational stages of development) that are considered potentially adverse to the surrounding environment.

11. In general, this EIA intends to:

- Examine and describe the existing status of the various ecological, physical and human related components surrounding the project area;
- Predict the potential significant impacts of the project on the surrounding environment during the pre-construction, construction, after completion of works, operations and maintenance stages and recommend appropriate mitigation and abatement measures; s
- Preparing an Environmental Management Plan (EMP) including an Environmental Monitoring Plan; and
- Proposing Grievance Redress Mechanism (GRM) for project-affected people and workers.

12. The study covers design, construction and operation and maintenance (O&M) phases of the proposed project. The methodology followed while conducting the present EIA study of the proposed project is shown in **Figure I-1**.

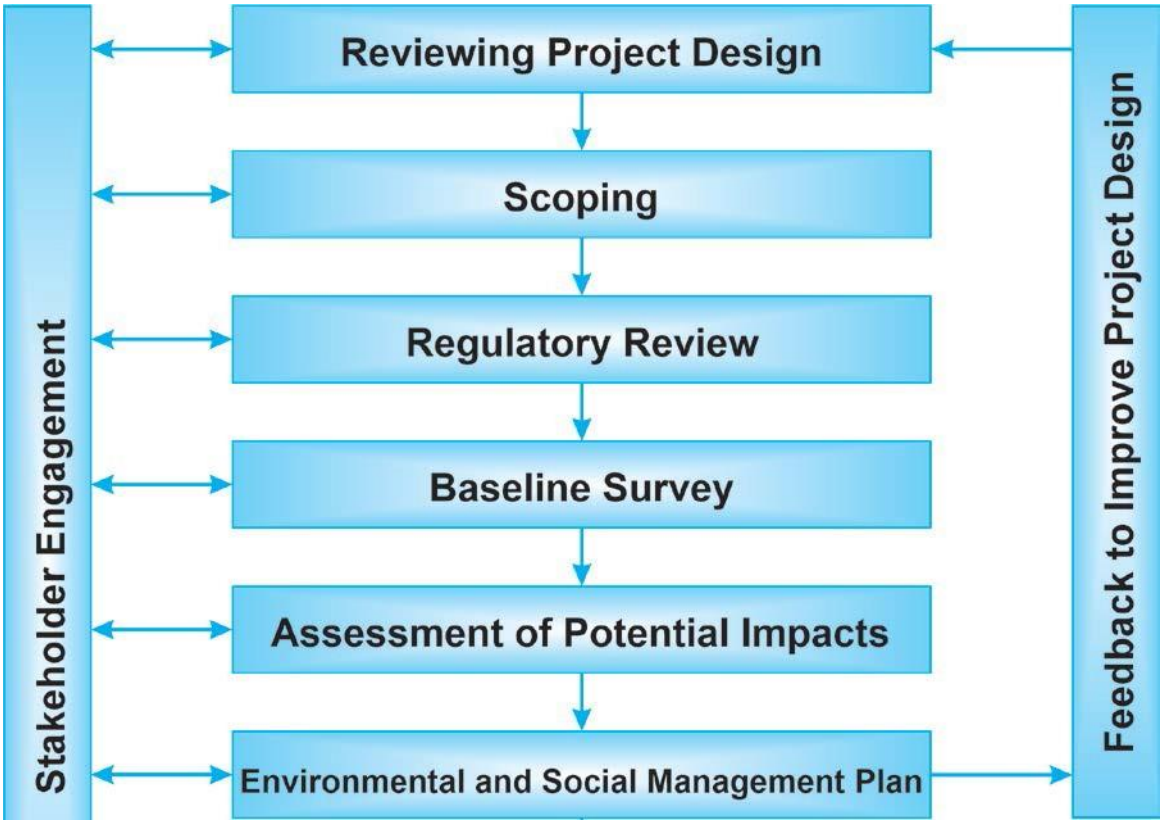

Figure I-1: Process Followed for EIA Study

13. The activities at each stage of the present EIA study are briefly described below.

14. **Reviewing Project Design**. Detailed information about project was collected from Project FSR and DEIAs for gaining an understanding of the proposed interventions and their possible environmental impacts. The following aspects have been included in the brief description of the project:

- Location of the project and its accessibility;
- Use of natural resources i.e. soil, water and its sources;
- Use of raw materials, fuels and chemicals, their quantities, characteristics, arrangements for transport to site, and storage facilities;
- List of main equipment and machinery, built-in pollution control equipment, description of detailed process;
- Information on solid, liquid and gaseous waste generated, and their points of generation;
- Noise level produced by equipment and machinery;
- Layout maps showing key project components.

15. **Scoping**. Based on the project activities the study team carried out the scoping and identified potential environmental impacts. At this stage, the suggestions from the stakeholders as well as nearby communities/residents were collected and taken into consideration.

16. **Regulatory Review.** As part of this task, national regulatory framework relevant to environmental impact assessment was reviewed. In addition, the AIIB's ESP and ESS were reviewed and their relevance to the proposed project determined. Finally, a comparison of the two sets of the requirements (ie, national and AIIB requirements) was carried out and gaps between them identified.

17. **Environmental Baseline Survey.** The environmental baseline conditions of the proposed project area have been determined by collecting relevant data from primary and secondary sources. Under the EIA study, available data on climate, geology, seismicity, water resources, land resources, soil properties, ecology and socio-economic components have been collected from secondary sources. Reconnaissance field visit and instrument monitoring of environmental quality were also carried out from September 2020 to October 2020 to collect primary data in the key areas of terrestrial ecology, industries and socioeconomics of the project site, physical and biological environment.

18. **Assessment of Potential Impacts.** Subsequent to the scoping, review of project details, and review of baseline environmental conditions, assessment of environmental impacts was carried out. Subsequently, the mitigations and enhancement measures were suggested to avoid, minimize and /or compensate the potential impacts.

19. **Environmental Management Plan**. The environmental management plan (EMP) was compiled once the impact assessment was completed and mitigation measures identified. During the EMP compilation, institutional arrangements for environmental management of the project were recommended, mitigation and monitoring plans were formulated, documentation and reporting protocols were defined, training needs were assessed, and cost of EMP implementation estimated.

20. **Stakeholder Engagement**. Stakeholder engagement started from environmental baseline stage when data and information on baseline conditions is collected from the directly and indirectly project impacted people. Their perceptions were considered in the selection of important environmental and social components through the scoping process.

21. Some formal consultations were carried out during EIA study. PIU arranged a formal consultation meeting with project affected people near the project site. Along with this, the study team also communicated with local government authority to inform them and to learned their perception regarding this project.

22. **EIA Report Preparation**. Towards to end of present assignment, the EIA report was prepared compiling the process and outcome of the tasks described above. The EIA report follows the standard structure that has been described later in the Chapter.

E. Report Structure

23. This EIA report consists of an executive summary, nine chapters and two appendixes. The report is structured as follows:

Executive Summary
Summarizes critical facts, significant findings, and recommended actions.

I Introduction
Introduces the proposed subproject, report purpose, approach to EIA preparation and EIA structure.

II Policy, Legal, and Administrative Framework
Discusses PRC's and AIIB's environmental assessment legal and institutional frameworks, status of approval of the domestic EIA reports, and applicable environmental guidelines and standards.

III Description of the Project

Describes the project rationale, scope, subprojects, location, key features, implementation arrangements, budget and time schedule.

IV Description of the Environment

Describes relevant physical, biological, and socioeconomic conditions within the subproject area.

V Anticipated Environmental Impacts and Mitigation Measures

Describes impacts predicted to occur as a result of the subproject and identifies the mitigation measures which will be implemented.

VI Environmental Management Plan

Presents the EMP, including required construction and operation phase environmental mitigation measures, EMoP, reporting requirements, and capacity building.

VII Analysis of Alternatives

Presents an analysis of alternatives undertaken to determine the best way of achieving the subproject objectives while minimizing environmental and social impacts.

VIII Information Disclosure, Consultation, and Participation

Describes the process undertaken for engaging stakeholders and carrying out information disclosure and public consultation.

IX Grievance Redress Mechanism

Describes the subproject grievance redress mechanism (GRM) for resolving complaints.

Appendix

Appendix I presents the draft guidelines for COVID 19 plan of the project.

Appendix II presents the minutes of the second public consultant meeting.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. Overview

24. This chapter discusses the laws, regulations and policies of the PRC and AIIB's Environmental and Social Policy (ESP) that are applicable for this project. Also provided in the Chapter is a comparison between the national and AIIB requirements. The intent of this section is to lay out the regulatory and non-regulatory performance requirements for all stages of the project. For the purposes of this report, only those regulatory elements directly relevant to the proposed Project will be discussed.

25. The project is classified as Category B under the AIIB ESP, requiring the preparation of a project EIA. Under PRC EIA regulations, the project is divided into 4 subprojects including 3 construction projects and 1 non-structural project. The subproject 1 and subproject 2 were classified as Class-2 at 2016, and preparation of two Environmental Impact Tabular Reports (EIT) were required. The subproject 3 was classified as Class-3 at 2020, and preparation of one Environmental Impact Registration Form (EIRF) was required. For the non-structural subproject 4, no DEIA was required).[1]

26. The PRC has a range of laws, regulations, technical guidelines and standards that govern the way in which environmental protection and environmental impact assessment for projects must be implemented, including for pollution prevention and control on air, noise, water, ecology and solid waste, and technical guidelines on assessing ambient air, noise, surface water, groundwater, and ecological impacts. The DEIAs upon which this project EIA is largely based was prepared in accordance with the PRC Law on Environmental Impact Assessment (2018 revision); Management Regulation on EIA Categories of Construction Projects (Ministry of Ecology and Environment (MEE), 2018 revision); Guidelines on Public Participation in EIA (MEE, 2019);[2] and, Technical Guidelines for Environmental Impact Assessment (HJ/T 2).[3]

B. PRC Environmental Laws, Regulations, Guidelines, and Standards

27. The environmental protection and management system in the PRC consists of a well-defined hierarchy of regulatory, administrative and technical institutions. At the top level the People's Congress of the PRC has the authority to pass and revise national environmental laws; the Ministry of Ecology and Environment (MEE, former Ministry of Environmental Protection) under the State Council promulgates national environmental regulations; and the MEE either separately or jointly with the Administration of Quality Supervision, Inspection and Quarantine issues national environmental standards. Provincial and local governments can also issue provincial and local environmental regulations and guidelines in accordance with the national ones. In addition, national and local five-year environmental protection plans form an important part of the legal framework.

28. The primary national laws and regulations that govern EIA are in **Table II-1** including associated regulations and decrees that support their implementation. Guidelines for EIA implementation. **Table II-2** shows the relevant provincial laws and regulations.

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1 The PRC's *Directory for the Management of Different Categories of Project Environmental Impact Assessment* classifies EIAs into three categories with different reporting requirements: (i) Full EIA Report – for projects with potentially significant environmental impacts; (ii) Environmental Impact Tabular Report (EIT) – for projects with less significant impacts; (iii) Environmental Impact Registration Form (EIRF)– for projects with the least environmental impacts.

2 Passed in the meeting of MEE on 16 April 2019 and implemented since 1 January 2019.

3 Including: atmosphere (HJ 2.2), surface water (HJ/T 2.3), noise (HJ 2.4), ecology (HJ 19) and biodiversity (HJ 623), groundwater (HJ 610), and invasive species (HJ 624).

Table II-1: National Laws and Regulations Relevant to Project

No.	Laws	Year Issued/Updated
1	National Environmental Impact Assessment Law	2016
2	Environmental Protection Law	2015
3	Atmospheric Pollution Prevention and Control Law	2015
4	Safety Production Law	2014
5	Occupational Disease Prevention and Control Law	2011
6	Water and Soil Conservation Law	2011
7	Water Pollution Prevention and Control Law	2010
8	Urban and Rural Planning Law	2008
9	Solid Waste Pollution Prevention and Control Law	2005
10	Water Law	2002
11	Cultural Relics Protection Law	2002
12	Noise Pollution Prevention and Control Law	1999
13	Labor Law	1995
Regulations		
14	Atmospheric Pollution Prevention and Control Action Plan (State Council Announcement No. 37)	2013
15	Policy on Integrated Techniques for Air Pollution Prevention and Control of Small Particulates (MEP Announcement No. 59)	2013
16	Planning Environmental Impact Assessment Regulation	2009
17	Cultural Relics Protection Law Implementation Regulation	2003
18	State Administrative Regulations of Safety Production	2003
19	Construction Project Environmental Protection Management Regulation	1998
20	Wild Plant Protection Regulation	1996
Decrees and Announcements		
21	Directory for the Management of Construction Project EIA Categorization (MEP Decree 2017-44)	2017
22	Measures for Public Participation in Environmental Protection (MEP Decree 2015-35)	2015
23	Management Measures for Environmental Impact Post Assessment of Construction Projects (on trial) (MEP Decree 2015-37)	2015
24	Government Information Disclosure of Construction Project EIA (on trial) (MEP Announcement No. 103)	2013
25	Measures for Environmental Supervision (MEP Decree 2012-21)	2012
26	Requirement for Preparation of EIA Report Summary (MEP Announcement 2012-51)	2012
27	Strengthening of EIA Management for Prevention of Environmental Risk (MEP Announcement 2012-77)	2012
28	Opinion from the State Council on Important Tasks for Strengthening Environmental Protection (State Council Announcement 2011-35)	2011
29	Management Measures for Operation of the Environmental Complaint Hotline (MEP Decree 2010-15)	2010
30	Management Procedures for the Supervision, Inspection and Environmental Acceptance of Construction Projects under the “Three Simultaneities” (on trial) (MEP Announcement 2009-150)	2009
31	Specifications on the Management of Urban Construction and Demolition Waste (Ministry of Construction Decree 2005-139)	2005
32	Management Measures for Inspection and Acceptance of Environmental Protection at Construction Project Completion (MEP Decree 2001-13)	2001
33	Interim Measures for the Environmental Protection Acceptance of Completed Construction Projects (EIA department of MEP, 2007-04)	2017

29. The most far-reaching law on pollution prevention and control is the Environmental Protection

Law (EPL) (1989, amended 2014, effective 2015 and item 2 in **Table II-1**), which sets out key principles for the country's pollution control system, including the policy known as the "Three Simultaneities Policy" [4], the application of pollution levies, and requirements for EIA. The implementation of the "Three Simultaneities Policy" was further strengthened by decrees on its implementation (**Table II-1** items 28 and 30) and the Construction Project Environmental Protection Management Regulation (**Table II-1** item 19).

30. The amended EPL further defines enforcement and supervision responsibilities for all levels of environmental protection authorities, imposes stricter obligations and more severe penalties on enterprises and construction units regarding pollution prevention and control, and allows for environmental public interest litigation including through nongovernment organizations. The procedures and requirements for the technical review of EIA reports by authorities have been specified (**Table II-1** item 4), and environmental inspection and enforcement on design, installation, and operation of project-specific environmental protection and control measures are regulated under the "Three Simultaneities Policy" (**Table II-1** items 5, 15, 25, 26, and 28).

31. Public participation and environmental information disclosure provisions are among the most significant changes introduced in the amended EPL, further supported by the decrees on the preparation of EIA summaries for public disclosure (**Table II-1** item 26), information disclosure on construction project EIAs by government (**Table II-1** item 24), method for public participation in environmental protection (**Table II-1** item 22), and technical guidelines for public participation in EIAs.

32. For grievance redress, a hotline number (12369) was established in March 2011 at each level of environmental protection authority throughout the country for receiving and resolving environmental complaints, in accordance with the Management Measures for Operation of the Environmental Complaint Hotline (MEP Decree 2010 No. 15 [item 29]).

33. The PRC also provides protection for community health and occupational health and safety through the Labor Law (1994) (item 13), the Occupational Disease Prevention and Control Law (2001) (item 5), PRC Safety Production Law (item 4), State Administrative Regulations of Safety Production (item 18) and environmental and hygiene standards for construction sites.

Table II-2: Local Laws, Regulations and Standards

Laws and regulations	Year
Henan Provincial Environmental Protection Regulation	2006
Henan Provincial Drinking Water Source Protection Zoning	2007
Henan Provincial Air Pollution Prevention and Control Regulation	2017
Henan Provincial Water Pollution Prevention and Control Regulation	2010
Henan Provincial Solid Waste Pollution Prevention and Control Regulation	2012
Regulation on Wetland Protection of Henan Province	2015
Henan Provincial Ecological Protection Red Line Demarcation Plan	2019
Notice of Henan Provincial Government on Issuing the Red Line of Ecological Protection in Henan Province	2018
Regulation of the Henan Provincial Government on Strengthening the Management of Environmental Impact Assessment	2018
Henan Provincial Soil and Water Conservation Plan (2016-2030)	2016

[4] The "Three Simultaneities Policy" requires the design, construction, and operation of pollution control and treatment facilities to occur simultaneously with the project design, construction, and operation.

C. PRC Environmental Impact Assessment Framework and Procedures

34. **EIA administrative framework**. The administrative framework for EIA in the PRC consists of national, provincial, and local (city and county) environmental protection authorities. The national authority is the MEE, which promulgates laws, regulations, administrative decrees, technical guidelines, and environmental quality and emission standards on EIA and pollution prevention and control. At the provincial level, there are ecology and environment departments (EEDs), which act as gatekeepers for EIA and pollution prevention and control in the provinces. They are often delegated authority by the MEE to review and approve EIA reports for development planning and construction projects, except for those projects with national interest and those that cross provincial boundaries. The local (city or county level) ecology and environment bureaus (EEB) enforce environmental laws and conduct environmental monitoring within city or county limits. Local EEBs can also be delegated the authority to approve EIA reports by the provincial EEDs. EEDs and EEBs are supported by environmental monitoring stations (EMS), which are subsidiaries of EEDs or EEBs and are qualified entities to carry out environmental monitoring.

35. The former MEP's "Guideline on Jurisdictional Division of Review and Approval of EIAs for Construction Projects" (2009) defines which construction project EIAs require former MEP review and approval, and which EIAs are delegated to the provincial EEDs.

36. The PRC has a qualification and registration system for EIA and only qualified and registered institutes and individuals are allowed to prepare EIAs. Under MEP Decree 2015-36, as of 1 November 2015 qualified institutes for conducting EIAs for construction projects in the PRC can no longer be a subsidiary of an environmental authority responsible for approving EIAs.

37. **EIA legal framework**. EIA is governed by the Environmental Impact Assessment Law (2016) (Table II-1 item 1), covering EIAs for (i) plans (such as new development areas and new industrial parks) and strategic environmental assessments (SEA), and (ii) construction projects. This was followed by the promulgation of two regulations: the Construction Project Environmental Protection Management Regulation (1998) (item 19) and the Planning Environmental Impact Assessment Regulation (2009) (item 16), both of which require early screening and environmental categorization.

38. **EIA procedures**. EIA procedures have been established in the PRC for over 20 years. In 2008, former MEP issued "Management Guideline on EIA Categories of Construction Projects" (revised 2017). Under MEE decree, Directory for the Management of Construction Project Environmental Impact Assessment Categorization (MEP Decree 2017-44) (item 21) provides detailed EIA requirements for 50 sectors and 192 subsectors and classifies EIAs for construction projects into three categories with different reporting requirements based on the "significance" of potential environmental impact due to the project and the environmental sensitivity [5] of the project site as described in the directory. The directory provides detailed EIA requirements for 50 sectors and 192 subsectors:

(i) Projects with significant adverse environmental impacts, for which a full EIA report is required;

[5] Environmentally-sensitive areas are defined in the Decree, and include (i) nature reserves and protected areas, scenic areas, world cultural and natural heritage sites, drinking water source protection zones; (ii) basic farmland and grassland, forest parks, geological parks, important wetland, natural woodland, critical habitats for endangered plant and animal species, important aquatic spawning/nursery/wintering/migration grounds, regions suffering from water resource shortage, serious soil erosion areas, desertification protection areas, eutrophic water bodies; and (iii) inhabited areas with major residential, health care, scientific research, and administration functions, cultural heritage protection sites, and protection areas with historical, cultural, scientific, and ethnic values.

(ii) Projects with adverse environmental impacts which are of a lesser degree and/or significance than those of Category A, for which a EIT report is required; and

(iii) Projects unlikely to have adverse environmental impacts, for which an EIRF is required.

39. **Environmental protection acceptance**. In 2017, the MEP issued Interim Measures for the Environmental Protection Acceptance of Completed Construction Projects (MEP Decree 2017-4, item 33 of **Table II-1**). Under this measure, environmental protection acceptance can be implemented by the project owner and the procedures and standards for the acceptance were also stipulated by this measure.

40. **EIA follow-up actions**. In 2015, the MEP issued Management Measures for Environmental Impact Post Assessment of Construction Projects (MEP Decree 2015-37, item 23 of **Table II-1**). Under this decree, a trial program was implemented on 1 January 2016 requiring follow-up actions 3 to 5 years after commencement of project operation for large infrastructure and industrial projects or projects located in environmentally-sensitive areas. These actions include environmental monitoring and impact assessment to verify the effectiveness of environmental protection measures and to undertake any corrective actions that might be needed. The decree also specifies that the institute that did the original impact assessment for the project cannot undertake environmental impact post-assessment for the same project.

41. **EIA guidelines**. The MEE has issued a series of technical guidelines for preparing EIAs (**Table II-3**). These include impact assessment guidelines on general EIA implementation and principles, atmospheric environment and ambient air quality, noise, surface water, groundwater, ecology and regional biodiversity, biodiversity monitoring, quality management on environmental monitoring, and public participation.

Table II-3: Applicable Environmental Guidelines

Guideline	Code/Year
Technical Guideline on EIA: for Construction Projects	HJ/T 2.1-2016
Technical Guideline on EIA: Atmospheric Environment	HJ 2.2-2018
Technical Guideline on EIA: Surface Water Environment	HJ/T 2.3-2018
Technical Guideline on EIA: Acoustic Environment	HJ 2.4-2009
Technical Guideline on EIA: Ecological Assessment	HJ 19-2011
Technical Guideline on EIA: Ground Water Environment	HJ610-2016
Standard for the assessment of regional biodiversity	HJ623-2011
Technical Guideline for Assessment on Environmental Risk of Alien Species	HJ624-2011
Technical Guideline on Environmental Risk Assessment for Construction Project	HJ/T169-2018
Technical Specifications for the Collection, Storage and Transportation of Hazardous Waste	HJ2025-2012
National List of Hazardous Wastes (MEE, Order No. 39)	2016
General Provisions-Technical Guidelines for Self-Monitoring of Pollution Emission Entities	HJ819-2017
Guidelines for Environmental Impact Assessment of Hazardous Wastes in Construction Projects" (MEE, No. 43)	2017
Technical Specifications for Application and Issuance of Pollution Discharge Permits	HJ942-2018

42. The national environmental quality standard system that supports/evaluates the implementation of the environmental protection laws and regulations in the PRC is classified into two categories by function, i.e. pollutant emission/discharge standards and ambient environmental standards. The standards applicable to this project are in **Table II-4**.

Table II-4: Applicable Environmental Quality Standards

Standard	Code
Surface Water Quality Standard	GB3838-2002
Urban Ambient Acoustic Quality Standard	GB3096-2008
Ambient Air Quality Standard	GB3095-2012
Groundwater Quality Standard	GB/T14848-2017
Integrated Emission Standard of Air Pollutants	GB16297-1996
Emission Standard for Industrial Enterprises Noise at Boundary	GB12348-2008
Soil environmental quality-Risk control standard for soil contamination of agricultural land	GB15618-2018
Soil environmental quality-Risk control standard for soil contamination of development land	GB36600—2018
Integrated Wastewater Discharge Standard	GB8978-1996
Noise Limit for Construction Sites	GB12523-2011
Standard on Pollution Control of Storage and Disposal Location for General Industrial Waste	GB18592-2001
Technical Specification on Landfill Treatment of Municipal Waste	GB50869-2013
Standard on Pollution Control of Municipal Waste Landfill	GB16889-2008
Identification of Major Hazard Sources of Hazardous Chemicals	GB18218-2018
Standard for Grading of Soil Erosion Intensity	SL190-2007
Urban Area Environmental Vibration	GB10070–88

D. PRC Labor Law

43. The Labor Law of China (amended 2018) is the main legislation regulating labor relations of individuals employed with labor contract by enterprises, institutions, organizations of all type of ownership forms, including contracted by individuals. These legislations are considering interests of employees and employers provide efficient function of labor market, just and secure labor conditions, protection of labor rights and employees health, promote to growth of labor productivity, increase of work quality, raising on this matter welfare and social livelihood level of the population.

44. China and the International Labor Organization (ILO) are actively cooperating on the elimination of the forced labor. Currently, 26 conventions of the ILO have been ratified, including 4 fundamental ones, which are focused on the preventing of forced labor. This project will be implemented based on the national legislation of prohibition of the forced labor in China.

E. AIIB Polices

45. The proposed project is being financed by AIIB and therefore its Environmental and Social Framework (ESF) will be applicable to the project. Key elements of the ESF are presented below.

46. Environmental and Social Policy (ESP). The objective of this overarching policy is to facilitate achievement of these development outcomes, through a system that integrates sound environmental and social management into Projects. The overarching policy comprises Environmental and Social Policy (ESP), and Environmental and Social Standards (ESSs) and Environmental and Social Exclusion List. The ESP sets out mandatory requirements for the Bank and its Clients relating to identification, assessment and management of environmental and social risks and impacts associated with Projects supported by AIIB.

47. Environmental and Social Standards. The environmental and social standards (ESSs) set out more detailed mandatory environmental and social requirements, as described below.

48. **Environmental and Social Standard 1 (ESS 1)**. The ESS 1 aims to ensure the environmental and social soundness and sustainability of Projects and to support the integration of environmental and social considerations into the Project decision-making process and implementation. ESS 1 is applicable if the Project is likely to have adverse environmental risks and impacts or social risks and impacts (or both). The scope of the environmental and social assessment and management measures are proportional to the risks and impacts of the Project. ESS 1 provides for both quality environmental and social assessment and management of risks and impacts through effective mitigation and monitoring measures during the course of Project implementation. The ESS 1 defines the detailed requirements of the environmental and social assessment to be carried out for any project to be financed by the Bank.

49. **Environmental and Social Standard 2 (ESS 2)**. The ESS 2 is applicable if the Project's screening process reveals that the Project would involve Involuntary Resettlement (including Involuntary Resettlement of the recent past or foreseeable future that is directly linked to the Project). Involuntary Resettlement covers physical displacement (relocation, loss of residential land or loss of shelter) and economic displacement (loss of land or access to land and natural resources; loss of assets or access to assets, income sources or means of livelihood) as a result of: (a) involuntary acquisition of land; or (b) involuntary restrictions on land use or on access to legally designated parks and protected areas. It covers such displacement whether such losses and involuntary restrictions are full or partial, permanent or temporary. The ESS 2 defined detailed requirements of resettlement planning of the projects involving involuntary resettlement.

50. **Environmental and Social Standard 3 (ESS 3)**. The ESS 3 is applicable if Indigenous Peoples are present in, or have a collective attachment to, the proposed area of the Project, and are likely to be affected by the Project. The term Indigenous Peoples is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees: (a) self-identification as members of a distinct indigenous cultural group and recognition of this identity by others; (b) collective attachment to geographically distinct habitats or ancestral territories in the Project area and to the natural resources in these habitats and territories; (c) customary cultural, economic, social or political institutions that are separate from those of the dominant society and culture; and (d) a distinct language, often different from the official language of the country or region. In considering these characteristics, national legislation, customary law and any international conventions to which the country is a party may be considered. A group that has lost collective attachment to geographically distinct habitats or ancestral territories in the Project area because of forced severance remains eligible for coverage, as an Indigenous People, under ESS 3. The ESS 3 defines the detailed requirements of People planning, in case such groups are present in the project area and are likely to be affected by the project.

51. The project not only the local environmental and social laws and regulations, but also the ESP and ESS of AIIB. Under the project ESS 1: Environmental and Social Assessment and Management and ESS 2: Involuntary Resettlement are applicable. The EIA addresses ESS 1 and the

Resettlement Plan (ARP) addresses ESS 2. Standards on Indigenous Peoples (ESS 3) is not be triggered under the project.

52. The Bank requires its clients (ZIH in this case) to manage the environmental and social risks and impacts associated with its project in a manner designed to meet the ESP and the applicable ESSs. The present EIA has been developed in compliance with the ESS 1 and ESS 2. The applicability of ESP and ESSs for the proposed project is presented in **Table II-5**.

Table II-5: Applicability of ESP and ESSs for the proposed project

Environmental and Social Standards		Applicability	Triggering Status
ESS 1	Environmental and Social Assessment and Management	ESS 1 is applicable if the Project is likely to have adverse environmental risks and impacts or social risks and impacts (or both)	Yes, since the proposed project is likely to have negative environmental and social impacts. The present EIA has been prepared in compliance with the ESS 1.
ESS 2	Involuntary Resettlement	ESS 2 is applicable if the project is likely to cause involuntary resettlement impacts.	Yes. ESS 2 is triggered. A resettlement due diligence and social impact assessment report has been prepared in compliance with the ESS 2.
ESS 3	Indigenous Peoples	ESS 3 is applicable if Indigenous People are present in the project area and they are likely to be affected by the project.	No, since no Indigenous people, as defined in the ESS 3 are present in the project area.

53. A comparison between the PRC national legislation and AIIB ESP and ESS is given in Table 2.2. The project will have to comply with both these requirements; in case of any conflict however, more stringent of the two sets of legislation/policy/standard would be applicable to the project.

Table II-6: Comparation of national legislation with AIIB Policy on Environmental aspects

Aspect	AIIB	National regulations	Comparation
Environmental policy and regulations	There are AIIB Environmental and Social Framework, Environmental and Social Policy and Environmental and Social Standards	Environmental impact assessment and permitting procedure in PRC are described in section C of chapter 2.	In most of the cases national requirements and standards for environment quality are matching with AIIB Policy and Standards (For example, EIA is compulsory for both requirements). However, there are some parameters when national and AIIB requirements and standards are different (For example, National legislation does not require a preparation of separate EMP or any other environmental documents/plans/checklists for proje c t) . In such cases more stringent provisions will apply for the project. Besides, life cycle management of the project is required by AIIB. AIIB's requirements will apply for the project.
Screening and categorization	AIIB carries out project screening and categorization at the earliest stage of project preparation when sufficient information is available for this purpose. In the case where AIIB and national categorization requirements differ, the more stringent requirement will apply. This refers mostly in the case of deciding about Category C subprojects - the national EIA legislation doesn't refer to small scale activities, including construction and rehabilitation of various buildings. In these cases, the client will apply the AIIB criteria. Categorization into Category A, B, C, FI. The project categorization depends on location, component presenting the highest environmental	Under MEE decree, Directory for the Management of Construction Project Environmental Impact Assessment Categorization (MEP Decree 2017-44) (item 21) provides detailed EIA requirements for 50 sectors and 192 subsectors and classifies EIAs for construction projects into three categories with different reporting requirements based on the "significance" of potential environmental impact due to the project and the environmental sensitivity of the project site as described in the directory. The directory provides detailed EIA requirements for 50 sectors and 192 subsectors:	The proposed project has been assessed as Category B in accordance with AIIB ESF. Under PRC EIA regulations, the project is divided into 4 subprojects including 3 construction projects and 1 non-structural projects. The subproject 1 and subproject 2 were classified as Class-2 at 2016, and preparation of two Environmental Impact Tabular Reports (EIT) were required. The subproject 3 was classified as Class-3 at 2020, and preparation of one Environmental Impact Registration Form (EIRF) was required. For the non-structural subproject 4, no DEIA was required). The EIA is prepared in accordance with AIIB ESF and PRC's requirements.

	or social risk, including direct, indirect, cumulative and induced impacts, as relevant, in the Project area.		
Environmental impact assessment report	In accordance with Environmental and Social Policy, EIA processes report for category A projects includes the following chapters: (a) description of the Project; (b) policy, legal and administrative framework, including the international and national legal framework applicable to the Project; (c) project description; (d) analysis of alternatives; (e) baseline environmental and social data; (f) evaluation of environmental and social risks and impacts; (g) public consultation and information disclosure; and (h) development of mitigation, monitoring and management measures and actions in the form of an ESMP or EIA. For the category B project, the scope of EIA and report should be narrow than for category A projects.	For category B projects, EIT include the following chapters: (a) description of the project; (b)applicable standards of the project; (c) project description; (d) baseline environmental and social data; (e) evaluation of environmental impacts and mitigation measures. For category C projects, EIRF is simple and includes project description, environmental impact and mitigation measures.	AIIB's requirements are more stringent and will apply for the project.
ESMP	ESMP should be prepared and should specify, along with the proposed mitigation activities, a monitoring plan and reporting requirements, institutional arrangements for ESMP implementation.	National legislation on EIA requires to identify possible impacts, but it does not require a preparation of separate EMP or any other environmental documents/plans/checklists.	An EMP has been prepared and included in the EIA.
Public consultations	The Sub-borrower is responsible for conducting at least one meaningful consultation for all Categories A, B and C projects to discuss the issues to be addressed in the EMP or to discuss the draft EMP itself.	Conducting of public consultation is not mandatory for category B and C projects.	Public consultations have been carried out with the stakeholders, affected people as part of the EIA, in line with the AIIB requirements. The feedback received from the Public Consultations has been used to finalize the EIA
Requirements on cultural heritages	AIIB ESS 1 requires development of Cultural Recourses field-based survey to conserve cultural resources	Destruction of PCRs is not allowed per PRC regulations, though domestic EIAs pay limited attention to this issue.	Chance Find procedures have been included in the EIA.

	and avoid destroying or damaging them under the Project		
Grievance redress	The Bank requires the Client to establish, in accordance with the ESP and applicable ESSs, a suitable grievance mechanism to receive and facilitate resolution of the concerns or complaints of people who believe they have been adversely affected by the Project's environmental or social impacts, and to inform Project- affected people of its availability.	In the PRC, grievances are addressed through the environmental complaints hotline operated by environment protection authorities (e.g. 12369 hotline, 12369 Wechat platform and www.12369.gov.cn). However, a formal grievance redress mechanism (GRM) is not required.	A GRM have been included in the EIA
Information disclosure	Make environmental and social information on the Project available, in an accessible manner, and in a form and language(s) understandable to affected people and other stakeholders, during preparation and implementation of the Project so as to provide an opportunity to broadly identify and address environmental and social risks and impacts.	PRC requires domestic EIA to be disclosed on the relevant local Ecology and Environment Bureau's websites for limited time periods. No further disclosure is required.	The EIA will be required to disclose on the ZIH's website and AIIB's website as well.

F. International Agreements

54. The PRC is signatory to major international environmental agreements relevant to the project (**Table II-7**), dealing with the biodiversity, wetland protection and climate change.

Table II-7: Applicable international agreements

Agreement	Year	Purpose (relevance to project)
Ramsar Convention on Wetlands of International Importance	1975	Prevent encroachment on and loss of wetlands for now and the future (project includes the reservoir)
Convention on Biological Diversity	1993	Conservation and sustainable use of biological diversity (project includes afforestation)
United Nations Framework Convention on Climate Change	1994	Achieve stabilization of atmospheric greenhouse gas (GHG) concentrations (project involves GHG emission reduction)
Kyoto Protocol to UN Framework Convention on Climate Change	2005	Further reduction of greenhouse gas emissions (as above)
Montreal Protocol on Substances That Deplete the Ozone Layer	1989	Protection of the ozone layer (same as above)
UN Convention to Combat Desertification	1996	Combat desertification and mitigate effects of drought (project involves soil erosion control)
Basel Convention	1992	Control over transboundary movement of hazardous wastes
Agreement under the United Nations Framework Convention on Climate Change	2016	Achieve stabilization of atmospheric greenhouse gas (GHG) concentrations (project involves GHG emission reduction)

G. Assessment Standards for Proposed Project

55. AIIB's ESP request environmental, Health, and Safety Guidelines (EHSGs), which are technical reference documents with general and industry-specific statements of Good International Industry Practice to be utilized in the EIA. Comparation of PRC standards and the World Bank Group Environmental, Health, and Safety Guidelines are presented below.

a. Surface Water Quality

56. The determining standard is PRC's Environmental Quality Standards for Surface Water (GB 3838-2002). This defines five categories reflecting different environmental functions: I – highest water quality, for headwaters and national nature reserves; II – drinking water sources in Class I protection areas, habitats for rare aquatic organisms, breeding grounds for fish and crustaceans, and feeding grounds for fish fry; III – drinking water sources in Class II protection areas, wintering grounds for fish and crustaceans, migration routes, water bodies for aquaculture and capture fishery, and swimming; IV – general industrial use and non-contact recreational activities; V – lowest quality, suitable only for agricultural and scenic water uses (**Table II-8**). The World Bank Group has no guidelines on ambient water quality and recognizes the use of local criteria for compliance purposes. Hence, the standard relevant to this project is Grade III of PRC Environmental Quality Standards for Surface Water (GB3838-2002) (**Table II-8**). The standard includes 24 parameters for regular surface water, and other 68 parameters specific for centralized drinking water sources. Eight of the 24 parameters were selected for sampling (**Table II-8**) as these are the most relevant to providing meaningful baselines and risk assessment based on the project scope.

Table II-8: Environmental Quality Standards for Surface Water (Unit: mg/L, except for pH)

Parameter	pH	COD_{Cr}	COD_{Mn}	BOD_5	TN	NH_3-N	TP	Oil
Class II Standard	6-9	15	4	3	0.5	0.5	0.1	0.05
Grade III Standard	6-9	20	6	4	1	1.0	0.2	0.05
Grade IV Standard	6-9	30	10	6	1.5	1.5	0.3	0.5
Grade V Standard	6-9	40	15	10	2	2	0.4	1

COD_{Cr}/COD_{Mn} = chemical oxygen demand, BOD_5 = 5 days biochemical oxygen demand, NH_3-N = ammonia nitrogen, TN=total nitrogen, TP=total phosphorus.

b. Ambient Air Quality

57. In the PRC, air quality is categorized in three classes (Ambient Air Quality Standard GB 3095-1996 and amendment in 2000): Class I (highest quality) to Class III (the worst). In 2012, a new national standard was issued (GB 3095-2012; effective 1 January 2016), which replaced GB 3095-1996. The new standard combined Classes II and III, and has two classes, I and II. It also introduced PM2.5 standards and relaxed the 1-hour NO2 standard to match the World Health Organization (WHO)[6] Air Quality Guideline (AQG) standard. The World Bank Group adopted the WHO standards for its Environment, Health and Safety (EHS) standards for air quality. Recognizing that progressive actions are needed to achieve these standards, the WHO established interim targets to achieve the AQG. **Table II-9** compares the PRC and World Bank Group's EHS standards for ambient air quality. The EHS has stricter standards for SO_2 and PM_{10}, and PRC has stricter or equivalent standards for other parameters. Hence, the more stringent standards are applicable to the project. Ambient air quality in the environmentally sensitive locations, and the areas outside the construction sites, meets Grade II of PRC Ambient Air Quality Standard GB3095-2012 and EHS guidelines.

58. Overall the PRC standards show a high degree of equivalency to the WHO guidelines or IT-1 values and the more stringent standards are adopted for use in this EIA report.

Table II-9: Ambient Air Quality Standard - Grade II (Unit: mg/m^3).

Pollutant	Time	GB 3096-1996 (Grade II)	GB3095-2012 (Grade II)	World Bank Group EHS Guidelines
SO_2	Annual average	0.06	0.06	n/a
	Daily average	0.15	0.15	0.125-0.05 (0.005 - 0.02 guideline)
	Hourly average	0.50	0.50	n/a
$PM_{2.5}$	Annual average	-	0.035	0.035
	Daily average	-	0.075	0.075
PM_{10}	Annual average	0.10	0.07	0.07-0.03 (0.02 guideline)
	Daily average	0.15	0.15	0.075-0.15 (0.05 guideline)
NO_2	Annual average	0.08	0.04	0.04 guideline
	Daily average	0.12	0.08	n/a
	Hourly average	0.24	0.2	0.20 guideline
CO	Daily average	4.0	4.0	n/a
	Hourly average	10.0	10.0	n/a

Note: SO_2=sulfuric dioxide; NO_2=nitrogen dioxide; PM_{10}/$PM_{2.5}$=particulate matter; CO=carbon monoxide.

c. Ambient Acoustic Quality

59. The PRC's GB 3096-2008 identifies five categories based on tolerance to noise pollution:

[6] World Health Organization. 2005. Air quality guidelines global update 2005. Bonn, Germany.

Category 0 – areas with convalescent facilities (least tolerant to noise; stringent day and night noise standards); 1 – residential areas, hospitals and clinics, educational institutions and research centers; 2 – mixed residential and commercial areas; 3 – areas with industrial production, storage and logistics functions; 4 – areas adjacent to traffic noise sources such as major roads and highways, and is subdivided into 4a (road and marine traffic noise) and 4b (rail noise). Comparison with World Bank Group EHS guidelines show that the EHS guidelines have lower noise limits for residential, commercial and industrial mixed areas but higher noise limits for industrial areas and night-time noise near trunk roads (**Table II-10**). Therefore, the EHS standards, which are more stringent than PRC, are applied for communities in the urban areas. While for industrial areas, the PRC standards are applicable since it has more stringent standards than EHS guidelines.

Table II-10: Environmental Quality Standards for Noise (LAeq: dB)

Noise Category	Applicable Area	GB 3096-2008		World Bank Group EHS Guidelines	
		Day 06:00-22:00	Night 22:00-06:00	Day 07:00-22:00	Night 22:00-07:00
0	Areas needing extreme quiet e.g. convalescence areas	50	40	55	45
1	Areas mainly for residence, hospitals, cultural and educational institutions, administration offices	55	45		
2	Residential, commercial and industrial mixed areas	60	50		
3	Industrial areas, warehouses and logistic parks	65	55	70	70
4a	Area on both sides of urban trunk road	70	55		

Note: Functional Area 4 is divided into 4a for trunk roads and 4b for railway lines.

d. Ground Water Quality

60. In the PRC this is divided into five categories according to the Quality Standard for Ground Water (GB/T 14848-2017) (**Table II-11**). Category III or above is suitable as drinking water. Category IV can only be used for drinking water after treatment. WHO guidelines for drinking-water quality[7] are also given in **Table II-11**, and concentrations above these guidelines are the cause of health concern. The national Grade III standards are more stringent than WHO standards, and hence the groundwater quality in the project area must comply with the Grade III standards.

Table II-11: Quality Standard for Groundwater

Parameter	Grade I	Grade II	Grade III	Grade IV	Grade V	WHO Guidelines for drinking water quality (2017)
pH	6.5-8.5			5.5-6.5 8.5-9	<5.5, >9	6.5-8.5
Ammonia nitrogen (mg/L)	≤0.02	≤0.10	≤0.50	≤1.5	>1.5	NA
Chloride (mg/L)	≤50	≤150	≤250	≤350	>350	≤250
Sulfate (mg/L)	≤50	≤150	≤250	≤350	>350	NA
Nitrate (in N) (mg/L)	≤2	≤5	≤20	≤30	>30	≤50
Nitrite (in N) (mg/L)	≤0.01	≤0.10	≤1.00	≤4.80	>4.80	≤3
Fluoride (mg/L)	≤1	≤1	≤1	≤2	>2	≤1.5
Zinc (mg/L)	≤0.05	≤0.5	≤1	≤5	>5	≤3
Copper (mg/L)	≤0.01	≤0.05	≤1	≤1.5	>1.5	≤2
Manganese (mg/L)	≤0.05	≤0.05	≤0.1	≤1.5	>1.5	NA
Iron (mg/L)	≤0.1	≤0.2	≤0.3	≤2.0	>2.0	NA
Total dissolved solids (mg/L)	≤300	≤500	≤1000	≤2000	>2000	≤1000
Total hardness (mg/L)	≤150	≤300	≤450	≤650	>650	-
Permanganate index	≤1	≤2	≤3	≤10	>10	

[7] Guidelines for drinking-water quality, 4th edition, incorporating the 1st addendum, 2017. https://www.who.int/water_sanitation_health/publications/drinking-water-quality-guidelines-4-including-1st-addendum/en/

(mg/L)						
Mercury (mg/L)	≤0.0001	≤0.0001	≤0.001	≤0.002	>0.002	≤0.006
Hexavalent chromium (mg/L)	≤0.005	≤0.01	≤0.05	≤0.1	>0.1	≤0.05
Arsenic (mg/L)	≤0.001	≤0.001	≤0.01	≤0.05	>0.05	≤0.01
Lead (mg/L)	≤0.005	≤0.005	≤0.01	≤0.1	>0.1	≤0.01
Cadmium (mg/L)	≤0.0001	≤0.001	≤0.005	≤0.01	>0.01	≤0.003
Cyanide (mg/L)	≤0.001	≤0.01	≤0.05	≤0.1	>0.1	≤0.07
Volatile phenol (mg/L)	≤0.001	≤0.001	≤0.002	≤0.01	>0.01	≤0.002
Benzene (μg/L)	≤0.5	≤1	≤10	≤120	>120	≤10
Toluene (μg/L)	≤0.5	≤140	≤700	≤1400	>1400	≤700
Xylene (μg/L)	≤0.5	≤100	≤500	≤1000	>1000	≤500
Nickel (mg/L)	≤0.002	≤0.002	≤0.02	≤0.1	>0.1	≤0.02

e. Wastewater Discharge Standard

61. Discharge of wastewater from construction sites is regulated under PRC's Integrated Wastewater Discharge Standard (GB 8978-1996). Class I standards apply to discharges into Category III water bodies under GB 3838-2002. Class II standards apply to discharges into Categories IV and V water bodies. Class III standards apply to discharges into municipal sewers going to municipal wastewater treatment stations (WWTS) with secondary treatment (**Table II-12**). World Bank Group has no such EHS standards for wastewater discharges from construction sites, and hence PRC standards are applicable to the project. Under this project, wastewater is discharge into the municipal sewage pipeline, Grade III Standard of GB8978-1996 will be applied (**Table II-12**). The PRC standard includes 56 parameters, most of which are for industrial sewage. The current project does not involve industrial development or existing industrial sites, and only six selected parameters were sampled, focusing on construction and domestic wastewater management.

Table II-12: Integrated Wastewater Discharge Standards (Unit: mg/L, except for pH)

Parameter	pH	COD_{Cr}	BOD_5	SS	NH_3-N	Oil
Grade III Standard	6 ~ 9	500	300	400	/	20

SS = suspended solids

f. Air Pollutant Emission

62. The PRC's Air Pollutant Integrated Emission Standard (GB 16297-1996) regulates the emission of particulate matter into the air, with a maximum allowable concentration of 120 mg/m^3 at source and for fugitive emission the highest concentration outside site boundary of 1.0 mg/m^3. During project construction, levels of onsite fugitive emissions should comply with Grade II of Integrated Emission Standards of Air Pollutants (GB16297-1996) (**Table II-13**). The World Bank Group has no such standards, but WHO Air Quality Guidelines are provided for comparison in **Table II-13**. The PRC standards for NOx are more stringent than WHO guidelines, and WHO guidelines for SO_2 and PM_{10} are more stringent than PRC standards. Hence, both the standards, whichever is more stringent, are applicable for the project.

Table II-13: Integrated Emission Standards of Air Pollutants Unit: mg/m^3

Classification	Parameter	Fugitive Emission Limit at Monitoring Point
Grade II Standard	PM	1.0

g. Noise Levels During Project Construction

63. The construction activities must comply with PRC Noise Limits for Construction Site standard (GB12523-2011). For the operation phase, Emission Standard for Industrial Enterprises Noise at Boundary (GB12348-2008) was adopted to assess the noise at the boundary of construction sites. The PRC standards for construction noise are more stringent than World Bank EHS Guidelines (**Table II-14** and **Table II-15**), and hence PRC standards are applicable to the project.

Table II-14: Emission Standard of Environment Noise for Boundary of Construction Site

Daytime (dB(A))	Nighttime (dB(A))	Code of Standard
70	55	GB12523-2011
70	70	EHS (industrial, commercial area)

Table II-15: Emission Standard for Industrial Enterprises Noise at Boundary

Daytime (dB(A))	Nighttime (dB(A))	Classification
55	45	Grade I Standard
60	50	Grade II Standard
70	70	EHS (industrial, commercial area)

h. Vibration

64. Construction activities may cause vibration impact and must comply with PRC Standard for Urban Area Environmental Vibration (GB10070–88) (**Table II-16**). World Bank Group has no standards for vibration.

Table II-16: Vertical (Z) Vibration Standard Value for Various Urban Areas (Unit: dB)

Scope of applicable area	Day	Night
Special residential area	65	65
Residential, cultural and educational area	70	67
Mixed area and commercial center	75	72
Industrial centralized area	75	72
Both sides of traffic trunk line	75	72
Both sides of railway main line	80	80

i. Soil quality

65. In 2018, the Ministry of Ecology and Environment (MEE) released two standards for soil contamination risk management. Soil environmental quality Risk control standard for soil contamination of development land (GB 36600-2018) replaced the previous GB15618-1995 that set thresholds for construction land. The World Bank Guidelines do not have EHS standards for soil quality. **Table II-17** presents GB 15618-2018 (soil).

Table II-17: List of Soil Quality Standard Limits

Parameter	Maximum Allowable Concentration (mg/kg dry weight)	
	GB 36600-2018 (trail)	
	Risk screen values of construction land	Risk intervention values of construction land
Arsenic (As)	60	140
Cadmium (Cd)	65	172
Chromium (Cr VI)	5.7	78
Copper (Cu)	18000	36000
Lead (Pb)	800	2500
Mercury (Hg)	38	82
Nickel (Ni)	900	2000

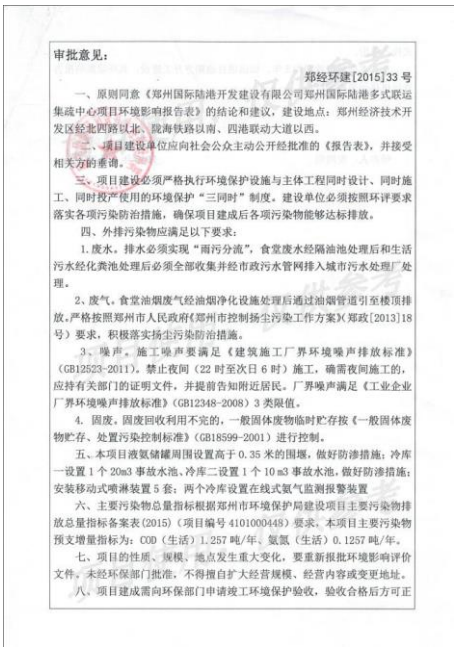
H. Domestic EIA Preparation, Approval and Post Assessment

66. Under PRC EIA regulations, the project is divided into 4 subprojects including 3 construction projects and 1 non-structural projects. The subproject 1 is phase II of ZIH's HMT project which is classified as PRC's Category B project, and preparation of an Environmental Impact Tabular Report (EIT) was required. Subproject 2 is phase II of a parallel vehicle imports facility with a distribution center which is classified as PRC's Category B project. Two EITs were prepared for subproject 1 and 2 at 2016 and obtained EIA approvals. The subproject 3 was classified as category C, and preparation of one Environmental Impact Registration Form (EIRF) was required. For the non-structural subproject 4, no DEIA was required). The approvals of subproject 1 and 2 are presented in **Figure II-1**.

67. For the ZIH's project involving subproject 1, the phase I of the project was completed at December 2019 and started trial operation. Environmental acceptance of the phase I project including environmental monitoring, site inspection was conducted at June 2020 and an environmental acceptance report was prepared and reviewed. Based on the environmental acceptance report, the phase I project was built according to the requirements of DEIA, environmental protection facilities were also designed, built and operated with the main works, the pollutants discharged from the phase I project met the relevant standards. Therefore, the environmental acceptance of the phase I project was approved.

68. For subproject 2, the construction of phase I was not completed by the end of October 2020. Therefore, no environmental acceptance is required.

69. For subproject 3 and 4, the two subprojects are newly built, therefore, no environmental acceptance is required.



审批意见：

郑经环建[2015]33号

一、原则同意《郑州国际陆港开发建设有限公司郑州国际陆港多式联运集疏中心项目环境影响报告表》的结论和建议，建设地点：郑州经济技术开发区经北四路以北、陇海铁路以南、四港联动大道以西。

二、项目建设单位应向社会公众主动公开经批准的《报告表》，并接受相关方的垂询。

三、项目建设必须严格执行环境保护设施与主体工程同时设计、同时施工、同时投产使用的环境保护“三同时”制度。建设单位必须按照环评要求落实各项污染防治措施，确保项目建成后各项污染物能够达标排放。

四、外排污染物应满足以下要求：

1.废水。排水必须实现“雨污分流”，食堂废水经隔油池处理后和生活污水经化粪池处理后必须全部收集并经市政污水管网排入城市污水处理厂处理。

2、废气。食堂油烟废气经油烟净化设施处理后通过油烟管道引至楼顶排放，严格按照郑州市人民政府《郑州市控制扬尘污染工作方案》(郑政[2013]18号）要求，积极落实扬尘污染防治措施。

3、噪声。施工噪声要满足《建筑施工厂界环境噪声排放标准》(GB12523-2011)。禁止夜间（22时至次日6时）施工，确需夜间施工的，应持有关部门的证明文件，并提前告知附近居民。厂界噪声满足《工业企业厂界环境噪声排放标准》(GB12348-2008）3类限值。

4. 固废，固废回收利用不完的，一般固体废物临时贮存按《一般固体废物贮存、处置污染控制标准》(GB18599-2001）进行控制。

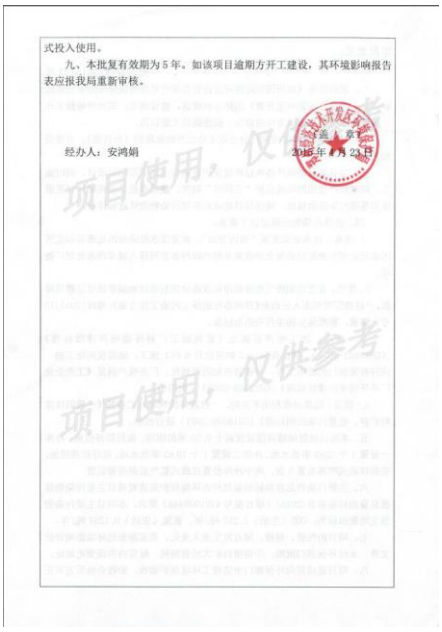
五、本项目液氨储罐周围设置高于0.35米的围堰，做好防渗措施；冷库一设置1个20m3事故水池、冷库二设置1个10 m3事故水池，做好防渗措施；安装移动式喷淋装置5套；两个冷库设置在线式氨气监测报警装置

六、主要污染物总量指标根据郑州市环境保护局建设项目主要污染物排放总量指标备案表(2015)（项目编号4101000448）要求，本项目主要污染物预支增量指标为：COD（生活）1.257吨/年、氨氮（生活）0.1257吨/年。

七、项目的性质、规模、地点发生重大变化，要重新报批环境影响评价文件。未经环保部门批准，不得擅自扩大经营规模、经营内容或变更地址。

八、项目建成需向环保部门申请竣工环境保护验收，验收合格后方可正

EIA approval for subproject 1 (page 1)



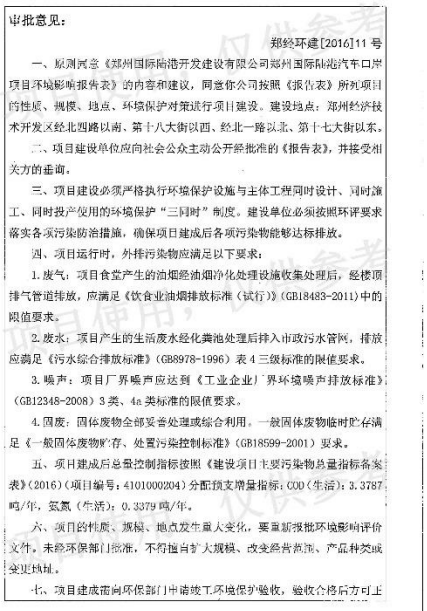
式投入使用。

九、本批复有效期为5年。如该项目逾期方开工建设，其环境影响报告表应报我局重新审核。

经办人：安鸿娟

2015年7月23日

EIA approval for subproject 1 (page 2)



审批意见：

郑经环建[2016]11号

一、原则同意《郑州国际陆港开发建设有限公司郑州国际陆港汽车口岸项目环境影响报告表》的内容和建议，同意你公司按照《报告表》所列项目的性质、规模、地点、环境保护对策进行项目建设。建设地点：郑州经济技术开发区经北四路以南、第十八大街以西、经北一路以北、第十七大街以东。

二、项目建设单位应向社会公众主动公开经批准的《报告表》，并接受相关方的垂询。

三、项目建设必须严格执行环境保护设施与主体工程同时设计、同时施工、同时投产使用的环境保护“三同时”制度。建设单位必须按照环评要求落实各项污染防治措施，确保项目建成后各项污染物能够达标排放。

四、项目运行时，外排污染物应满足以下要求：

1.废气：项目食堂产生的油烟经油烟净化处理设施收集处理后，经楼顶排气管道排放，应满足《饮食业油烟排放标准（试行）》(GB18483-2011)中的限值要求。

2.废水：项目产生的生活废水经化粪池处理后排入市政污水管网，排放应满足《污水综合排放标准》(GB8978-1996）表4三级标准的限值要求。

3.噪声：项目厂界噪声应达到《工业企业厂界环境噪声排放标准》(GB12348-2008）3类、4a类标准的限值要求。

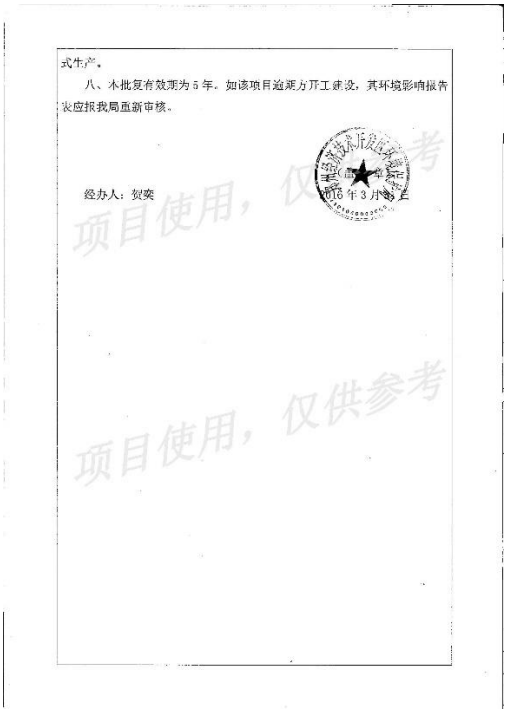
4.固废：固体废物全部妥善处理或综合利用。一般固体废物临时贮存满足《一般固体废物贮存、处置污染控制标准》(GB18599-2001）要求。

五、项目建成后总量控制指标按照《建设项目主要污染物总量指标备案表》(2016)（项目编号：41010000204）分配预支增量指标：COD（生活）：3.3787吨/年，氨氮（生活）：0.3379吨/年。

六、项目的性质、规模、地点发生重大变化，要重新报批环境影响评价文件。未经环保部门批准，不得擅自扩大规模、改变经营范围、产品种类或变更地址。

七、项目建成需向环保部门申请竣工环境保护验收，验收合格后方可正

EIA approval for subproject 2 (page 1)



式生产。

八、本批复有效期为5年。如该项目逾期方开工建设，其环境影响报告表应报我局重新审核。

经办人：贺奕

2016年3月8日

EIA approval for subproject 2 (page 2)

Figure II-1: Approval of DEIAs

III. DESCRIPTION OF THE PROJECT

A. Project Background

70. The project will be implemented at Zhengzhou, Henan, China. Henan Province is a landlocked province of China (**Figure III-1**), in the central part of China. Due to its location in PRC, Henan has a convenient and accessible transportation network and is an important transportation hub in PRC. The main lines of railways, highways, electric power and telecommunications across Zhengzhou and make it an extremely important hub in China.

Figure III-1: Henan Province in China

Source: https://en.wikipedia.org/wiki/Henan

Figure III-2: Zhengzhou City in Henan Province

Source: https://en.wikipedia.org/wiki/Henan

71. The China-Europe block train is the container international rail multi-modal transport line running between China and Europe in terms of fixed trains and routes. There are three routes from the west Middle East to the central Europe: the western route departs from China's central and western regions via Alashankou (Horgos), the central route departs from north China via Erenhot, and the eastern route departs from China's southeastern coastal areas via Manzhouli (Suifenhe).

72. China-Europe Block Train has increased rapidly from 2011, with a rapid expansion of its radiation range, a substantial increase in cargo categories, a significant reduction in operating time, a steady increase in the proportion of returned trains. In 2018, total operated block train reached 6,363 trains and achieved the planned target in 2020 set in the "China-Europe Railway Express Construction and Development Plan (2016-2020)". Xi'an, Chengdu, Chongqing, and Zhengzhou are the cities with the largest number of block trains operating between China and Europe. In 2019, they operated 2133, 1576, 1500, and 1000 block trains separately, accounting for 75% of the operated total block trains in China.

Table III-1: Operation state of China-Europe block train (2011-2019)

Year	2011	2012	2013	2013	2015	2016	2017	2018	2019
Operated cities	1	2	7	12	25	31	43	60	63
Number of block trains	17	42	80	308	815	1702	3673	6363	8225

Total numbers of twenty-foot equivalent units (TEU)	1404	3674	6960	26070	68902	145794	317930	600000	725000

73. The first China-Europe Block Train (Zhengzhou section) was operated at July 18, 2013. The main routes of China-Europe Block Train (Zhengzhou section) depart from Zhengzhou to Munich/ Hamburg via Alashankou (Horgos) and Erenhot, passing through Kazakhstan (Mongolia), Russia, Belarus, Poland, Germany. After seven years' development, by the end of April 2020, the total number of China-Europe block train (Zhengzhou section) has exceeded 3,000 and the total transported cargo is 1.5471 million tons with a value of 12.748 billion dollars. In 2019, number of China-Europe block train (Zhengzhou section) exceeded 1,000 with a growth rate of 33%. Now China-Europe block train (Zhengzhou section) has developed an international multi-modal transport network, covering 130 cities in European Union (EU), Middle-Asia and Russia including Hamburg, Munich, Liege, Altynkol, Brest, Tashkent, Almaty, Atenkori, Hanoi, Warsaw, Duisburg, Prague, Paris, Budapest, Malmo (Helsingborg), Milan, Minsk, St. Petersburg, Moscow, Astana, Chimkent, Dushanbe, Haiphong. Besides, China-Europe block train (Zhengzhou section) has developed a national multi-modal transport network in China, covering 23 provinces in China with a service range of 1,500 km.

Table III-2: Number of China-Europe block train (2019)

City	Number of block trains	Growth rate (%)	Ratio (%)
China	8,225	29	100
Chengdu	1,576	-0.7	19.2
Chongqing	1,500	4.0	18.2
Zhengzhou	1,000	33	12.2
Xi'an	2,133	72.7	25.9
Hefei	368	102.2	4.5
Changsha	411	189	5.0
Nanchang	370	83.2	4.5

74. China-Europe block train (Zhengzhou section) was the first China-Europe block train which has the cold chain transportation (operated from November 2015). Now China-Europe block train (Zhengzhou section) is the only China-Europe block train block train with the regular cold chain transportation in China.

75. In order to take the advantages of modern comprehensive transportation hubs in Henan Province and Zhengzhou City, the Henan Provincial Government planned to build an inland port in Zhengzhou from 2013. Zhengzhou International Hub Development and Construction Co., Ltd (herein after referred to as ZIH) was jointly established by Management Committee of Zhengzhou Economic and Technological Development Zone (ZETDZ) (51% share) and Henan Materials Group Corporation (49% share) at June 2013 with a registered capital of 400 million Chinese Yuan (CNY). ZIH is mainly responsible for the operation of the service platform for Zhengzhou international hub and China-Europe Block Train (Zhengzhou section).

76. ZIH has developed several multi-modal transport routes including China-Europe Block Train (Zhengzhou section), road-railway-road multi-modal transport route including China-Europe Block Train (Zhengzhou section) and Zhengzhou-Russia (Brest, Minsk, Moscow, St. Petersburg) Block Train, road-sea-road-railway-road multi-modal transport route to transport cargo from Japan/Korea

to Europe and air- road-railway-road multi-modal transport route to transport cargo from east Asia, southeast Asia and south Asia to Europe.

B. Rational

77. Now the cargo transported by cold chain technology accounts around 5% of the total cargo transported by ZIH. Because ZIH doesn't have cold storage facilities, ZIH needs to rent cold storage facilities. The average transport distance is around 20km between ZIH and the rented cold storage facilities, which result in cost increase and efficiency reduction. The demand of the cargo transported by cold chain technology is presented in **Table III-3**.

Table III-3: Estimated cargo transported by cold chain **(2020-2024)**

Year	2019	2020	2021	2022	2023	2024
International demand of refrigerated cargo	16462	17944	19559	21319	23237	25329
International demand of frozen cargo	487	531	579	631	687	749
Domestic demand of refrigerated cargo	2246	3122	4340	6033	8385	11656
Domestic demand of frozen cargo	1946	2341	2817	3388	4076	4904
Total	21141	23938	27294	31370	36386	42637

Source: FSR.

78. Based on **Table III-3**, there will be 42,637 tons demand for refrigerated and frozen cargo in 2024. Thus, the project will build phase II of ZIH's HMT collection and distribution center with a cold storage capacity of 50,000 tons per year (10,000 tons capacity for frozen cargo, 10,000 tons capacity for refrigerated cargo and 30,000 tons adjustable capacity for both).

79. Now most of the vehicle import ports in China are on the coasts and the imported vehicles are mainly transported by sea with a small amount transported by air. For the six provinces in central part of China including Henan Province, Hubei Province, Hebei Province, Shanxi Province and Shaanxi Province, both transportation methods will result in cost and transport time increase. In 2018, pilot parallel imports of vehicles at Zhengzhou railway port were approved by eight ministries including the Ministry of Commerce, the Ministry of Industry and Information Technology, the Ministry of Public Security, the Ministry of Environmental Protection, the Ministry of Transport, the General Administration of Customs, the General Administration of Quality Supervision, Inspection and Quarantine, and the National Certification and Accreditation Administration. Now ZIH doesn't have a site for the vehicle import business. Thus, the project will build phase II of a parallel vehicle imports facility with a distribution center to provide customs clearance and inspection service. Besides, exhibition and trade center will also be built to provide sales and after sales service.

80. The core businesses of the vehicle import ports are: (i) automobile import; (ii) imported automobile logistics services: customs clearance, inspection, transportation and pickup, Warehousing, logistics and distribution services; (iii) exhibition and sales; (iv) automobile parts and accessories import. At present, ZIH has no designated site for vehicle parallel import and has negative impacts on the increasement of the parallel import business of ZIH. It is estimated that by 2025, the annually imported vehicles of ZIH will be 5,000. After the completion of this project, the parallel vehicle imports facility will have the capacity of turnover, customs clearance and logistics distribution of 30,000 imported vehicles.

81. Now ZIH's imported and exported cargo are stored separately, which result in cost increase

and efficiency reduction. Besides, the parallel vehicle imports facility of the project will also need customs clearance service. Thus, the project will build a type B bonded logistics center with bonded warehousing, international logistics and distribution, simple processing and value-added services, allocation and distribution, import and export trade and entrepot trade, tax refund service, logistics information processing.

82. Since July 2015, the State Council issued the "Guidance on Promotion of the Internet Plus Action". There are 11 key actions in the document including promotion of internet plus based logistics. Informatization, automation and smart of logistics have become development trends. ZIH already developed an information platform. Considering the implementation of the project, the platform will need to be updated based on the project.

C. Project Description

83. The project will build an international logistics hub for HMT at Zhengzhou International Hub in Zhengzhou City, Henan Province of the PRC. The project will have 4 subprojects, which will be: (i) multimodal cold storage facilities (with a cold storage capacity of 50,000 tons per year); (ii) parallel vehicle imports facility; (iii) Type-B bonded logistics center; and (iv) multimodal logistics information platform upgrade. A summary of the activities to be implemented under these projects are given in **Table III-4**.

Table III-4: Summary of Projects

No.	Subproject name	Major Contents
1	Multimodal cold storage facilities	The subproject will build a road logistics warehouse of 32,540 m^2 with a transfer warehouse of 25,639.18 m^2. The total building area is 58,179.18 m^2. Two multimodal cold storage facilities, goods shelf and electric fork lift truck are involved.
2	Parallel vehicle imports facility	The subproject will include: (i) Vehicle part warehouse, 8,335.34 m^2; (ii) Vehicle exhibition and transfer warehouse, 57,907.30 m^2; (iii) Vehicle modification warehouse, 24,252.36 m^2; (iv) Logistics and business area including an accounting center, 34,228.8 m^2; (v) Exhibition center for goods (food) from China-Europe block train, 28,365.74 m^2; (vi) Power switching station, 268.85 m^2; (vii) Public toilets, 83.60 m^2; and (viii) Basement, 23,330.19 m^2: incudes basement for vehicle exhibition and transfer warehouse (12,483.16 m^2) and basement for logistics and business area (176,503.3 m^2). The total building area is 176,503.3 m^2. Goods shelf, hydraulic vehicle, electric fork lift truck and reach stacker are involved.
3	Type-B bonded logistics center	The subproject will include: (i) Bonded warehouse, 14,881.18 m^2; (ii) Distribution warehouse, 14,449.38 m^2; (iii) Transit warehouse, 13,990.14 m^2; (iv) Container freight warehouse, 19,325.14 m^2; (v) Cross-border e-commerce warehouse, 30,805.82 m^2; (vi) Gate, 460 m^2; (vii) Unload area, 4,706.25 m^2; (viii) Service center, 55,376.32 m^2, includes a underground area of 24,437.32 m^2. The total building area is 154,404.16 m^2. Goods shelf, sorting equipment, hydraulic vehicle, electric fork lift truck, reach stacker, video system and storage management system are involved.
4	Information service center	The subproject will build an integrated information platform for subproject 1, 2 and 3 and China-Europe Block Train. The subproject will establish information platform for HMT, parallel vehicle imports facility information system, bonded logistics center information system, China-Europe block train digitalization system and management platform. The management platform will achieve one-stop command and dispatch service, information display in one window function. Big data, cloud computing, internet plus and other information technologies will be utilized in the management platform to achieve one-stop command and dispatch service, information display in one window function. The main content includes LPD tiled display system, central control system, visualization system, smart inspection, smart monitoring, sound reinforcement system etc.

84. The Project will be implemented through 4 subprojects, and descriptions are given below.

1. Subproject 1: Multimodal cold storage facilities

85. Subproject 1 will be Phase II of HMT collection and distribution center (**Figure III-3**) and will be located within the phase I of HMT collection and distribution center. East boundary of subproject 1 is closed to East fourth ring of Zhengzhou, west is the HMT warehouse, north is container area and south is reserved land.

Figure III-3: Location of subproject 1

86. The layout of subproject 1 is presented in **Figure III-4**.

Figure III-4: Layout of subproject 1

87. The road logistics warehouse has a building area of 32,540 m^2. The warehouse is reinforced

concrete frame structure. The warehouse has six floors and the height of each storey is 5.4m. The total height of the warehouse is 35.5 m. The fresh-keeping warehouse, office, equipment room, waste temporary storage area, security room and driver lounge are located at first floor. The second floor to sixth floor are all refrigerated warehouses.

88. The road logistics warehouse has a building area of 25,639.18 m^2. The warehouse is reinforced concrete frame structure. The warehouse has six floors and the height of each storey is 5.4m. The total height of the warehouse is 35.5 m. The fresh-keeping warehouse, office, equipment room, waste temporary storage area, security room and driver lounge are located at first floor. The second floor to sixth floor are all refrigerated warehouses.

89. For the two warehouses, coolants will be utilized for refrigeration and freezing. The coolant CO_2 and R507 has been selected as it has no impact on the ozone layer and its global warming potential is 3,985[8]. 25.7 tons CO_2 and 1.954 tons R507 will be filled every five years.

90. During operation, subproject 1 will source municipal water as domestic water for staff and drivers and production water (make up water for refrigerated and frozen warehouses). Power will be from the Grid. Estimated annual water and power consumption and wastewater quantity are presented in **Table III-5**.

Table III-5: Estimated annual water and power consumption of subproject 1

Item	**Quantity**
Domestic water for staff	5 m^3/d; 1,500 m^3/a
Domestic wastewater for staff	4 m^3/d; 1,200 m^3/a
Domestic water for driver	10 m^3/d; 3,000 m^3/a
Domestic wastewater for driver	8 m^3/d; 2,400 m^3/a
Make up water for refrigerated and frozen warehouses	5 m^3/d; 1,500 m^3/a
Wastewater from refrigerated and frozen warehouses	0.1 m^3/d; 30 m^3/a
Total water consumption	20 m^3/d; 6,000 m^3/a
Total generated wastewater	12.1 m^3/d; 3,630 m^3/a
Power consumption	11.41 million kWh

Note: Annual working days is 300 days, water consumption for one staff is 100 l/d and water consumption for one driver is 20 l/d and. The total staff is 50 and the drivers are 500 per day.

91. During operation, domestic wastewater, domestic waste, expired cargo and noise will be generated. The estimated pollutants concentration in domestic wastewater will be: COD:350 mg/L; BOD: 150 mg/L; ammonia nitrogen: 25 mg/L; SS: 100 mg/L. The estimated domestic waste will be 40 kg/d and 12 ton/a and will be collected and treated by the local sanitary department. Expired cargo will be classified and collected and treated by the local sanitary department.

2. Subproject 2: parallel vehicle imports facility

92. Subproject 2 will be phase II of parallel vehicle imports facility. Subproject 2 will be located at southwest of subproject 1 (**Figure III-5**). East boundary of subproject 2 is a construction site for

[8] The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO_2). The larger the GWP, the more that a given gas warms the Earth compared to CO_2 over that time period. The time period usually used for GWPs is 100 years.

phase I, west is a construction site for communities and office buildings, north is a petrol service station and south is No.1 Jinghai Road.

Figure III-5: Location of subproject 2

93. The layout of subproject 2 is presented in **Figure III-6**. The buildings of subproject 2 are described below.

94. The vehicle part warehouse has a building area of 8,335.34 m^2. The warehouse is reinforced concrete frame structure. The warehouse has seven floors. The height of first floor is 3.9 m, the second floor is 3.6m and the third to seventh floor is 3.2m. The total height of the warehouse is 23.98 m. The fresh-keeping warehouse, office, equipment room, waste temporary storage area, security room and driver lounge are located at first floor. All the floors are all warehouses.

95. The vehicle exhibition and transfer warehouse has a building area of 57,907.30 m^2. The warehouse is reinforced concrete frame structure. The warehouse has six floors. The height of first floor and second floor is 5.7 m and the third to sixth floor is 5.1 m. The total height of the warehouse is 33.7 m.

96. The vehicle modification warehouse has a building area of 24,252.36 m^2. The warehouse is reinforced concrete frame structure. The warehouse has seven floors. The height of first floor and second floor is 5.7 m and the third to sixth floor is 5.1 m. The total height of the warehouse is 32.6 m.

97. The logistics and business area has a building area of 34,228.8 m^2. The building is reinforced concrete frame structure. The building is a dormitory for ZIH's staff and has 24 floors. The first floor is the activity room for staff and the rest floors are dormitory. The height of first floor is 3.3 m and the rest floors are 2.97 m. The total height of the warehouse is 71.91 m. The building has one basement and is parking lot.

98. The exhibition center for goods (food) from China-Europe block train has a building area of 28,365.74 m^2. The building is reinforced concrete frame structure. The building is an office building for ZIH's staff and has 18 floors. The height of first floor to third floor is 4.8 m and the rest floors are 3.9 m. The total height of the warehouse is 73.5 m.

Figure III-6: Layout of subproject 2

99. Main equipment of subproject 2 is presented in **Table III-6**.

Table III-6: Main equipment of subproject 2

Item	Quantity
Goods shelf	1 set
Soring equipment	2 sets
Hydraulic vehicle	20
Fork lift truck	50
Reach stacker	1

100. During operation, subproject 2 will source municipal water as domestic water for staff and tenants in the logistics and business area. Power will be from the Grid. Estimated annual water and power consumption and wastewater quantity are presented in **Table III-7**

Table III-7: Estimated annual water and power consumption of subproject 2

Item	Quantity
Domestic water for staff from ZIH	20 m^3/d; 6,000 m^3/a
Domestic wastewater for staff	16 m^3/d; 4,800 m^3/a
Domestic water for staff from tenants	260.88 m^3/d; 78,264 m^3/a
Domestic wastewater for staff from tenants	208.7 m^3/d; 62,611.2 m^3/a
Total water consumption	280.88 m^3/d; 84,264 m^3/a
Total generated wastewater	224.7 m^3/d; 66,411.2 m^3/a
Power consumption	26.05million kWh

Note: Annual working days is 300 days, water consumption for one staff from ZIH is 100 l/d and water consumption for staff from the enterprises is 40 l/d. The total staff is 200 and the staff from tenants is 6,522.

101. During operation, domestic wastewater, domestic waste, waste package materials and noise will be generated. The estimated pollutants concentration in domestic wastewater will be: COD:350 mg/L; BOD: 150 mg/L; ammonia nitrogen: 25 mg/L; SS: 100 mg/L. The estimated domestic waste will be 752.2 kg/d and 225.66 ton/a and will be will be collected and treated by the local sanitary department. Waste package materials will be 2 t/a and will be sold out. Besides, waste parts will be generated during vehicle maintenance and will be recycled by manufactures.

3. Subproject 3: Type-B bonded logistics center

102. Subproject 3 will be located at south of HMT collection and distribution center (**Figure III-7**). East boundary of subproject 3 is closed to East fourth ring of Zhengzhou, west is parallel vehicle imports facility, north is HMT collection and distribution center and south is an abandoned food processing plant.

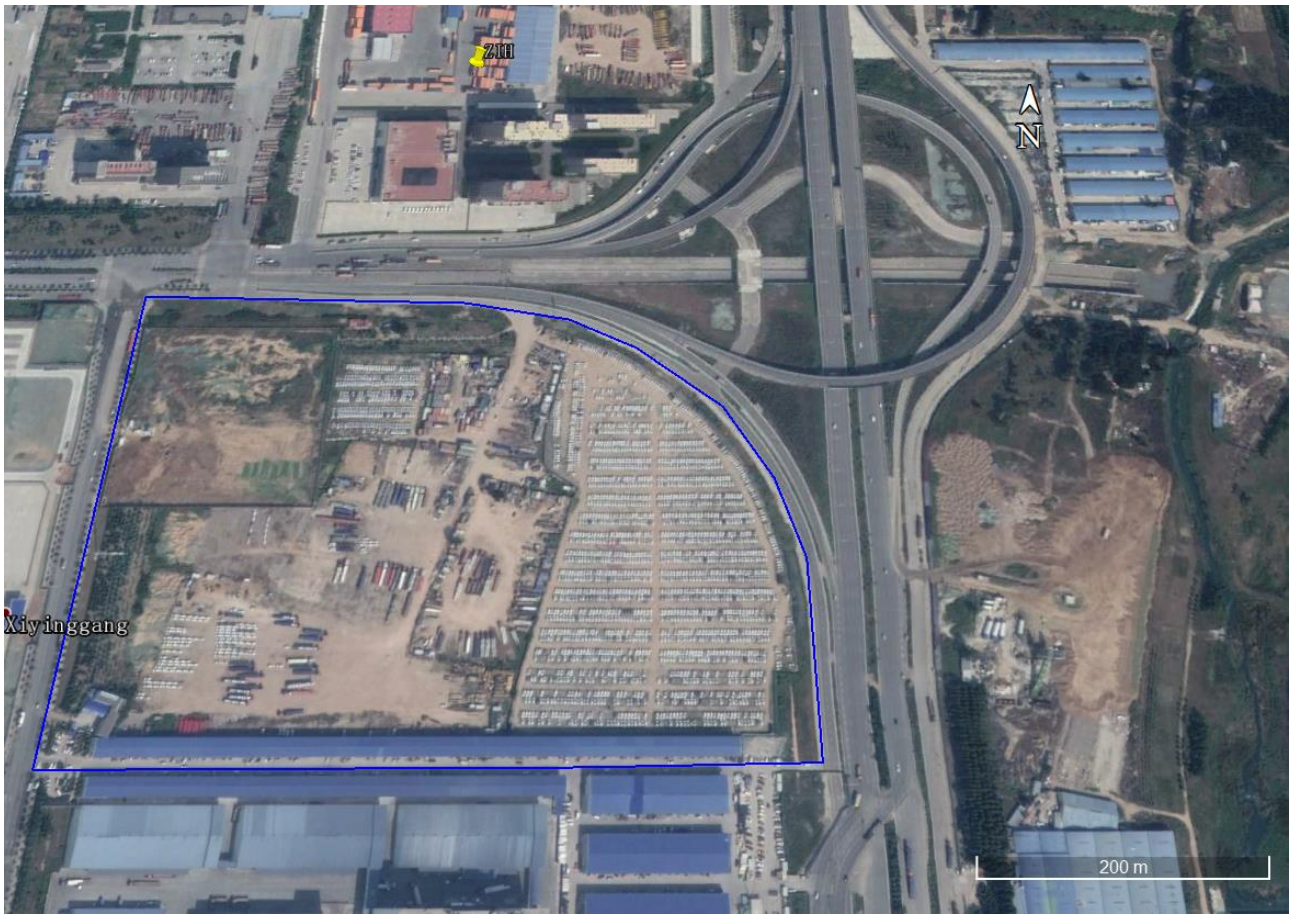


Figure III-7: Location of subproject 3

103. The layout of subproject is presented in **Figure III-8**. The buildings of subproject 3 are described below.

104. The bonded warehouse has a building area of 14,881.18 m^2. The warehouse is reinforced concrete frame structure. The warehouse has two floors. The height of first floor is 7.0 m, the second floor is 8.2 m. The total height of the warehouse is 17.1 m.

105. The distribution warehouse has a building area of 14,449.38 m^2. The warehouse is reinforced concrete frame structure. The warehouse has two floors. The height of first floor is 7.0 m, the second floor is 8.2 m. The total height of the warehouse is 17.1 m.

106. The assemble warehouse has a building area of 13,990.14 m^2. The warehouse is reinforced concrete frame structure. The warehouse has two floors. The height of first floor is 7.0 m, the second floor is 8.2 m. The total height of the warehouse is 17.1 m.

107. The cross-border e-commerce warehouse has a building area of 30,805.82 m^2. The warehouse is reinforced concrete frame structure. The warehouse has two floors. The height of first floor is 7.0 m, the second floor is 8.2 m. The total height of the warehouse is 17.1 m.

108. The unload area has a building area of 4,706.25 m^2. The building is light weight steel portal frame.

109. The service area has a building area of 55,376.32 m^2. The area includes service center and business center. Business center has seven floors and one basement. Service center has 15 floors and one basement. Both basements are used as parking lot.

Figure III-8: Layout of subproject 3

110. Main equipment of subproject 3 is presented in **Table III-6**.

Table III-8: Main equipment of subproject 3

Item	**Quantity**
Goods shelf	1 set
Soring equipment	2 sets
Hydraulic vehicle	20
Fork lift truck	50
Reach stacker	2
Video system	1
Storage management system	1

111. During operation, subproject 3 will source municipal water as domestic water for staff. Power will be from the Grid. Estimated annual water and power consumption and wastewater quantity are presented in **Table III-7**

Table III-9: Estimated annual water and power consumption of subproject 3

Item	Quantity
Domestic water for staff	20 m^3/d; 6,000 m^3/a
Domestic wastewater for staff	16 m^3/d; 4,800 m^3/a
Total water consumption	20 m^3/d; 6,000 m^3/a
Total generated wastewater	16 m^3/d; 4,800 m^3/a
Power consumption	16.57 million kWh

Note: Annual working days is 300 days, water consumption for one staff is 100 l/d and. The total staff is 200.

112. During operation, domestic wastewater, domestic waste, waste package materials and noise will be generated. The estimated pollutants concentration in domestic wastewater will be: COD:350 mg/L; BOD: 150 mg/L; ammonia nitrogen: 25 mg/L; SS: 100 mg/L. The estimated domestic waste will be 100 kg/d and 30 ton/a and will be will be collected and treated by the local sanitary department. Waste package materials will be 2 t/a and will be sold out.

4. Subproject 4: Information service center

113. The subproject will build an integrated information platform for subproject 1, 2 and 3. The subproject will establish information platform for HMT, parallel vehicle imports facility information system, bonded logistics center information system, China-Europe block train digitalization system and management platform. Big data, cloud computing, internet plus and other information technologies will be utilized in the management platform to achieve one-stop command and dispatch service, information display in one window function. The main content includes: (i) management software platform: including DLP tiled display system, integrated block train seat management system, sound reinforcement system, auxiliary equipment and decoration in the exhibition hall; (ii) block train digital system: including digital center, block train digital management, integration of block train digital system, upgrade of existing system and purchase of supporting hardware equipment; (iii) multimodal bill of lading information platform: including development of portal website, user client, service provider client, bill of lading management terminal, big data center and purchase of supporting hardware equipment; (iv) documentation platform: including database, system setting module, customer service, recording equipment, tax number verification, review, customs clearance, data management, single window message push equipment and purchase of supporting hardware equipment; (v) positioning system transformation: the existing GPS systems for cold storage block train and vehicles will be upgraded to Beidou positioning system; (vi) auxiliary customs supervision system: including auxiliary customs clearance management system for special supervision areas, auxiliary management system for bonded supervision areas, paperless management system for customs clearance, and information management platform for vehicle inspection areas.

114. Main equipment of subproject 4 is presented in **Table III-10**.

Table III-10: Main equipment of subproject 4

Item	Quantity
DLP tiled display system	1, including 18 tiled displayers
Integrated block train seat management system	1
Sound reinforcement system	1
Development of block train digital system and supporting software and hardware	1
Development of multimodal bill of lading information platform and supporting software and hardware	1
Development of documentation platform and supporting software and hardware	1
Positioning system transformation	Including 150 GPS equipment for cold

Item	Quantity
	storage block train and 400 GPS equipment for vehicles

115. During operation, subproject 3 will source municipal water as domestic water for staff. Power will be from the Grid. Estimated annual water and power consumption and wastewater quantity are presented in **Table III-11**.

Table III-11: Estimated annual water and power consumption of subproject 4

Item	Quantity
Domestic water for staff	20 m^3/d; 6,000 m^3/a
Domestic wastewater for staff	16 m^3/d; 4,800 m^3/a
Total water consumption	20 m^3/d; 6,000 m^3/a
Total generated wastewater	16 m^3/d; 4,800 m^3/a
Power consumption	16.57 million kWh

Note: Annual working days is 300 days, water consumption for one staff is 100 l/d and. The total staff is 200.

116. During operation, domestic wastewater and domestic waste will be generated. The estimated pollutants concentration in domestic wastewater will be: COD:350 mg/L; BOD: 150 mg/L; ammonia nitrogen: 25 mg/L; SS: 100 mg/L. The estimated domestic waste will be 100 kg/d and 30 ton/a and will be will be collected and treated by the local sanitary department.

D. ZETDZ

117. The project will be located at three plots of Zhengzhou Economic and Technological Development Zone (ZETDZ). ZETDZ is located at the southeast of Zhengzhou. It was established on April 1993 and became the first national economic and technological development in Henan Province. Now ZETDZ boards Lanzhou-Lianyungang Railway in the north, Airport Expressway in the west, Fushan Road in the south and Wansan Road in the east. ZETDZ is surrounded by many highways and railways Now it has a floor area of 158.7 km^2 and 63 administrative villages including 45 administrative villages and 18 communities. After more than 20 years' development, the three leading industries of ZETDZ are vehicle industry (annual output value of 2019 was 47.84 billon CNY), modern Logistics Industry (annual business income of 2019 was more than 100 billon CNY) and equipment manufacturing industry. The population of ZETDZ is around 400,000 including permanent population and employees.

118. In 2019, its GDP totaled 105.9 billion CNY, a year-on-year increase of 6.0 percent, and the added value of industries above designated scale reached 48.44 billion CNY, up 5.6 percent. Its general public budget revenue was 7.28 billion yuan, a growth of 6.3 percent.

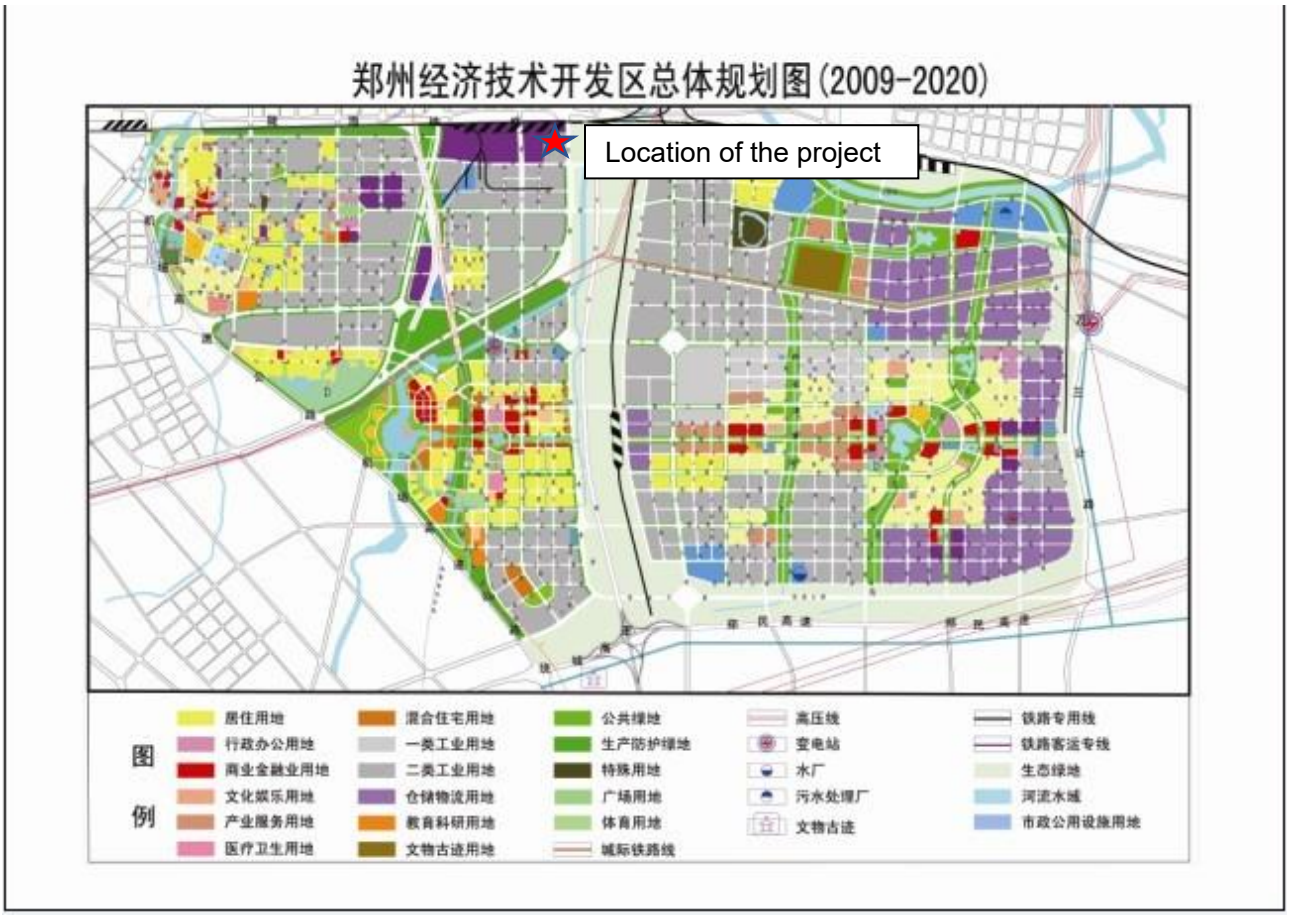


Figure III-9: Master plan of ZETDZ and location of the project

Figure III-10:Location of the project and surroundings

119. The ZETDZ management committee has setup the following internal divisions related to environmental management, which are Planning Bureau, approval center and EEB. The Planning Bureau is responsible for developing and implementing the overall plans, control plans and construction plans of the ZETDZ. The approval center is responsible for project approval and registration. The EEB is responsible for environmental monitoring, EIA approval and environmental acceptance, construction supervision, and enforcement of environmental laws and regulations.

120. Overall, the ZETDZ management committee will have sufficient capacities to manage the ZETDZ and environmental issues in ZETDZ.

121. According to the PRC Law on EIA, an EIRF for subproject3 will be prepared and submitted to the EEB for approval. Any construction or modification works of the project is not permitted to commence unless an approval of the EIA from the EEB is obtained.

IV. DESCRIPTION OF THE ENVIRONMENT (BASELINE)

A. Location and Setting

122. The project will build an international logistics hub for HMT at Zhengzhou International Hub in Zhengzhou City, Henan Province of the PRC.

123. Zhengzhou is the capital and largest city of Henan Province in the central part of the People's Republic of China. It is one of the National Central Cities in China, the centre of Central Plains area, and serves as the political, economic, technological, and educational center of Henan province. The Zhengzhou metropolitan area (including Zhengzhou and Kaifeng) is the core area of the Central Plains Economic Zone.

124. The city lies on the southern bank of the Yellow River. Zhengzhou is located in the central part of China and is a major hub of China's national transportation network, with railways connecting Zhengzhou to Europe and an international airport. Zhengzhou is a National Civilized City, State-list Famous Historical and Culture City, and the birthplace of the Yellow Emperor. As of 2020, there are two World Cultural Heritage Sites in Zhengzhou. The Zhengzhou Commodity Exchange is China's first futures exchange, Zhengzhou Airport Economy Zone is China's first Airport Economy Zone.

125. Zhengzhou has a population of 10.352 million inhabitants, and had a GDP of 1158.97 billion CNY in 2019. The city is one of the main built-up areas of Henan region. Greater Zhengzhou was named as one of the 13 emerging mega-cities in China in a July 2012 report by the Economist Intelligence Unit, and officially named as the eighth National Central City in 2017 by the central government in Beijing.

B. Topography and Geology

126. Located just north of the province's center and south of the Yellow River, Zhengzhou borders Luoyang to the west, Jiaozuo to the northwest, Xinxiang to the northeast, Kaifeng to the east, Xuchang to the southeast, and Pingdingshan to the southwest. With the land within its administrative borders generally sloping down from west to east, Zhengzhou is situated at the transitional zone between the North China Plain to the east and the Song Mountains and Xionger Mountains to the west, which are part of the greater Qinling range. The city center is situated to the south of the middle reach of the Yellow River, where its valley broadens into the great plain. Zhengzhou is at the crossing point of the north–south route skirting the Taihang Mountains and the mountains of western Henan. The prefecture spans 34° 16' ~ 34° 58 N latitude and 112° 42' ~ 114° 14' E longitude, covering a total area of 7,446.2 km^2, including the metropolitan area, which covers 1,013.3 km^2, and the city center, which occupies 147.7 km^2.

127. The section of the Yellow River flowing through the prefecture extends 150.4 km. Mountains loom over the western counties of Gongyi and Dengfeng while the easternmost county of Zhongmu is a vast, fertile floodplain, with the counties in between being hilly transitions.

128. The soil in Zhengzhou is mainly divided into three categories: i) yellow-brown loam soil, distributed in the west and southwest of hilly area, accounting for 49% of the city’s arable land; ii) sandy black soil, mainly districted in the northeast and southeast of plain low-lying areas, accounting for 49% of the total arable area; iii) alluvial soil only accounts for 2% of arable land. The pH value normally ranges from 6.9 to 7.9, which is suitable for a variety of crops to grow.

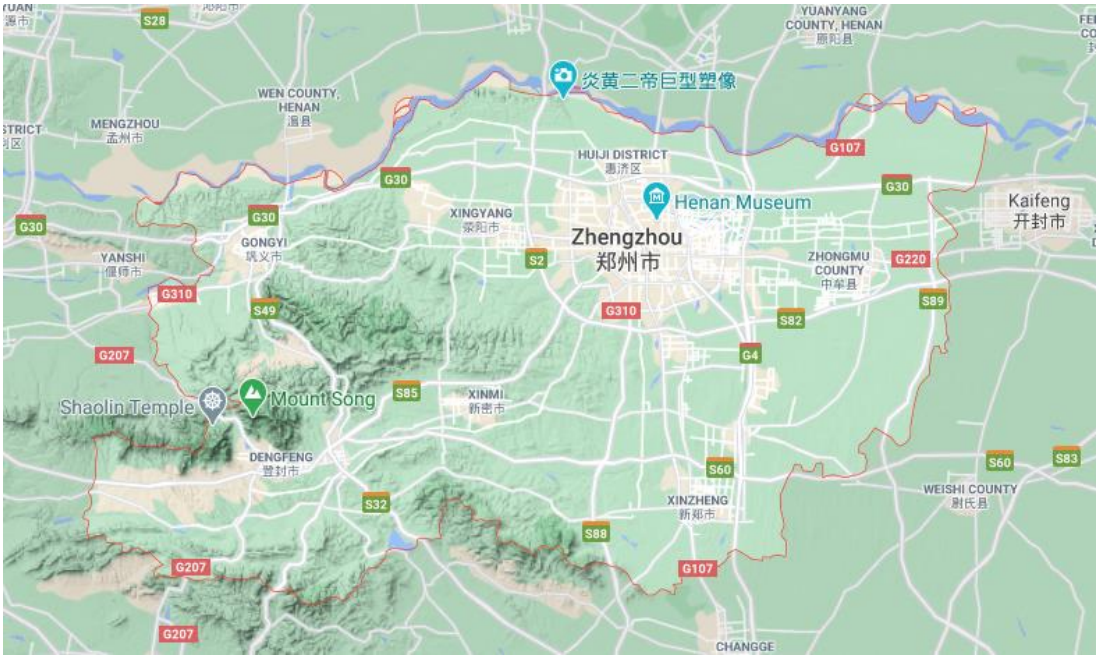


Figure IV-1: Zhengzhou Terrain

Source: Google map

129. The PRC classifies seismic intensity into 12 grades under the China Seismic Intensity Table (GB/T 17742-2008) based on the severity of “shaking” of the earth's surface and the extent of potential impacts. According to the China Seismic Ground Motion Parameters Zoning Map (GB18306-2015), the project area is relatively stable with a basic seismic intensity of Grade 6, a peak ground acceleration of 0.05 g, a 10% probability of exceedance in 50 years, and a return period of 475 years. The Grade 6 seismicity intensity will be applied for the design and construction project facilities as per the requirements of the Code for Seismic Design of Buildings (GB 5011-2010).

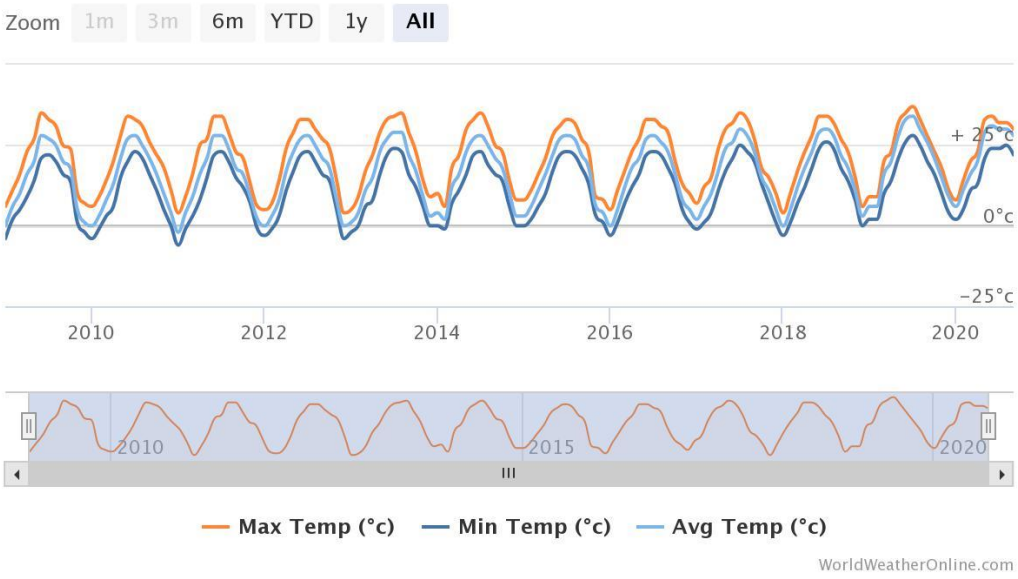
C. Climate

130. Zhengzhou experiences a monsoon-influenced, four-season humid subtropical climate (Köppen climate classification Cwa), with cool, dry winters and hot, humid summers. Spring and autumn are dry and somewhat abbreviated transition periods. The city has an annual mean temperature of 14.73 °C, with the monthly 24-hour average temperature ranging from 0.5 °C in January to 27.1 °C in July. The frost-free period lasts on average 220 days. Extremes since 1951 have ranged from −17.9 °C on 2 January 1955, 27 December 1971 and 1 February 1990 to 43.0 °C on 19 July 1966.

131. Rainfall is primarily produced by the monsoonal low during summer; in winter, when the vast Siberian High dominates due to radiative cooling from further north, the area receives little precipitation. During the summer season, the city is also often affected by tropical depressions, which bring additional amounts of rain. The annual precipitation is about 630 mm. With monthly percent possible sunshine ranging from 45 percent in February and March to 54 percent in May, the city receives 2,182 hours of sunshine per year, which is just under half the possible total. Temperature, rainfall and windspeed data are presented in **Figure IV-2**.

Zhengzhou, China

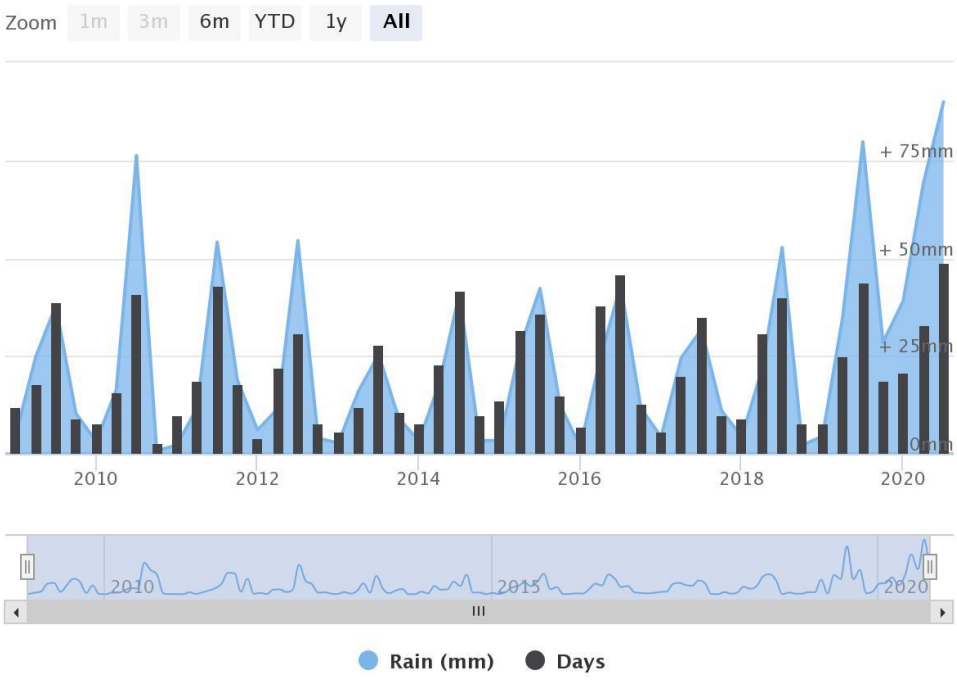
Max, Min and Average Temperature (°c)



WorldWeatherOnline.com

Zhengzhou

Average Rainfall Amount (mm) and Rainy Days



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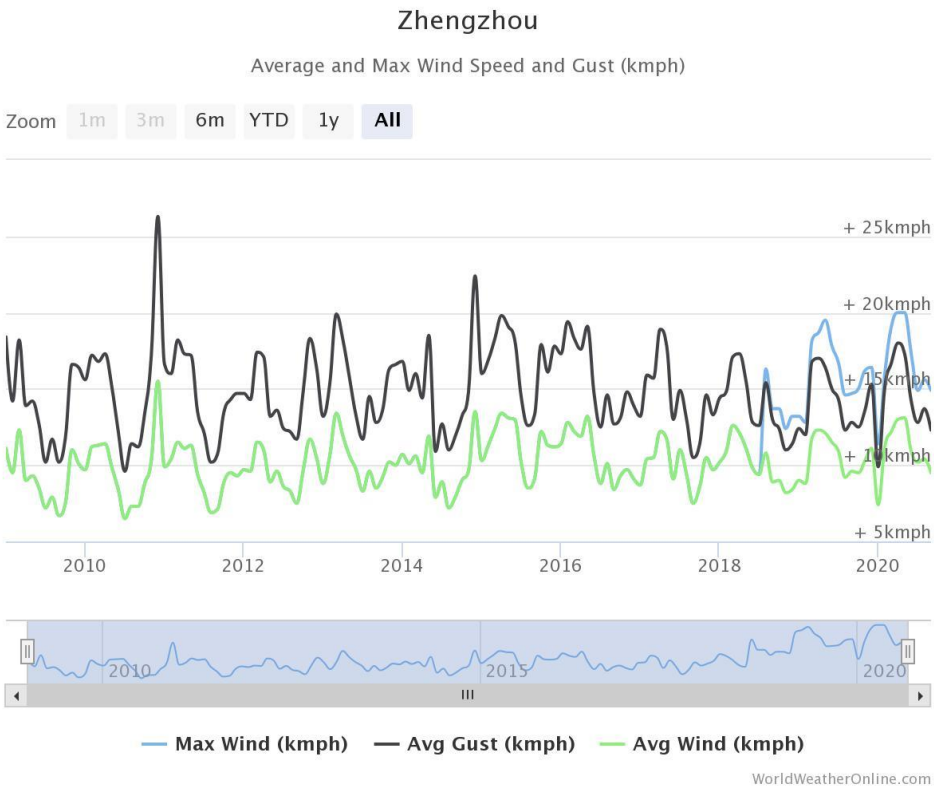


Source: https://www.worldweatheronline.com/zhengzhou-weather-averages/henan/cn.aspx

Figure IV-2: Temperature, rainfall and windspeed data for Zhengzhou, 2009 to 2020

132. **Hydrology**. The main river systems in Zhengzhou are Yellow River system and Huai River system. Annual average surface water resource of Zhengzhou City in 2019 is 494 million m3 and underground freshwater resource is 953 million m3. The total water resource is 112.4 million m3. The per capita water resource is only 179 m3. Zhengzhou is short of water resource, which is major restrict factor for Zhengzhou's sustainable development.

133. There are no groundwater wells within 1 km of the project sites that are used as water source.

134. Floods are the most frequent and serious climate hazard in Zhengzhou, with heavy rains being the main cause during the flood season. Flood disasters are frequent. Since the beginning of this century, there have been 6 major flood disasters in 12 years, once every 2 years on average. The flood seriously restricts the sustainable development of the local economy and society.

D. Ecological Values

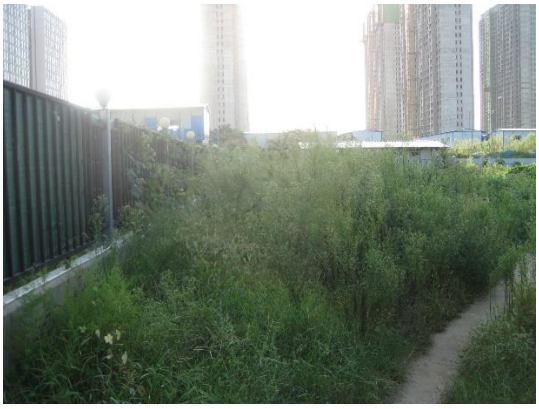
135. The natural vegetation of Zhengzhou is deciduous forest and woodland over the plains, and deciduous and coniferous forest in the west. Zhengzhou is a warm-temperate deciduous broad-leaved forest vegetation type in terms of flora division, and its plant resources are typical of Songshan plants and Yellow River wetland plants. There are 78 families, more than 250 genera, and more than 400 species of trees in Zhengzhou. Common plants include Populus tomentosa, Populus tomentosa, Ailanthus altissima, Paulownia, Platycladus orientalis, wattle, motherwort, crabgrass, goosegrass, setaria, etc. There are three national key protected wild plants in Zhengzhou which are ginkgo, wild soybean, and wild lotus. There are also many provincial key protected wild plants in Zhengzhou. These species are concentrated in the mountainous areas of Zhengzhou City and the

Yellow River wetlands.

136. There are 46 species of national key protected wild animals in Zhengzhou, including 9 Class I national key protected animals and 37 Class II national secondary protected animals, There are 19 provincial key protected animals in Zhengzhou. There are 206 species of terrestrial wild animals (excluding insecta) in Zhengzhou with beneficial or important economic and scientific value. Wild animals are mainly distributed in areas along the Yellow River, mountainous areas and plains in Zhengzhou.

137. **Land types in the project area.** The project sites are located at industrial area of ZETDZ and the original vegetation cover has been previously removed, and existing site vegetation is secondary vegetation, weeds and artificial vegetation.

Subproject 1 site



Subproject 2 site

Subproject 3 site

Figure IV-3:Site conditions of the project area

138. There are no known rare or endangered flora or fauna in the project area based on the site visit.

E. Socio-economic and Cultural Resources

139. Zhengzhou is divided into 6 urban districts, 5 county-level cities and 1 county. These subdivisions are likely to undergo significant changes in the near future due to increasingly rapid urban expansion and urban planning. Gross domestic product (GDP), average income and

expenditure are shown in **Table IV-1**.

Table IV-1: Summary of GDPs in 2019 (CNY)

Administrative Region	GDP (billion CNY)	GDP per Capita
PRC	99,086.5	70,892
Henan	5,425.92	56,388
Zhengzhou	1,158.97	113,139

140. Zhengzhou is the economic center of the province and the surrounding areas such as southeastern Shanxi and southwestern Shandong. Due to its strategic location in one of the most populous areas in the world (more than 100 million people in Henan alone) and in China's railway, road and aviation transport networks, Zhengzhou is increasingly attracting domestic and international investment as well as migrants from other areas, transforming the city into one of the largest economic centers in China. In 2019, total GDP of Zhengzhou was 1,158.97 billion CNY, ranked 15th in China.

141. Zhengzhou was the capital of China during the Shang dynasty. Parts of the Shang-era capital city wall that were built 3,600 years ago still remain in Downtown Zhengzhou (see Zhengzhou Shang City). Zhengzhou maintains abundant cultural heritages that reflect its glorious history as well as the culture of Henan Province.

142. Archaeological reconnaissance reports of the three plots of the project site were prepared by local Cultural Relics Bureau. Based on the assessment No cultural heritage or archaeological sites have been documented in the project area. Chance Find procedures for physical cultural resources (PCR) have been included in the EIA.

F. Environmental quality

143. The environmental monitoring includes the environmental baseline qualities of (i) surface water qualities of the rivers near the projects; (ii) groundwater qualities near the project sites; (iii) the soil qualities near the project sites; (iv) the ambient air baseline in the project area; and (v) baseline noise near the projects. The monitoring locations are presented in **Figure IV-4**.

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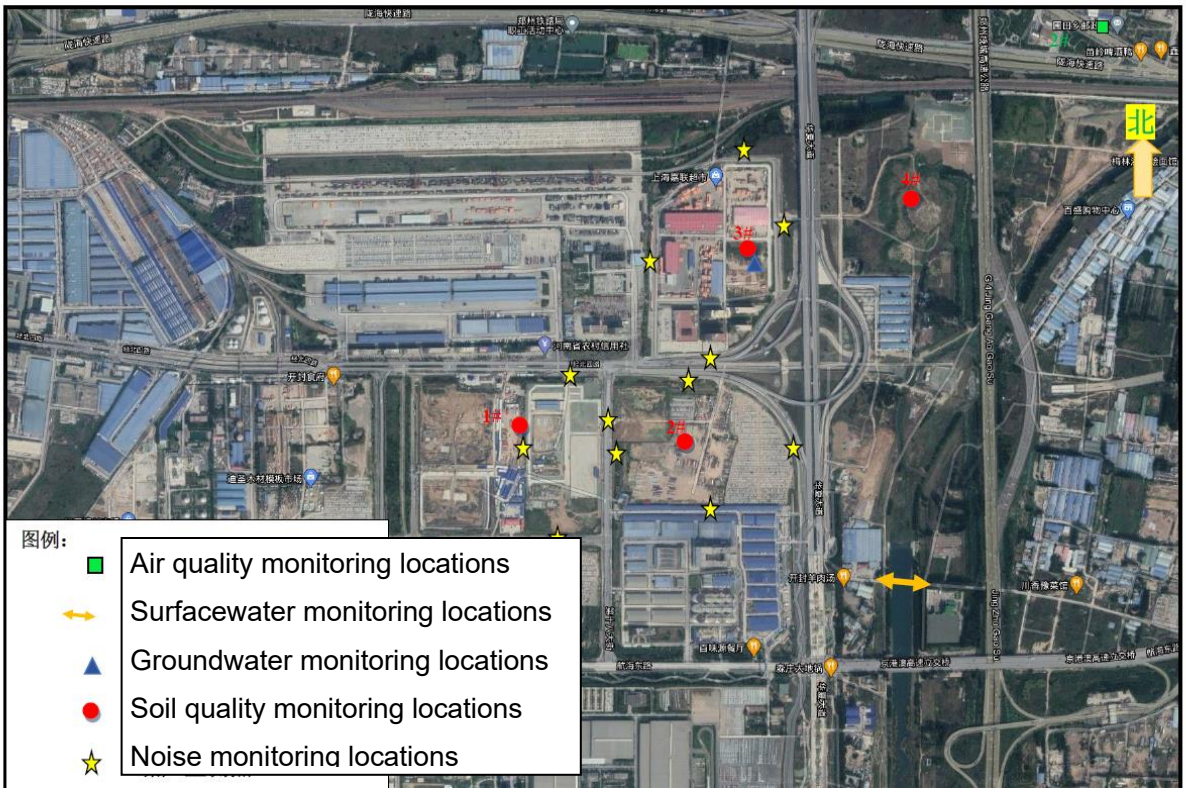


Figure IV-4: Monitoring locations of the project

a) Ambient air quality

144. Air quality index. MEE monitors air pollution in cities throughout the PRC and presents the results in an Air Quality Index (AQI) based on the level of 6 pollutants (**Figure IV-5**).

145. The AQI was introduced in 2012 and replaces the old Air Pollution Index (API). The MEE measures airborne pollution using AQI. The AQI is based on the concentration levels of six major atmospheric pollutants: SO2, NO2, PM10, carbon monoxide (CO), ozone (O3), and PM2.5. The AQI is employed at monitoring stations in 367 cities across the nation.

146. The MEE measures and assigns an individual air quality score (IAQI) to each of the six pollutants over a period of one, eight, or 24 hours. A city's final AQI is the highest of those six scores with that particular pollutant being the city's major pollutant. When the index is lower than 50, the ministry does not name the major pollutant. The AQI ranges from zero to over 300.

AQI	Air Pollution Level	Health Implications
0–50	Excellent	No health implications.
51–100	Good	Few hypersensitive individuals should reduce outdoor exercise.
101–150	Lightly Polluted	Slight irritations may occur, individuals with breathing or heart problems should reduce outdoor exercise.
151–200	Moderately Polluted	Slight irritations may occur, individuals with breathing or heart problems should reduce outdoor exercise.
201–300	Heavily Polluted	Healthy people will be noticeably affected. People with breathing or heart problems will experience reduced endurance in activities. These individuals and elders should remain indoors and restrict activities.
300+	Severely Polluted	Healthy people will experience reduced endurance in activities. There may be strong irritations and symptoms and may trigger other illnesses. Elders and the sick should remain indoors and avoid exercise. Healthy individuals should avoid out door activities.

Figure IV-5: The PRC's Air Quality Index (AQI) System

Source: Li and Dong-Jun Liu (2014) and http://multimedia.scmp.com/china-air-pollution-in-2014/

147. **Air quality in Zhengzhou City**. Summary data on stations and monitoring results from 2016-2019 are presented in **Table IV-2**.

Table IV-2: Annual Mean Ambient Air Quality in Zhengzhou City, 2016-2019. (Unit: μg/m3, excluding CO)

No.	Year	PM_{10}	$PM_{2.5}$	SO_2	NO_2	CO (mg/m^3)	O_3 (8 hours)
1	2016	143	78	29	56	2.8	195
2	2017	118	66	21	54	2.2	199
3	2018	106	63	15	50	1.8	194
4	2019	98	58	9	45	1.6	194
5	Limit (Class II of GB3095-2012)	70	35	60	40	4	160

Source: http://sthjj.zhengzhou.gov.cn/zlbgs/index.jhtml

148. Based on **Table IV-2**, although Zhengzhou's air quality improved a lot from 2016, the air quality of Zhengzhou is not good. Annual average concentration of PM_{10}, $PM_{2.5}$, NO_2 and O_3 can't meet the PRC's standards.

149. During preparation of the EIA, ambient air quality monitoring was conducted at two nearby sensitive receptors- Putian Jiayuan Community and Huihang Jiayuan Community. Monitoring was undertaken continuously over a 7 days period from September 27, 2020 to October 3, 2020 for SO_2 and NO_2 (1-hour average concentrations), O_3 (8 hours) and TSP, PM_{10}, $PM_{2.5}$, SO_2 and NO_2 (24-hour average concentration). The monitoring methods are presented in **Table IV-4**.Meteorological parameters such as wind direction, wind speed, air temperature, barometric pressure and cloud cover were also monitored.

Table IV-3: Ambient Air Quality Monitoring Resultis. (Unit: μg/m^3)

No.	Item	1-hour mean concentration rage	Limit	8-hour concentration rage	Limit	24-hour mean concentration rage	Limit
Huihang Jiayuan Community	SO_2	8-12	500	NA	NA	8-11	150
	NO_2	49-61	200	NA	NA	43-47	80
	O_3	NA	NA	44-98	160	NA	NA
	$PM_{2.5}$	NA	NA	NA	NA	36-51	75
	PM_{10}	NA	NA	NA	NA	65-84	150
	TSP	NA	NA	NA	NA	146-173	NA
Putian Jiayuan Community	SO_2	15-24	500	NA	NA	17-21	150
	NO_2	24-35	200	NA	NA	27-31	80
	O_3	NA	NA	85-131	160	NA	NA
	$PM_{2.5}$	NA	NA	NA	NA	38-56	75
	PM_{10}	NA	NA	NA	NA	62-83	150
	TSP	NA	NA	NA	NA	151-177	NA

Table IV-4: Air quality monitoring methods

Pollutants	Reference standard	Method	Detection limit
SO_2	HJ/T482-2009	Formaldehyde absorbing-pararosaniline spectrophotometric method	1-hour mean: 0.007 mg/m^3 24-hour mean: 0.004 mg/m^3
NO_2	HJ/T479-2009	Spectrophotometric method	1-hour mean:0.005 mg/m^3 24-hour mean:0.003 mg/m^3
TSP	GB/T15432-1995	Gravimetric method	0.001mg/m^3
PM_{10}	HJ 618-2011	Gravimetric method	0.010 mg/m^3
$PM_{2.5}$	HJ 618-2011	Gravimetric method	0.010 mg/m^3
O_3	GB/T9801-1988	Ultraviolet photometric	0.002 mg/m^3

150. The results show that air quality monitoring results met relevant PRC standards.

b) Surface water quality

151. During the domestic EIA preparation, surface water sampling was conducted by the DEIA Institute at the Chao river near the project sites from September 27 2020 to September 29 2020. The monitoring data was presented in **Table IV-5**.

Table IV-5: Surface water quality of Chao River unit: mg/L

Location	Item	September 27	September 28	September 29	Limit (Class III)
Chao River	pH	7.55	7.52	7.57	6-9
	Dissolved Oxygen (DO)	6.4	6.6	6.3	≥5
	Permanganate index	4.0	4.1	4.1	≤6
	COD	12	12	12	≤20
	BOD5	2.3	2.5	2.4	≤4

Location	Item	September 27	September 28	September 29	Limit (Class III)
	NH3-N	0.304	0.315	0.293	≤1.0
	TN	4.43	4.48	4.57	≤1.0
	TP	0.06	0.06	0.06	≤0.2
	Fluoride	0.23	0.20	0.22	≤1.0
	Chromium VI	0.027	0.025	0.026	≤0.05
	Cyanide	<0.002	<0.002	<0.002	≤0.2
	Volatile phenol	<0.0003	<0.0003	<0.0003	≤0.005
	Anionic surfactant	<0.05	<0.05	<0.05	≤0.2
	Sulfide	<0.005	<0.005	<0.005	≤0.2
	Fecal coliform	230	330	230	≤10000
	Copper	<0.05	<0.05	<0.05	≤1.0
	Lead	0.011	0.009	0.01	≤0.05
	Zinc	<0.05	<0.05	<0.05	≤1.0
	Cadmium	0.001	0.001	0.0011	≤0.005
	Mercury	0.00005	0.00004	0.00004	≤0.0001
	Arsenic	<0.0003	0.0003	0.0003	≤0.05
	Selenium	<0.0004	<0.0004	<0.0004	≤0.01
	Petroleum	<0.01	<0.01	<0.01	≤0.05

152. The results show that surface water quality monitoring results of Chao River met relevant PRC standards.

c) Groundwater quality

153. Groundwater sampling and analysis was carried out by the DEIA Institute. The sample was taken from the well near the project sit from September 27 2020 to September 29 2020 (**Table IV-6**). Quality of groundwater complies with the Grade III of Groundwater Quality Standard of GB/T14848-2017.

Table IV-6: Ground water quality near project site unit: mg/L

Item	September 27	September 28	September 29	Limit (Class III)
pH	7.14	7.12	7.11	6.5-8.5
Ammonia nitrogen	0.258	0.244	0.233	≤0.50
Nitrate	1.05	1.08	1.06	≤20
Nitrite	<0.016	<0.016	<0.016	≤1.00
Chloride	60.8	62.5	60.6	≤250
Sulfate	108	112	106	≤250
Volatile phenol	<0.0003	<0.0003	<0.0003	≤0.002
Cyanide	<0.002	<0.002	<0.002	≤0.05
Arsenic	<0.0003	<0.0003	<0.3	≤0.01
Mercury	0.00004	0.00005	0.00006	≤0.001
Hexavalent chromium	0.013	0.015	0.014	≤0.05
Total hardness	339	316	330	≤450
Lead	0.009	0.009	0.0009	≤0.01
Cadmium	0.0012	0.0012	0.0011	≤0.005
Fecal coliform	<10	<10	<10	≤10000

154. The results show that ground water quality monitoring results met relevant PRC standards.

d) Acoustic environment

155. The noise baseline monitoring, conducted by DEIA Institute from September 27 to September 28, 2020. The results in **Table IV-7** show that noise baseline at all points met the Class II standards and Class II standards of EHS guidelines.

Table IV-7: Noise monitoring data Unit: dB(A)

No.	Location	Monitoring time	Monitoring result		Limit	Standard compliance
			September 27	September 28		
1	East boundary of subproject 1 site	Daytime	53	53	55	Yes
		Nighttime	43	43	45	Yes
2	South boundary of subproject 1 site	Daytime	53	52	55	Yes
		Nighttime	42	43	45	Yes
3	West boundary of subproject 1 site	Daytime	54	55	55	Yes
		Nighttime	44	42	45	Yes
4	North boundary of subproject 1 site	Daytime	53	53	55	Yes
		Nighttime	43	44	45	Yes
5	East boundary of subproject 2 site	Daytime	53	54	55	Yes
		Nighttime	42	43	45	Yes
6	South boundary of subproject 2 site	Daytime	55	54	55	Yes
		Nighttime	44	42	45	Yes
7	West boundary of subproject 2 site	Daytime	53	55	55	Yes
		Nighttime	42	44	45	Yes
8	North boundary of subproject 2 site	Daytime	53	55	55	Yes
		Nighttime	43	42	45	Yes
9	East boundary of subproject 3 site	Daytime	54	53	55	Yes
		Nighttime	43	45	45	Yes
10	South boundary of subproject 3 site	Daytime	52	52	55	Yes
		Nighttime	44	44	45	Yes
11	West boundary of subproject 3 site	Daytime	52	55	55	Yes
		Nighttime	42	42	45	Yes
12	North boundary of subproject 3 site	Daytime	54	53	55	Yes
		Nighttime	43	44	45	Yes

156. The results show that noise monitoring results met relevant PRC and EHS standards.

e) Soil quality

157. During domestic EIA preparation, soil samples were taken by DEIA institute. The samples were taken from sites of subproject 1, 2 and 3. The monitoring results are presented in **Table IV-8**. The results show that soil quality monitoring results met relevant PRC standards.

Table IV-8: Soil quality monitoring results Unit: mg/kg dry weight

Item	Subproject 1 site	Subproject 2 site	Subproject 3 site	Risk screen values	Risk intervention values
Arsenic (As)	6.40	3.41	6.12	60	140
Cadmium (Cd)	0.06	0.05	0.04	65	172
Chromium (Cr VI)	<0.5	<0.5	<0.5	5.7	78
Copper	5	5	7	18000	36000

(Cu)					
Lead (Pb)	10.4	10.0	9.4	800	2500
Mercury (Hg)	1.89	1.72	1.64	38	82
Nickel (Ni)	53	33	50	900	2000

f) COVID-19 outbreak

158. The coronavirus disease (COVID-19) outbreak trend in Zhengzhou is presented in **Figure IV-6** (source: news.sina.cn/project/fy2020/yq_province.shtml?city=CN41010000000000). From January 28 to February 20, 2020, 157 confirmed cases were found in Zhengzhou, of which 98 recovered and 4 were fatal. As of October 2020, no new cases have been found since February 20. All the 157 confirmed cases were cured before March 4 except 5 dead cases. Even so, Zhengzhou County is required to follow the PRC and Henan Province requirements to strictly control monitor human movements within, and in and out of, the city. At the train stations and airport, body temperature scanners were installed. Persons who enter Zhengzhou via train, plane are required to provide a Health Code, which has been assigned by the PRC's State Council's APP for each person, to demonstrate that the persons have not visited the medium-risk or high-risk areas in last 14 days (these areas are updated and published on a daily basis by the State Council). If the persons have visited medium risk or high-risk areas in last 14 days without negative nucleic acid detection certification, the person cannot enter Zhengzhou or is allowed to enter Zhengzhou after 14 days' quarantine with negative nucleic acid detection certification.

159. Zhengzhou also implemented COVID-19 prevention and control measures following the PRC and Henan Province's requirements, including disinfection/cleaning of public space, temperature checks at entrances of facilities, social distancing measures, mandatory use of personal protective equipment such as facemasks and procedures to be adopted in the event any person is infected with COVID-19.

160. The project EMP includes the requirement for a COVID-19 health and safety plan to address health risks. An outline and minimum requirements for the plan are given in Appendix 2, based on international and national guidelines.

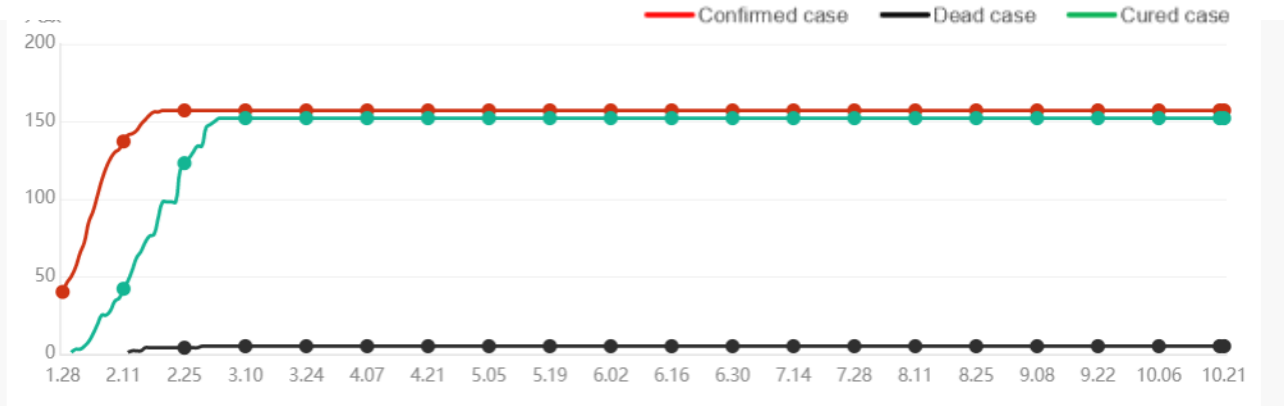


Figure IV-6: COVID-19 outbreak trend in Zhengzhou City

V. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Project Area of Influence and Sensitive Receptors

161. To define the geographic scope of the impact assessment, the "project area of influence" and "sensitive receptors" were identified. The project area of influence was defined as the total area which might be subject to adverse impacts of the project. This was based on the locations of sensitive receptors, defined as settlements and/or environmental values that might be affected by the project construction and/or operation. The receptors comprise (i) communities potentially subject to construction or operational noise, air pollution, and/or environment-related social impacts; (ii) public service facilities vulnerable to disturbance or pollution; and (iii) vegetation, fauna habitats, and agricultural lands within the construction sites.

162. The following distances were applied to identify the sensitive receptors: (i) for construction and/or operational noise – receptors within 200 m of the noise-generating source; (ii) for construction-related air quality impacts – receptors within 200 m of the source; (iii) for local ecological environment within 100 m and the entire areas of other subprojects. These distances, combined with the direct construction sites, were assumed to encompass the total project area of influence.

163. Based on the characteristics of the proposed subprojects, the environmental features of each project site were investigated by the domestic EIA Institute. The sensitive receptors related to the project are identified and summarized from **Table V-1**.

Table V-1: Environmentally Sensitive Receptors of the project

Sensitive Receptor	Direction	Distance (m)	HH
Huihang Jiayuan Community	NE	1,5000	800
Putian Jiayuan Community	SW	877	200
Business area of ZETDZ	W	150	Under construction

Source: DEIA

B. Pre-construction Phase

164. The following measures will be implemented in the engineering design and pre-construction phase to ensure the project's environment management readiness.

(i) **Institutional strengthening**. (a) The PIU will appoint at least one full-time and qualified safeguard officer responsible for EMP implementation. This officer will lead the coordination of the EMP; and (b) the PIU will hire a third party environmental monitoring company to provide external support.

(ii) **Safety measures for COVID-19.** Prior to the arrival of external project personnel (e.g., workers and consultants), the PIU will implement safety procedures to ensure that all staff do not pose a threat to local human populations. This will include: (i) external workers and consultants confirm their COVID-19 – free status to PIU prior to arrival, and (ii) project safety and sanitation measures are distributed to all personnel and are included as contractual requirements for all staff.

(iii) **Updating the EMP.** In case of any changes in the detailed project design, the EMP will be updated as needed, including the mitigation measures and monitoring plan. This will be the responsibility of the PIU.

(iv) **Training in environmental management.** Training on the implementation and supervision of EMP will be provided to contractors and the construction supervision companies (CSCs).

(v) **Grievance Redress Mechanism (GRM).** The PIU will update the existing GRM of ZIH before the start of construction to ensure that the related residential communities, schools and hospitals are well informed and have the opportunity to discuss any concerns. This is

further to the public consultations already conducted during project preparation (Section VIII).

(vi) **Bidding documents and contract documents.** The project EMP (Appendix 1) will be included in all the bidding documents and contracts for procurement of civil works, cargo and services. All contractors and subcontractors will be required to comply with the EMP.

(vii) **Contractor obligations.** All contractors, in their bids, will respond to the environmental clauses in the bidding documents for EMP requirements. Prior to construction, each contractor will develop its site EMP, based on the project EMP (Appendix 1), and assign at least a specific person responsible for the environment, health and safety (EHS). The site EMP shall at least include the following: (a) Dust control; (b) spill control and management; (c) site drainage and soil erosion protection; (d) temporary traffic management; (e) construction site access control; (f) health and safety; (g) all site-specific mitigation measures listed in the project EMP; (h) contractor performance targets; and (i) safety measures for coronavirus disease (COVID-19), which are listed in the EMP, to strengthen the implementation of the mitigation measures. The site EMPs will be submitted to the PIU for review.

(viii) **Environmental management on construction sites.** Ensure that during construction, the PIU safeguard officers, together with environmental supervision engineers from CSCs, will be responsible for enhancing site supervision, management and appraisal, for timely identification and resolving any issues. Intermittent follow-up training during construction will be conducted.

C. Construction Phase

165. Key environmental risks anticipated due to construction include: (i) soil erosion; (ii) temporary noise and traffic disturbance to nearby office buildings and communities; (iii) air pollution (mainly fugitive dust); (iv) inappropriate or uncontrolled solid waste disposal, both construction waste and domestic waste from workers; and (v) occupational and community health and safety.

a) Soil erosion and earthwork balance

166. Soil erosion will occur at the project sites during construction. Without management, the construction works may cause soil erosion, from unprotected stockpiles of soil and spoil, and exposed surfaces from the land leveling and excavation. Erosion could also occur after completion of construction, where site restoration is inadequate. Soil contamination could result from inappropriate transfer, storage, and/or disposal of chemicals, (e.g., gasoline, diesel and lubricant), and solid wastes.

167. **Soil erosion.** Erosion rates are expected to increase during construction when the sites are disturbed and surface vegetation and soil are damaged or disturbed. The most vulnerable soil erosion areas for the project are, spoil sites, temporary construction roads, and other areas where surface soil is disturbed, especially on rainy days.

168. **Generation of surplus spoil.** Based on site visit, the ground level of subproject 3 is lower than the surroundings. During the land leveling, the spoil will be mostly used for back-fill. For most project works, no surplus spoil is expected. For project works resulting in surplus spoil, this will be re-used to the extent possible, for subproject 3. If the spoil is generated, the spoil will be transported by the contractors to the locations designate by local Urban Administration Bureau for reuse to minimize the transportation distance and avoid the transportation routes crossing the urban area.

169. The following mitigation measures for soil erosion and contamination will be adopted.

(i) At construction site, the potential for storm water runoff will be assessed and appropriate storm

water drainage systems to minimize soil erosion will be implemented, including perimeter bunds and establishment of temporary detention and settling ponds to control topsoil runoff.
(ii) Land excavation and filling will be balanced so as minimize the requirement for fill material transportation.
(iii) During earthworks, the area of soil exposed to potential erosion at any time will be minimized through good project and construction management practices.
(iv) Temporary spoil storage sites (and storage containers at lane modification and stations construction sites) will be identified, designed, and operated to minimize impacts. Spoil sites will be restored at the conclusion of storage activities.
(v) Spoil will be reused on-site to the maximum extent feasible as fill. Excess spoil that cannot be used on-site will be transported to an approved spoil disposal site.
(vi) Spoil and aggregate piles will be covered with landscape material and/or regularly watered.
(vii) Waste construction material such as residual concrete, etc., will be properly handled for reuse or disposal.
(viii) Construction and material handling activities will be limited or halted during periods of rains and high winds.
(ix) Any planned paving or vegetating of areas will be done as soon as practical after the materials are removed to protect and stabilize the soil.
(x) Once construction is complete disturbed surfaces will be properly sloped and revegetated with native trees and grass.

170. **Inspection and monitoring.** Site inspections and monitoring will be conducted by the contractors, CSCs, PIU, and external environment monitoring agency

b) **Worker camp**

171. Three separate worker camps will be established in the subproject 1 , 2 and 3 separately and provided to the workers during construction. Worker camp management is important for workers' health and safety. The following mitigation measures for worker camp will be adopted.
(i) The worker camps will be designed with sufficient water supply, power supply, heating equipment in the heating season, toilets, bathrooms. Besides, firefighting equipment will also be designed;
(ii) The design including the layout of the worker camps will be provided to local safety supervision station and firefighting departments for review and approval;
(iii) After the worker camps are completed, acceptance will be conducted by local safety supervision station and firefighting departments.
(iv) During construction, the worker camps will be cleaned and disinfected regularly;
(v) During construction, regular supervision of worker camps will be conducted;
(vi) During construction, safety training, disease control training including COVID-19 will be provided to the workers living in the worker camp;
(vii) After construction is completed, the worker camp will be dismantled based on PRC's requirements and regulations.

c) **Water quality**

172. **Construction wastewater.** Construction wastewater will be produced from the maintenance and cleaning of mechanical equipment and vehicles, water from mixing and curing concrete and lost water and soil during the construction period, which is discharged as pollutants. During construction, there will be three construction sites for over 5 years. Each site will generate an estimated 0.5-2.0 m^3/d construction wastewater depending on their construction contents, with suspended solids (SS) (about 300 mg/L) and petroleum (20 mg/L) (based on rates applied in the DEIA). If discharged in an improper manner, this has the potential to impact the existing water bodies. Construction wastewater will not be discharged onto the surrounding soil or into the surface water bodies like Chao River.

Sedimentation tanks will be held on-site and, after settling out of solids, the upper clear liquid will be recycled for spraying the construction site for dust control, and the waste residue in the tank will be cleared and transported to the construction spoil disposal sites. Oily wastewater will require the installation of oil-water separators before the sedimentation tank. After site treatment, construction wastewater will comply with the Integrated Wastewater Discharge Standard (GB8978-1996). The standard provides the limit for pollutant concentrations from construction sites.

173. **Domestic wastewater from construction workers.** The average workforce is estimated to be 520 workers in the project area (although the project scale is small, the construction sites are numerous and scattered). Daily domestic wastewater discharge production is estimated as 0.06 m^3 per worker per day. The pollutant concentrations of CODcr, BOD_5 and NH_3-N in the domestic wastewater from the construction workers are assumed to be 200 mg/L, 100 mg/L and 20 mg/L, respectively. Estimated volumes of construction and domestic wastewater are 31.2 m^3/d and the CODcr, BOD_5 and NH_3-N in the domestic wastewater will be 6.24 kg/d, 3.12 kg/d and 0.624 kg/d respectively. According to the DEIA, most of the workers will live in work campers at the project sites. Therefore, the majority of domestic sewage will be discharged through the existing sewer network to the nearby wastewater treatment plant for treatment.

174. The following measures will be implemented to minimize water pollution.

(i) Contractors will develop relevant measures on controlling the oil and other chemicals as part of their site EMPs.
(ii) Worker camp will be installed with sufficient toilets. Domestic wastewater will be discharged to the municipal sewerage system on a regular basis
(iii) Wastewater from construction activities will be collected in sedimentation tanks, retention ponds, and filter tanks to remove silts and oil.
(iv) All areas, where construction equipment and vehicles are to be washed, will be equipped with water collection basins and sediment traps. The area will be restored after construction is completed.
(v) Fuel storage, machinery maintenance workshop and vehicle cleaning areas must be located at least 500 m away from the surface waterbody.
(vi) Storage facilities for fuels, oil, and other hazardous materials will be within secured areas on impermeable surfaces and provided with sorbent mats and cleanup installations.
(vii) Contractors' fuel suppliers must be properly licensed, who shall follow proper protocol for transferring fuel and the PRC standard of JT618-2004 (Transportation, Loading and Unloading of Dangerous or Harmful Cargo. revised).
(viii) Portable toilets and on-site wastewater pre-treatment systems will be installed at construction camps with proper maintenance protocols.
(ix) Wastewater quality will be monitored by local environmental monitoring agencies during construction as per the EMP.

d) Air quality

175. Air pollution sources include: (i) dust from earth excavation, filling, loading, hauling, bare earth surfaces, uncovered construction areas, and vehicle movements on unpaved roads, especially in windy days; (ii) aggregate preparation and concrete-mixing; (iii) vehicle and machinery emissions (gaseous CO, hydrocarbon and NO_2) during works. During the asphalt heating and mixing process, the fuel-burning will produce smoke, and the asphalt will produce flue gas. Thus, on-site asphalt mixing and concrete making will be prohibited. Commercial concrete will be purchased.

176. The quantity of dust generated will depend on wind, the humidity of the material and earth, and state of the site. For the project area it was estimated that under general on-site conditions (average wind speed 1.7 m/s, and average humidity of 74%) dispersion distance is 70 m downwind.

For dust generated by transporting earth and other construction materials, the impact zone may exceed 50 m on each side of the route. Based on the locations of sensitive receptors (Section VI.A), the sensitive receptors may be subject to dust-related disturbance.

177. Mitigation measures to reduce impacts on air quality are as follows.

(i) Spraying of water daily on construction sites where fugitive dust is being generated.
(ii) On-site asphalt mixing and concrete making will be prohibited. Commercial concrete will be purchased.
(iii) Transport vehicles will be limited to low speeds in construction sites.
(iv) Dust suppression including dust proof net, automatic water spray equipment etc. near sensitive receptors, e.g., schools, hospitals and residential areas.
(v) Storing petroleum or other harmful materials in the appropriate places and covering to minimize fugitive dust and emission.
(vi) Covering materials during truck transportation, in particular fine material, to avoid spillage or dust generation.
(vii) Fencing will be installed around project sites.
(viii) Ensure vehicle and machinery emissions comply with PRC standards of GB18352-2005, GB17691-2005, GB11340-2005, and GB18285-2005.
(ix) Timely monitoring of air quality and inspections during construction, as defined in the project EMP.

e) **Noise**

178. The construction phase will result in increased noise levels and sudden and discontinuous vibration impacts. Construction will involve excavators, bulldozers, graders, concrete-mixers, rollers, and other heavy machinery. Construction noise will be temporary and localized. Estimated construction noise values (at 5 m distance from the machinery and vehicles) are in **Table V-3**.

Table V-2: Testing Values of Construction Machinery Noise

No.	Machine Type	Maximum Sound Level Lmax (B)
1	Excavator	85-95
2	Bulldozer (100 horse-power)	78-96
3	Scraper	85-95
4	Heavy truck	88-93 (speed up), 84-89 (steady speed)
5	Medium-duty truck	85-91 (speed up), 79-85(steady speed)
6	Drilling machine	96
7	Wheel loader	85-92
8	Vibrating roller	86
9	Two-wheeled two-vibrating roller	81
10	Asphalt concrete paver	82
11	Generating set	88-92

179. A significant increase in localized noise is expected during construction. Construction activities will involve excavators, bulldozers, concrete-mixing plants, loaders, graders, rollers, and other heavy machinery, as well as noise from goods and material transportation. Noise during pipeline construction will be generated by trench excavators, rollers and compaction machinery.

180. The construction phase can be divided into 4 stages: earthworks, foundation construction, structure construction and final finishing:

- The main noise sources during the earthwork stage will be non-directive mobile sources including excavators, bulldozers, loaders and transport vehicles.

- The main noise sources during foundation construction stage will be stationary, including pile machines, land levelers, etc. Although the foundation construction phase period is short, predicted noise levels are high, ranging from 95-105 dB(A).

- The structure construction stage is the longest period in the construction phase. There are a variety of noise sources in this phase including concrete mixers, heavy equipment, cranes, etc.

- The final finishing stage is also lengthy. Main noise sources include electrical saws, drills, cutting machines etc. Noise levels from these noise sources range from 85-95 dB(A) and are short in duration.

- Materials and equipment transport can occur in all four phases.

181. **Prediction results.** Noise levels at different distances were derived after calculating the impact scope of equipment noise during construction, as defined in Table V-6. The PRC Standard of Noise Limits for Construction Sites (GB12523－2011, revised) specifies the noise limit in Class II areas as 70 dB (A) during daytime and 55 dB (A) during nighttime. The standard compliance noise impact scope (m) of different machineries is listed in **Table V-3**.

Table V-3: Noise Values of Construction Machineries at Different Distances [dB(A)]

Machinery Name	Distance to Machinery								
	15m	20m	40m	60m	80m	100m	130m	150m	200m
Excavator	71	69	63	59	57	55	53	51	49
Bulldozer	72	70	64	60	57	56	54	52	50
Loader	61	59	53	49	47	45	43	41	39
Heavy truck	69	67	61	57	55	53	51	49	47
Drilling machine	72	70	64	60	57	56	54	52	50
Concrete-mixer	71	69	63	59	57	55	53	51	49
Grade II of GB12523－2011	70 (daytime)								
	55 (nighttime)								
World Bank EHS Guideline	55 (daytime for residential and institutional area); 70 (daytime for industrial and commercial area)								
	45(nighttime for residential and institutional area); 70 (nighttime for industrial and commercial area)								

Source: DEIA Institute

182. These values were compared with the locations of the sensitive receptors (Section V.A) to see which communities would be within 40 m of construction works which exceed daytime noise levels of 70 dB(A), the threshold applied to this project under PRC standard GB12523-2011. Based on the estimated nose values, noise level of the business area of ZETDZ may exceed the limit.

183. **Mitigation measures.** The following measures will be implemented to comply with PRC construction site noise limits and to protect sensitive receptors.

i). Ensure that noise levels from equipment and machinery conform to PRC standard of GB12523-2011 (revised). Properly maintain construction vehicles and machineries to minimize noise.

ii). Apply noise reduction devices and methods for high noise equipment operating within 200 m of the sensitive sites, e.g., schools, villages, residential areas (section V.A).
iii). Locate high-noise activities (e.g., pilling) >500 m from sensitive areas.
iv). Construction activities, and particularly noisy ones, are to be limited to reasonable hours during the day and early evening. Construction activities will be strictly prohibited during the nighttime (22:00 h to 07:00 h). Exceptions will only be allowed in special cases, and only after getting approval of the surrounding residents, local EEB and other relevant departments. And nearby residents should be notified of such night time activities well in advance.
v). When undertaking construction planning, simultaneous high-noise activities will be avoided, and high noise activities will be scheduled during the day rather than evening hours. Similarly, construction site will be planned to avoid multiple high noise activities or equipment from operating at the same location.
vi). Low-noise equipment will be selected as much as possible.
vii). Equipment and machinery will be equipped with mufflers and will be properly maintained to minimize noise.
viii). Noise PPE will be provided to workers.
ix). Transportation routes and delivery schedules will be planned during detailed design to avoid densely populated and sensitive areas and high traffic times.
x). Vehicles transporting construction materials or waste will slow down and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals.

f) Vibration

184. Mechanical vibration during the use of work machinery may be sudden and discontinuous, which can cause stress among workers and communities. To reduce this risk: (i) high noise activities, such as compaction operations, will be prohibited at night; (ii) communities will be consulted prior to large earthworks to ensure they are informed and to avoid sensitive timing, e.g., exams at nearby schools or festivals. The Japanese Handbook of Environmental Impact Assessment provides measures of vibrations caused by construction machinery (**Table V-16**).

Table V-4: Vibration Levels of Construction Machinery (Unit: dB)

Equipment	At 5 m	At 10 m	At 20 m	At 30 m
Vibratory hammer	75	67	48	44
Roller	58	53	50	48
Diesel truck	62	58	54	51

185. The table shows that the requirements for residential and cultural areas, as specified in Environmental Vibration Standard for Urban Areas (GB10070-88) is met at a distance of >10 m from the vibration source. Mitigation measures include a prohibition of compaction operations at night, which will effectively reduce the vibration impact. No sensitive receptor site is closer than 20 m from a construction area, although some residential areas are between 20 m and 100 m of construction areas. Overall, the impact of vibration is considered to be low, due to: (i) stone material is commercially available, and there will not be any on-site stone crushing; (ii) no structures require the use of pile hammers (high noise and vibration); and (iii) only medium-sized trucks will be used.

g) Solid waste

186. The solid waste generated will comprise construction and domestic waste, and include packaging materials and waste generated during equipment installation and cleaning. The average workforce is estimated at 260 workers in total. Daily domestic solid wastes production is estimated as 0.5 kg per worker per day (130 kg/d in total). Most of the workers will live worker camps. For the

rubbish from the worker camps, covered garbage bins will be installed in the camps, which will be the responsibility of the construction contractors to provide sufficient garbage bins at proper locations and ensure they are protected from birds and vermin and emptied regularly, and transport to the local domestic waste landfill for disposal. Assuming the average construction days in a year is 270, the estimated domestic waste generated by the project is 140 tons in about 4 years construction.

187. The following measures will be undertaken to manage construction and worker waste.

i). Covered garbage collection bins will be installed at each construction site. It will be the responsibility of the contractors to provide sufficient garbage bins at proper locations and ensure that they are protected from birds and vermin and emptied regularly (using the local municipal solid waste collection system by sighing contracts between the contractor and the local sanitation authority). The contractors' responsibility is included in the EMP and will be included in bidding documents and construction contracts.

ii). Construction waste will be recycled and reused to the extent possible (including wood, concrete, and brick debris). The remaining waste will be transported to the construction waste disposal site.

iii). Littering by workers will be prohibited. Domestic waste will be collected on a regular basis by the local sanitation departments and transported for recycling, reuse, or disposal at a licensed landfill, in accordance with relevant PRC regulations and requirements.

iv). Excavated soil will be backfilled onsite to the extent possible. Excess spoil that cannot be used on-site will be transported to an approved spoil disposal site.

v). Construction waste dumpsters will be provided at all work sites. Construction waste will be collected on a regular basis by a licensed waste collection company and transported for recycling, reuse, or disposal at a licensed landfill, in accordance with relevant PRC regulations and requirements.

vi). There should be no final waste disposal on site. Waste incineration at or near the site is strictly prohibited.

vii). Contractors will be held responsible for proper removal and disposal of any significant residual materials, wastes, spoil, waste from drilling and contaminated soils that remain on the site after construction.

h) Ecology

188. **Vegetation and flora**. The vegetation to be removed during works comprises weeds. None of these species is on the PRC local or provincial list of protected species, nor are these species of concern on the IUCN list.

189. **Impacts on fauna.** Risks to fauna during construction include: (i) noise and visual disturbance to birds, mammals, reptiles, and/or amphibians. Noise and visual disturbance will be temporary. Based on this analysis, the location of work sites are far from, documented ecological values, and modified nature of most sites, the risk of ecological impacts by the project is assessed to be low. The following mitigation measures will also be implemented for ecological protection.

190. **Protected areas.** Based on the site visit, there is no any protected areas near the project sites. The project will have no impacts to the protected areas.

191. The following mitigation measures will be applied for all works in all sites, to avoid, minimize, and mitigate risks to ecological values.

(i) Clearance of vegetation will be restricted to specific construction sites.

(ii) Cleared sites will be immediately re-vegetated afterward.

(iii) Landscaping activities will only use native plant species. In the event that non-native seedlings are required for rapid stabilization of exposed soils and sites, only sterile seedlings (i.e., which

cannot propagate) will be used, to prevent the spread of weeds.

(iv) To reduce the risk of spreading weeds, pest animals, and/or soil-based organisms, the project will: (a) prohibit the use of any plant species classified in the PRC as weeds – including native species – as defined by the Research Center for Biological Prevention and Control of Alien Invasion (Ministry of Agriculture and Rural Affairs) and Institute of Plant Protection (Chinese Academy of Agricultural Sciences), available at http://www.chinaias.cn/wjPart/index.aspx.

i) Community and worker health and safety

192. Construction may cause unexpected interruptions in public services and utilities because of damage to pipelines for water supply and drainage, as well as to power cables and communication cables. Contractors will implement the following EMP measures to reduce risks to community health.

i) **Traffic management**. A traffic management plan will be prepared by the contractor. The plan will include provisions for scheduling construction traffic, regulating traffic at road crossings, selecting transport routes to reduce disturbance to regular traffic, reinstating roads, and opening them to traffic as soon as the construction is completed.

ii) **Underground facilities survey and protection**. If any utilities are disturbed by the construction activities, they will be rectified immediately by the contractor in coordination with the utility provider. During this rectification period, the users will be provided with alternatives such as the provision of water supply through tankers if the water supply pipes are broken.

iii) **Information disclosure and public consultation**. Residents, and businesses will be informed in advance through media, information boards, and public consultations (Section VIII), including the dates, duration, and scope of planned works.

iv) **Construction site protection**. Clear signs will be placed at construction sites in view of the public, informing people about the project GRM, and warning people against potential dangers such as moving vehicles and hazardous materials, and raising awareness on safety issues. All sites will be secured, disabling access by the public through appropriate fencing whenever appropriate.

v) **Excavated sites and protection**. Construction activities will be planned so as to minimize disturbances to utility services. Open trenches will be fenced and cordoned off to prevent access by the general public and reduce the risk of persons accidentally falling in.

j) Occupational health and safety

193. The construction industry is considered to be one of the most hazardous industries. Intensive use of heavy construction machinery, tools, and materials present physical hazards, including noise and vibration, dust, handling heavy materials and equipment, falling objects, work on slippery surfaces, fire hazards, and chemical hazards such as toxic fumes and vapors. Contractors will each prepare an environmental, health and safety management plan, which will include the following.

(i) Provide a clean and sufficient supply of freshwater for construction sites and camps.

(ii) Provide an adequate number of portable on-site latrines at construction sites and work camps and ensure that they are cleaned and maintained in a hygienic state.

(iii) Garbage receptacles at construction sites and camps will be set up, which will be periodically cleared to prevent the outbreak of diseases.

(iv) Provide personal protective equipment to comply with PRC regulations, e.g., safety boots, helmets, gloves, protective clothing, goggles, earplugs.

(v) Emergency preparedness and response plan for accidents and emergencies, including environmental and public health emergencies associated with hazardous material spills and similar events. Emergency phone link with hospitals in the project area will be established. A fully equipped first-aid base in each construction camp will be organized.

(vi) A records management system that will store and maintain easily retrievable records against

loss or damage will be established. It will include documenting and reporting of occupational accidents, diseases, and incidents.

(vii) Occupational health and safety matters will be given a high degree of publicity to all work personnel and posters will be displayed prominently at construction sites.

(viii) All workers will be given basic training in sanitation, general health and safety matters, and work hazards. An awareness program for HIV/AIDS and other communicable diseases will be implemented for workers and the local communities.

(ix) Core labor standards will be implemented. Civil works contracts will stipulate priorities to: (i) employ local people for works; (ii) ensure equal opportunities for women and men; (iii) pay equal wages for work of equal value and pay women's wages directly to them; and (iv) not employ child or forced labor.

(x) **COVID-19 health and safety plan.** The project EMP will include a coronavirus (COVID-19) health and safety plan to address COVID-19 health risks. The plan will be prepared in line with government regulations and guidelines on COVID-19 prevention and control, and in consultation with public health agencies in the area. The plan will include (i) measures to record the locations that workers have visited/lived immediately before and during project work; (ii) schedules for disinfecting/cleaning offices, yards, stores and labor camps; (iii) measures to implement temperature checks and other health checks on-site; (iii) physical distancing measures, particularly in worker camps; (iv) requirements for mandatory use of personal protective equipment such as facemasks, and provision of handwashing stations, hand sanitizers, and other appropriate protective measures; (v) how workers and residents living near project sites will be provided with information to protect themselves from COVID-19; (vi) procedures to be adopted in the event a worker is suspected of having contracted COVID-19; and (vii) other COVID-19 prevention and control measures appropriate for the local context.

194. It is expected that these risks can be effectively managed through the implementation of the EMP, including mitigation measures, capacity building, inspection, supervision, and reporting.

k) Physical cultural resources

195. No cultural heritage or archaeological sites are known from the project area. However, construction activities have the potential to disturb unknown underground cultural relics. To address this issue, a construction phase chance find procedure will be established and activated if any chance finds of PCRs are encountered:

(i) Construction activities will be immediately suspended if any PCRs are encountered and protective measures will be implemented;

(ii) Destroying, damaging, defacing, or concealing PCRs will be strictly prohibited in accordance with PRC regulations;

(iii) Local Cultural Heritage Bureau will be promptly informed and consulted; and,

(iv) Construction activities will resume only after thorough investigation and with the permission of the local Cultural Heritage Bureau.

l) Socioeconomic impacts

196. Construction works may cause unexpected interruption to municipal services. Altered traffic flows and increased occurrence of slow-moving heavy vehicles may cause traffic jams and delays. These impacts will be localized and temporary. They will be managed through ongoing consultations with communities during construction (as well as operation), that will build on the consultations conducted during project preparation (Section VIII), and measures for community health and safety, including a traffic management plan are included in the project EMP.

D. Operation Phase

197. Key operational risks assessed were groundwater, surface water, and/or soil pollution from the project operation. Other operational risks are coolant leakage; (iii) increased waste from the increased staff; (iv) noise disturbance to nearby sensitive receptors. All facilities will be under the management of the PIU. The PIU will develop operation and maintenance (O&M) procedures for each subcomponent and will receive training in environment-friendly O&M from the construction companies.

a) Wastewater

198. To address production and domestic wastewater, the following measures will be implemented:
(i) Wastewater from refrigerated and frozen warehouses will be discharged to the municipal sewerage system.
(ii) Domestic wastewater will be produced from worker sanitation facilities. Domestic wastewater will be treated in digestion tank and will be discharged to the municipal sewerage system.

b) Solid waste

199. To further mitigate solid waste impacts, the project will do the following.
(i) Domestic waste bins will be provided and domestic waste will be routinely collected by the local sanitation department for recycling, if possible, or final disposal at an approved waste disposal site.
(ii) No permanent on-site solid waste disposal will be permitted at the project sites.
(iii) Cold storage facilities should be well managed to reduce the expired cargo as much as possible. The expired cargo will be treated by local sanitary department after classification.
(iv) Waste package material will be sold out.
(v) waste parts will be recycled by manufactures.

c) Noise

200. Noise sources during operation will be mainly from cold storage facilities, vehicles. Nonetheless, to further mitigate noise impacts, the project will do the following.
(i) Low-noise equipment will be used as far as possible, and noise reduction measures such as noise elimination, shock absorption, insulated enclosures and sound dampening materials on exterior walls will be implemented.
(ii) All equipment will be properly maintained to minimize noise.
(iii) Appropriate noise protective equipment will be provided to the workers who are likely to be exposed to high noise level environments to meet the requirements in occupational exposure limits for hazardous agents in workplace Part 2: physical agents (GBZ 2.2-2007) and EHS Guidelines on occupational health and safety (OHS).
(iv) Layout for project sites will be planned to reduce noise levels in nearby communities.
(v) Vehicles transporting materials or cargo will slow down and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals.

d) Chemicals

201. Chemicals used in operations, e.g., machinery fuels and oils. The following measures will be applied.
(i) A registry of all activities that involve the handling of potentially hazardous substances will be developed, including protocols for the storage, handling and spill response.
(ii) All chemicals, toxic, hazardous, and harmful materials will be transported in spill-proof tanks with filling hoses and nozzles in working order.

(iii) All chemicals, toxic, hazardous, and harmful materials will be stored in secure areas with impermeable surfaces and protective dikes such that spillage or leakage will be contained from affecting soil, surface water or groundwater systems. The area should be a 110% volume of storage capacity. Their usage will be strictly monitored and recorded.
(iv) Good housekeeping procedures will be established to avoid the risk of spills.
(v) Spills will be dealt with immediately, and personnel will be trained and tasked with this responsibility.
(vi) Workers will be properly trained before handling hazardous wastes and have the required protective equipment.
(vii) Hazardous waste will be temporarily stored in closed containers away from direct sunlight, wind, water and rain in secure designated areas with impermeable surfaces and protective dikes such that spillage or leakage will be contained.
(viii) Hazardous wastes, including pesticides, waste chemicals and waste ion exchange resin, will be collected and disposed of by licensed contractors.

202. **Coolants.** For subproject 1, coolants will be utilized for refrigeration. The coolant CO_2 and R507 has been selected as it has no impact on the ozone layer and its global warming potential is 3,985.

e) Community and Occupational Health and Safety

203. Project operation poses potential risks to workers and community. To mitigate potential health and safety risks to workers, the following measures will be taken:
(i) Operation phase EHS plan will be developed and implemented and workers will be trained regularly on their implementation.
(ii) The nearby communities will be informed of the potential risks of the project operation.
(iii) PPE including goggles, gloves, safety shoes will be provided to workers. Noise protection equipment will be provided to workers in high-noise area.
(iv) Provide training to workers on occupational health and safety, and emergency response.
(v) Vehicles transporting materials or cargo will slow down and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals.
(vi) Safe traffic control measures, including road signs and flag persons to warn of dangerous conditions will be taken as needed. Regular maintenance of vehicles to minimize potential accidents caused by equipment malfunction.
(vii) Project sites will be fence with restricted public access.

E. Anticipated Positive Operation Phase Impacts

204. **GHG emissions from the project operation**. The GHG emissions in the project will mainly result from the use of electricity to run the project facilities. The proposed coolants to be used for cold storage facilities will be R507 (global warming potential is 3,985) and R744 (CO_2), which have no impact on the ozone layer and hence the annual GHG emissions from the use of coolants (25.7 tons CO_2 and 1.954 tons R507 every five years) will be 6,697.3 tons CO_2. Annual power consumption for the various projects and respective GHG emissions are presented in **Table V-5**. The annual GHG emissions from the power consumption are estimated at 31,173.1 tons of CO_2.

Table V-5: Annual power consumption of the project

Component	Estimated annual power consumption (million kWh)	Estimated annual coal consumption (tce)	Estimated annual GHG emission (ton)
Cold storage facilities	11.41	3,496.0	6,583.6
Parallel vehicle imports facility	26.05	7,982.0	15,031.4

Component	Estimated annual power consumption (million kWh)	Estimated annual coal consumption (tce)	Estimated annual GHG emission (ton)
Type-B bonded logistics center	16.57	5,075.6	9,558.1
Total	54.0261	16,553.6	31,173.1

Note: Based on the China Power Sector Annual Development Report 2020 issued by CEC (China Electricity Council), the CO_2 emission factor of power generation was 577 g/kWh in 2019 and the coal consumption of power generation was 306.4 g/kWh.

205. **Energy saving and GHG reduction by transportation mode changes**. When compared to the equivalent transportation by sea (for China-Europe route) and road (for China- Central Asia route), once operational the project will: (i) result in annual energy savings equivalent to 56,206.6 (tce) thereby providing a global public good by avoiding the annual emission of 140,123.1 tons of CO_2. The calculations are presented in **Table V-6**.

206. **Energy saving and GHG reduction by from subproject 1.** If the cold storage facilities are not built, the cargo will be storge at rented facilities which is 20 km way. The annual cold stored cargo will be 14,097 tons. In the assumption that 5 tons imported cargo will be transported one time with an average diesel consumption of 5 L (average transport distance is 20 km and the diesel consumption is 25 L per 100 km) The annual diesel savings will be 14,097/5*5/1176 = 12.0 Tons diesel (equality to 17.5 tce) and annual CO_2 savings will be 43.5 tons.

207. **Energy saving and GHG reduction by from parallel vehicle imports facility (subproject 2).** If the import port is not built, vehicle will be transported from Tianjin Port with an average transport distance of 750 km. Annual imported vehicle will be 2,000. In the assumption that 10 vehicles will be transported one time from Tianjin port one time with an average diesel consumption of 375 L and the annual energy savings will be 63.8 tons diesel (equality to 92.9 tce) and CO_2 savings will be 231.6 tons.

208. **Energy saving and GHG reduction by from the Type-B bonded logistics center (subproject 3)**. Once operational, annual exported and imported cargo will be 800,000 tons. About 30% of the imported cargo (250,000 tons) will be stored at the Type-B bonded logistics center which will result in fuel (diesel) savings compared to No-Project alternative. In the assumption that 10 tons imported cargo will be transported one time with an average diesel consumption of 87.5 L (average transport distance is 350 km and the diesel consumption is 25 L per 100 km) The annual diesel savings will be 25,000*87.5/1176 = 558.0 Tons diesel (equality to 813.1 tce) and annual CO_2 savings will be 2,027.1 tons.

209. **Net Energy saving and GHG reduction of the project**. The annual energy saving and GHG reduction of the project is presented in **Table V-7**.

210. The project will deliver significant positive social and environmental impacts to beneficiaries. When compared to the equivalent production of power through traditional coal-fired sources, once operational the subproject will: (i) result in annual energy savings equivalent to 40,576.5 tce, thereby providing a global public good by avoiding the annual emission of 104,554.9 tons of CO_2; and (ii) improve local air quality through the estimated annual reduction of emissions of SO_2 by 3.0 tons, NOx by 1.5 tons, and PM by 27.6 tons[9].

[9] Based on the data issued by MEE, the PM, SO_2, and NOx emission factor of coal was 0.68, 0.075, and 0.0375 kg/ton.

Table V-6: Annual Energy saving and GHG reduction by transportation mode changes

Numbers of block trains after 2025	Route	Total transport quantity	Transport capacity per unit (TEU)	Transport distance per unit (km)	Transport mode	Energy consumption (tce per 1,000 km)	Energy consumption (tce)	Energy saving (tce)
1600	China-Europe	1264.00	82.00	10,214	Railway	1.774	2,2903.2	15,399.0
		7.38	14,036.00	20,000	Sea	259.5	38,302.2	
	China- Central Asia	336.00	82.00	5,023	Railway	1.774	2,994.0	40,807.6
		6888.00	4.00	5,023	Road	1.266	43,801.6	
Total								56,206.6

Table V-7: Annual Energy saving and GHG reduction of the project

Item	Energy saving (tce)	GHG reduction (t)
Energy saving and GHG reduction from transportation mode changes	56,206.6	140,123.1
Energy saving and GHG reduction from subproject 1	17.5	43.6
Energy saving and GHG reduction from subproject 2	92.9	231.6
Energy saving and GHG reduction from subproject 3	813.1	2,027.1
Energy consumption from the project operation	16,553.6	NA
GHG emission from the project operation	NA	31,173.1+6,697.3=37,870.4
Total	40,576.5	104,554.9

VI. ENVIRONMENTAL MANAGEMENT PLAN

211. This EIA includes an EMP for the project (Appendix 1). Development of the EMP drew on the domestic environmental assessments, discussions with PIU and consultations with the local EEBs, other government agencies, and communities. The EMP defines mitigation measures for the anticipated environmental impacts, institutional responsibilities, and mechanisms to monitor and ensure compliance with PRC's environmental laws, standards and regulations and AIIB's ESP. The EMP specifies the environmental risk and mitigation measures, roles and responsibilities, inspection, monitoring, and reporting arrangements, training, and GRM. The EMP will be updated after detailed design, as needed. The EMP is the over-arching document for environmental safeguards. The mitigation and monitoring measures focus largely on civil works under the project and the operation of the project. Semi-annual environmental safeguard progress reports will be provided to AIIB to report on implementation progress for the EMP.

A. Objectives

212. This environment management plan (EMP) is for the Zhengzhou International Logistics Hub Project (the project). The EMP is developed based on the domestic environmental impact assessment (EIA) of the project and in compliance with the requirements of PRC environmental laws and AIIB's ESP (environmental and social policy).

213. The EMP defines appropriate mitigation measures for the anticipated environmental and social impacts and defines the institutional responsibilities and mechanisms to monitor and ensure compliance with PRC's environmental laws, standards and regulations, and AIIB's ESP. The EMP specifies (i) objectives; (ii) mitigation measures; (iii) implementing organization and responsibilities; (iv) inspection, monitoring, and reporting arrangements; (v) training and institutional strengthening; (v) a feedback and adjustment mechanism; and (vi) the grievance redress mechanism (GRM).

214. The EMP will be reviewed and updated at the end of the detailed designs, as needed, in order to be consistent with the final design. The EMP (or its updated version) will be included as a separate annex in all bidding and contract documents. The contractors will be made aware of their obligations to implement the EMP and to budget the EMP implementation costs in their proposals. The EMP supervision and monitoring results will be used to evaluate (i) the extent and severity of actual environmental impacts against the predicted impacts, (ii) the performance of the environmental protection measures or compliance with related rules and regulations, (iii) trends of impacts; and (iv) overall effectiveness of the mitigation measures.

B. Organizations and Their Responsibilities for EMP Implementation

215. Zhengzhou International Hub Development and Construction Co., Ltd (herein after referred to as ZIH) will be the Project Implementing Unit (PIU) and responsible for implementing the project and administering, monitoring contractors and suppliers and day-to-day management of the project. The EMP implementation arrangements and responsibilities of governmental organizations are summarized in **Table VI-1**.

216. Environmental staff within PIU. The PIU will designate a qualified safeguard officer, who will take overall responsibility for supervising the implementation of the EMP, and update of the EIA and EMP if required after the detailed design. The officer will work full-time for the project and will take charge of: (i) supervising the implementation of mitigation measures during project design, construction and operation; (ii) ensuring that environmental management plan, monitoring, and mitigation measures are incorporated into bidding documents, construction contracts and operation management manuals; (iii) submitting semi-annual EMP monitoring and progress reports to AIIB; (iv)

coordinating the GRM; and (v) responding to any unforeseen adverse impacts.

Table VI-1: Summary of Institutional Responsibilities for EMP Implementation

Agency	Role and Responsibility
Relevant departments of ZETDZ	• Overall accountability and responsibility for project planning, management, and implementation
Project implementation units (PIU)	**Overall project management and environment safeguards** • Supervise and manage daily project implementation • Recruit and manage design institutes, procurement agents, contractors, CSCs, in accordance with government regulations • Submit bidding documents, bid evaluation reports and other documents as needed to AIIB for endorsement • Supervise construction and monitor quality control • Coordinate with AIIB on all aspects of project implementation • Assign 1 PIU Safeguard Officer • Engage EMA for the project external environmental monitoring • GRM operation
Project Operators of the PIU	• Commission the constructed facilities • Operate and maintain the completed facilities, including environmental management, monitoring and reporting responsibilities
External environment monitoring agency (intermittent throughout project)	• A qualified independent environmental monitoring agency will be recruited to implement the environmental monitoring plan.
Contractors (intermittent throughout construction)	• Ensure sufficient funding and human resources for proper and timely implementation of required mitigation and monitoring measures in the EMP throughout the construction phase. • Responsible for GRM operation during the construction phase.
Construction supervision company (intermittent throughout construction)	• Ensure sufficient funding and human resources for supervising and instructing contractors for proper and timely implementation of required mitigation and monitoring measures in the EMP • Supervise construction progress and quality • Appoint qualified EHS officer for regular onsite supervision of contractors • Supervise the contractor's EMP implementation performance • Undertake simple and cost-effective on-site quantitative measurements to regularly check that construction complies with the project environmental monitoring standards and targets, especially for noise and air quality (especially during works in urban areas and villages), using a basic hand-held meter • Submit monthly EMP monitoring reports to PIU
Asian Infrastructure Investment Bank	• Oversee project administration and timely execution of the loan agreements • Review project compliance and targets against the EMP • Review and endorse updated EIA and EMP as needed • Monitors project progress and conducts review missions • Discloses monitoring reports on AIIB public website

CSC = construction supervision company, EHS = environment, health and safety, EMA = environment monitoring agency, EMP = environment management plan, GRM = grievance redress mechanism, PIU = project implementation unit, ZETDZ =Zhengzhou Economic and Technological Development Zone.

C. Potential Impacts and Mitigation Measures

217. **Table VI-2** list the potential impacts of the project components in the project areas during project preparation, design, construction and operation, and proposed mitigation measures. The

mitigation measures will be incorporated into detailed design, bidding documents, construction contracts and operational management manuals, by the design institutes (during detailed design) and contractors (during construction), under the supervision of the PIU safeguard officer and CSCs. The effectiveness of these measures will be evaluated based on environmental inspections and monitoring to determine whether they should be continued, improved, or adjusted.

Table VI-2: Potential Impacts and Mitigation Measures during Pre-construction and Construction Phases

Item	Potential impacts / issues	Mitigation measures	Who implements	Who supervises
A. DESIGN AND PRE-CONSTRUCTION PHASES				
Detailed design stage	Institutional strengthening for EMP Implementation and supervision	• At least 1 month before construction, reconfirm the full-time status of the PIU safeguard office. • At least 1 month before any construction, provide training to all environmental staff for EMP implementation and supervision. • Confirm that at least one certified EMA has been recruited for the project at least 2 months before any construction. • **Coronavirus (COVID-19) safety management – prescreening ahead of works**. Establish early screening measures and procedures before commencing on-site work. See also requirements under occupational health and safety (Construction Phase, and Appendix 2) for preparation of a COVID-19 health and safety plan. • Organize and conduct training on the project EMP for appropriate staffs of the PIU, contractors, and CSCs.	PIU	AIIB
	Updating EMP	**Update the mitigation measures defined in this EMP** • Update the EMP as needed, based on the final detailed designs. • Submit the updated EMP to AIIB for review. **Changes in project locations or scope** • In case of major changes of project location and/or additional physical components, form a DEIA team to conduct additional DEIA and public consultation. The revised DEIA will be submitted to local EEBs and AIIB for approval and disclosure. AIIB will determine if the change is minor or major.	PIU	EEB, AIIB
Construction Preparation	Environmental monitoring plan	• Prior to construction, the PIU will hire an EMA for environmental monitoring. • Prepare detailed monitoring plan in accordance with the monitoring plan in this EMP.	PIU	EEB, AIIB
	Bidding and contract documents	• Mitigation measures in the EMP are incorporated in all bidding documents. • Prepare environmental contract clauses for contractors.	PIU	AIIB
	EMP training	• Invited environment specialists and/or officials from EEBs provide training on construction environmental management, implementation, supervision, to contractors and CSCs, in accordance with the training plan in this EMP.	PIU	AIIB
	Establish GRM	• Responsibility for GRM implementation is assigned to the PIU safeguard officer • PIU personnel will be aware of, and trained in, the GRM, and will help support the environmental and social officers when necessary. • Key contact details for the GRM (phone number, WeChat, address, email) will be provided on the PIU websites and information boards at construction sites and project sites.	PIU	AIIB
B. CONSTRUCTION PHASE				
Topography and Soils	Earthwork, soil erosion, soil contamination	• At construction site, the potential for storm water runoff will be assessed and appropriate storm water drainage systems to minimize soil erosion will be implemented, including perimeter bunds and establishment of temporary detention and settling ponds to control	Contractor	CSC, PIU, EEB

Item	Potential impacts / issues	Mitigation measures	Who implements	Who supervises
		topsoil runoff. • Land excavation and filling will be balanced so as minimize the requirement for fill material transportation. • During earthworks, the area of soil exposed to potential erosion at any time will be minimized through good project and construction management practices. • Temporary spoil storage sites (and storage containers at lane modification and stations construction sites) will be identified, designed, and operated to minimize impacts. Spoil sites will be restored at the conclusion of storage activities. • Spoil will be reused on-site to the maximum extent feasible as fill. Excess spoil that cannot be used on-site will be transported to an approved spoil disposal site. • Spoil and aggregate piles will be covered with landscape material and/or regularly watered. • Waste construction material such as residual concrete, asphalt, etc., will be properly handled for reuse or disposal. • Construction and material handling activities will be limited or halted during periods of rains and high winds. • Any planned paving or vegetating of areas will be done as soon as practical after the materials are removed to protect and stabilize the soil. • Once construction is complete disturbed surfaces will be properly sloped and revegetated with native trees and grass. • Based on site visit, the spoil disposal site is closed to the component site at the north direction. Conduct component completion audit to confirm that spoil disposal site rehabilitation meets required standard, hold contractor liable in case of non-compliance.		
Worker camp	Health and safety of the workers	• The worker camps will be designed with sufficient water supply, power supply, heating equipment in the heating season, toilets, bathrooms. Besides, firefighting equipment will also be designed; • The design including the layout of the worker camps will be provided to local safety supervision station and firefighting departments for review and approval; • After the worker camps are completed, acceptance will be conducted by local safety supervision station and firefighting departments. • During construction, the worker camps will be cleaned and disinfected regularly; • During construction, regular supervision of worker camps will be conducted; • During construction, safety training, disease control training including COVID-19 will be provided to the workers living in the worker camp; • After construction is completed, the worker camp will be dismantled based on PRC's requirements and regulations.	Contractor	CSC, PIU, EEB
Ambient Air	Dust generated by construction activities,	• Spraying of water daily on construction sites where fugitive dust is being generated. • On-site asphalt mixing and concrete making will be prohibited. Commercial concrete will	Contractor	CSC, PIU, EEB

Item	Potential impacts / issues	Mitigation measures	Who implements	Who supervises
	gaseous air pollution (SO_2, CO, NO_x) from construction machinery	be purchased. • Transport vehicles will be limited to low speeds in construction sites. • Dust suppression including dust proof net, automatic water spray equipment etc. near sensitive receptors, e.g., schools, hospitals and residential areas. • Storing petroleum or other harmful materials in the appropriate places and covering to minimize fugitive dust and emission. • Covering materials during truck transportation, in particular fine material, to avoid spillage or dust generation. • Temporary fencing will be erected around dusty activities. • Ensure vehicle and machinery emissions comply with PRC standards of GB18352-2005, GB17691-2005, GB11340-2005, and GB18285-2005. • Timely monitoring of air quality and inspections during construction, as defined in the project EMP.		
Noise and vibration	Noise and vibration generated from construction activities	• Ensure construction machinery conform to PRC standard of GB12523-2011. • Ensure that noise levels from equipment and machinery conform to PRC standard of GB12523-2011 (revised). Properly maintain construction vehicles and machineries to minimize noise. • Apply noise reduction devices and methods for high noise equipment operating within 200 m of the sensitive sites, e.g., schools, villages, residential areas (section V.A). • Locate high-noise activities (e.g., pilling) >500 m from sensitive areas. • Prohibit operation of high-noise machinery, and movement of heavy vehicles along urban and village roads, between 20:00 and 07:00, in accordance with Henan provincial regulations. • Take special caution at construction sites that are close to such sensitive sites as schools and villages. When construction activities are unavoidable during the school seasons, the use of heavy equipment will be restricted to weekends and non-class hours. • Place temporary hoardings or noise barriers around noise sources during construction. • Monitor noise at sensitive areas at regular intervals (EMP monitoring plan in Appendix 1). If noise standards are exceeded, equipment and construction conditions shall be checked, and mitigation measures shall be implemented to rectify the situation. • Conduct regular interviews with residents/villagers adjacent to construction sites to identify noise disturbance. Community feedback will be used to adjust the work hours of noisy machinery. • Concrete mixing is prohibited. Commercial concrete will be purchased. • If needed, discuss with residents the need for other measures: (a) temporary relocation away from the construction; and/or (b) provision of hearing protection equipment, during occasions of short duration high noise	Contractor	CSC, PIU, EEB
Soil and water	Impact from	• Contractors will develop relevant measures on controlling the oil and other chemicals as	Contractor	CSC, PIU,

Item	Potential impacts / issues	Mitigation measures	Who implements	Who supervises
pollution	wastewater pollution	part of their site EMPs. • Worker camp will be installed with sufficient toilets. Domestic wastewater will be discharged to the municipal sewerage system on a regular basis. • Wastewater from construction activities will be collected in sedimentation tanks, retention ponds, and filter tanks to remove silts and oil. • All areas, where construction equipment and vehicles are to be washed, will be equipped with water collection basins and sediment traps. The area will be restored after construction is completed. • Fuel storage, machinery maintenance workshop and vehicle cleaning areas must be located at least 500 m away from the surface waterbody. • Storage facilities for fuels, oil, and other hazardous materials will be within secured areas on impermeable surfaces and provided with sorbent mats and cleanup installations. • Contractors' fuel suppliers must be properly licensed, who shall follow proper protocol for transferring fuel and the PRC standard of JT618-2004 (Transportation, Loading and Unloading of Dangerous or Harmful Cargo. revised). • Portable toilets and on-site wastewater pre-treatment systems will be installed at construction camps with proper maintenance protocols. • Wastewater quality will be monitored by local environmental monitoring agencies during construction as per the EMP		EEB
Solid Waste	Solid waste generated by construction activities and from workers' camps	• Covered garbage collection bins will be installed at each construction site. It will be the responsibility of the contractors to provide sufficient garbage bins at proper locations and ensure that they are protected from birds and vermin and emptied regularly (using the local municipal solid waste collection system by sighing contracts between the contractor and the local sanitation authority). The contractors' responsibility is included in the EMP and will be included in bidding documents and construction contracts. • Construction waste will be recycled and reused to the extent possible (including wood, concrete, and brick debris). The remaining waste will be transported to the construction waste disposal site. • Littering by workers will be prohibited. Domestic waste will be collected on a regular basis by the local sanitation departments and transported for recycling, reuse, or disposal at a licensed landfill, in accordance with relevant PRC regulations and requirements. • Excavated soil will be backfilled onsite to the extent possible. Excess spoil that cannot be used on-site will be transported to an approved spoil disposal site. • Construction waste dumpsters will be provided at all work sites. Construction waste will be collected on a regular basis by a licensed waste collection company and transported for recycling, reuse, or disposal at a licensed landfill, in accordance with relevant PRC regulations and requirements. • There should be no final waste disposal on site. Waste incineration at or near the site is	Contractor	CSC, PIU, EEB

Item	Potential impacts / issues	Mitigation measures	Who implements	Who supervises
		strictly prohibited. • Contractors will be held responsible for proper removal and disposal of any significant residual materials, wastes, spoil, waste from drilling and contaminated soils that remain on the site after construction. • **CONTRACTOR PERFORMANCE TARGET**: No uncollected waste at close of construction activities each day.		
Ecology	Damage to ecology values	• Clearance of vegetation will be restricted to specific construction sites. • Cleared sites will be immediately re-vegetated afterward. • Landscaping activities will only use native plant species. In the event that non-native seedlings are required for rapid stabilization of exposed soils and sites, only sterile seedlings (i.e., which cannot propagate) will be used, to prevent the spread of weeds. • To reduce the risk of spreading weeds, pest animals, and/or soil-based organisms, the project will: (a) prohibit the use of any plant species classified in the PRC as weeds – including native species – as defined by the Research Center for Biological Prevention and Control of Alien Invasion (Ministry of Agriculture and Rural Affairs) and Institute of Plant Protection (Chinese Academy of Agricultural Sciences), available at http://www.chinaias.cn/wjPart/index.aspx	Contractor	CSC, PIU, EEB
Physical cultural resources	Damage to known or unknown above or below-ground cultural relics	**Implement the following chance-find procedure at all sites:** • Construction activities will be immediately suspended if any PCRs are encountered and protective measures will be implemented; • Destroying, damaging, defacing, or concealing PCRs will be strictly prohibited in accordance with PRC regulations; • Local Cultural Heritage Bureau will be promptly informed and consulted; and, • Construction activities will resume only after thorough investigation and with the permission of the local Cultural Heritage Bureau.	Contractor	PIU, cultural relic bureau
Community and occupational health and safety	Community consultation, health, and safety	**Community consultations** • Prior to any works, inform residents and businesses in advance through media, information boards, and direct consultations, of the construction activities, dates and duration of expected disruption. • Especially for the communities within 40 m of works and who will be subjected to higher noise/dust levels, conduct meetings with residents prior to any works. • Record all community feedback and solutions discussed and agreed. • Based on feedback from the community consultations: (i) update contractor site plans as needed to incorporate the solutions, including revisions in work schedules, working hours, and construction and/or mitigation methods; (ii) revise CSC monitoring schedules and monitoring criteria as needed to reflect the updated contractor site management plans. **Community health, safety, and minimizing disruption to daily life** • Prepare and implement a traffic control plan, for approval by local traffic management	Contractor	CSC, PIU, EEB

Item	Potential impacts / issues	Mitigation measures	Who implements	Who supervises
		administration before construction. This will include scheduling or diverting construction traffic to avoid peak hours, regulating traffic at road crossings, selecting routes to reduce disturbance, reinstating roads, and opening them to traffic when construction is completed; • For all excavation along roads and easements which already have existing subsurface utilities (power cables, sewage pipes, water pipes, telecommunication cables): (i) plan and coordinate the project pipeline construction with the utility managers, (ii) check whether there are other pending projects to upgrade these utilities. Coordinate works to avoid repeated excavation of the same sections of road or easement; and work with utility managers to minimize the risk of damage or disruption to the existing utilities. If any utilities are disturbed by the construction activities, they will be rectified immediately by the contractor in coordination with the utility provider. During this period, users will be provided with alternative water supply (e.g. tankers) if the water supply pipes are broken • Install signs at construction sites to inform people of the project GRM, potential dangers (e.g. moving vehicles, hazardous materials, excavations) and safety issues. • Install safety barricades around all excavations, including open trenches. • Assign personnel to direct pedestrians around dangerous work areas. • Ensure that all sites are secure, discouraging access through appropriate fencing. • Lock and secure all work sites to prevent unauthorized access. • Night-time (8:00pm – 6:00am) use of heavy machinery is strictly prohibited.		
	Occupational health and safety	• Prepare environmental, health and safety plan, to include: (i) clean and sufficient supply of fresh water for construction sites, camps, offices; (ii) sufficient latrines and other sanitary arrangements at construction sites and work camps; (iii) garbage receptacles and regular emptying; and (iv) provision of safety clothing and equipment as needed, in accordance with health and safety regulations. • Prepare emergency response plan and submit to PIU and EEB for approval. Establish emergency phone links with township hospitals. Maintain a first-aid base in each construction camp. • Establish a records management system for occupational accidents, diseases, incidents that: (a) includes a tracking system to ensure that incidents are followed-up; (b) can easily retrieve records; and (c) can be used during compliance monitoring and audits. The system will be backed up on at least one external hard drive to protect records against loss or damage. The records will be reviewed during compliance monitoring and audits. • Establish worker camps in conformance with relevant domestic guidelines. • Safety communication. Publicize occupational health and safety matters to all project personnel. Install on-site signs and give regular training. • Train all workers in basic sanitation, health and safety matters, and work hazards. Implement awareness and prevention program for HIV/AIDS and other diseases – target the local community and construction workers.	Contractor	CSC, PIU, EEB

Item	Potential impacts / issues	Mitigation measures	Who implements	Who supervises
		• Provide personal protection equipment to workers as needed, e.g. safety boots, helmets, gloves, protective clothing, goggles, ear protection. • **COVID-19.** Prepare and implement a coronavirus (COVID-19) health and safety plan to address COVID-19 health risks. The plan will be prepared in line with Appendix 2 and government regulations and guidelines on COVID-19 prevention and control, and in consultation with public health agencies in the area. The plan will include (i) measures to record the locations that workers have visited/lived immediately before and during project work; (ii) schedules for disinfecting/cleaning offices, yards, stores and labor camps; (iii) measures to implement temperature checks and other health checks on site; (iii) physical distancing measures, particularly in worker camps; (iv) requirements for mandatory use of personal protective equipment such as facemasks, and provision of handwashing stations, hand sanitizers, and other appropriate protective measures; (v) how workers and residents living near project sites will be provided with information to protect themselves from COVID-19; (vi) procedures to be adopted in the event a worker is suspected to have contracted COVID-19; and (vii) other COVID-19 prevention and control measures appropriate for the local context. **CONTRACTOR PERFORMANCE TARGET:** Camps clean, emergency response plans in place, and 100% of workers aware of emergency response procedures.		
C. OPERATION PHASE				
Wastewater	Wastewater pollution	• Wastewater from refrigerated and frozen warehouses will be discharged to the municipal sewerage system. • Domestic wastewater will be produced from worker sanitation facilities. Domestic wastewater will be treated in digestion tank and will be discharged to the municipal sewerage system.	PIU	EEB
Solid waste	Solid waste generated by operation activities	• Domestic waste bins will be provided and domestic waste will be routinely collected by the local sanitation department for recycling, if possible, or final disposal at an approved waste disposal site. • No permanent on-site solid waste disposal will be permitted at the project sites. • Cold storage facilities should be well managed to reduce the expired cargo as much as possible. The expired cargo will be treated by local sanitary department after classification. • Waste package material will be sold out. • Waste parts will be recycled by manufactures.	PIU	EEB
Noise	Noise generated from operation activities	• Low-noise equipment will be used as far as possible, and noise reduction measures such as noise elimination, shock absorption, insulated enclosures and sound dampening materials on exterior walls will be implemented. • All equipment will be properly maintained to minimize noise. • Appropriate noise protective equipment will be provided to the workers who are likely to be exposed to high noise level environments to meet the requirements in occupational	PIU	EEB

Item	Potential impacts / issues	Mitigation measures	Who implements	Who supervises
		exposure limits for hazardous agents in workplace Part 2: physical agents (GBZ 2.2-2007) and EHS Guidelines on occupational health and safety (OHS). • Layout for project sites will be planned to reduce noise levels in nearby communities. • Vehicles transporting materials or cargo will slow down and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals		
Chemicals	Chemicals pollution	• A registry of all activities that involve the handling of potentially hazardous substances will be developed, including protocols for the storage, handling and spill response. • All chemicals, toxic, hazardous, and harmful materials will be transported in spill-proof tanks with filling hoses and nozzles in working order. • All chemicals, toxic, hazardous, and harmful materials will be stored in secure areas with impermeable surfaces and protective dikes such that spillage or leakage will be contained from affecting soil, surface water or groundwater systems. The area should be a 110% volume of storage capacity. Their usage will be strictly monitored and recorded. • Good housekeeping procedures will be established to avoid the risk of spills. • Spills will be dealt with immediately, and personnel will be trained and tasked with this responsibility. • Workers will be properly trained before handling hazardous wastes and have the required protective equipment. • Hazardous waste will be temporarily stored in closed containers away from direct sunlight, wind, water and rain in secure designated areas with impermeable surfaces and protective dikes such that spillage or leakage will be contained. • Hazardous wastes, including pesticides, waste chemicals and waste ion exchange resin, will be collected and disposed of by licensed contractors.	PIU	EEB
Community and Occupational Health and Safety	Community and occupational health and safety	• Operation phase EHS plan will be developed and implemented and workers will be trained regularly on their implementation. • The nearby communities will be informed of the potential risks of the project operation. • PPE including goggles, gloves, safety shoes will be provided to workers. Noise protection equipment will be provided to workers in high-noise area. • Provide training to workers on occupational health and safety, and emergency response. • Vehicles transporting materials or cargo will slow down and not use their horn when passing through or nearby sensitive locations, such as residential communities, schools and hospitals. • Safe traffic control measures, including road signs and flag persons to warn of dangerous conditions will be taken as needed. Regular maintenance of vehicles to minimize potential accidents caused by equipment malfunction. • Project sites will be fence with restricted public access.	PIU	EEB

COVID-19 = coronavirus disease, CSC = construction supervision company, EEB = ecology and environment bureau, EMA = environmental monitoring agency; PIU = project

implementation unit (under project implementing agency) GHG = greenhouse gas, O&M = operation and maintenance

Table VI-3: Institutional strengthening and training program

Training Topic	Trainers	Attendees	Contents	Times	Days	# Persons	Budget (USD)
Construction Phase Environment, Health and Safety Training	Consultant	Contractors, CSC, PIU	**AIIB and PRC laws, regulations and policies** – AIIB's ESP and ESS – Project applicable PRC environmental, health and safety laws, policies, standards and regulations – International environmental, health and safety management practice in civil irrigation and drainage construction **GRM** – GRM structure, responsibilities, and timeframe – Types of grievances and eligibility assessment **Implementation of Construction Phase EMP** – Impacts and mitigation measures – Monitoring and reporting requirements – Non-compliance and corrective actions	3	2	20	**Training Development** Fixed costs: $20,000
Operation Phase Environment, Health and Safety Plan Training	Consultant	PIU	**AIIB and PRC laws, regulations and policies** – AIIB's ESP and ESS – Project applicable PRC environmental, health and safety laws, policies, standards and regulations – International environmental, health and safety management practice in civil irrigation and drainage operation **GRM** – GRM structure, responsibilities, and timeframe – Types of grievances and eligibility assessment **Implementation of Operation Phase EMP** – Impacts and mitigation measures – Monitoring and reporting requirements – Non-compliance and corrective actions	2	2	20	**Training Development** Fixed costs: $20,000
			Total	**5**		**40**	**$40,000**

AIIB = Asian Infrastructure Investment Bank, EMP = environment management plan, EEB = environment protection bureau, , GRM = grievance redress mechanism, PIU = project implementation unit.

D. Training and Capacity Building

218. The PIU have no previous experience with AIIB-funded projects or safeguard requirements. Domestic EIAs and project approvals generally include limited mitigation measures, but there is not yet a regulatory requirement in the PRC for EMPs of the scope required by AIIB. Implementation of the current EMP represents a significant new task for the local agencies and PIU. During the project preparation phase, preliminary training on EMP implementation will be provided, including roles and responsibilities of contractors and CSCs for EMP implementation, project impacts, and mitigation measures.

219. During implementation, a capacity building program (**Table VI-3**) will be implemented for safeguards and technical capacity for the designed subprojects. Training will be facilitated by the PIU. Trainees will include the PIU, contractors, CSCs. The training will focus on the AIIB ESP; PRC safeguard requirements; development and implementation of EHS plans during construction and operation; implementation of the EMP, the EMoP, and the GRM; and worker and community health and safety issues and measures.

E. Environmental Monitoring and Reporting

220. Three types of project monitoring will be conducted under the EMP: (i) internal monitoring – to be conducted by the PIU and the CSCs; (ii) external monitoring – of air, water and noise – to be conducted by the EMA(s); and (iii) compliance monitoring, to ensure the EMP is being implemented.

221. The monitoring program (**Table VI-5**) describes the scope of monitoring, parameters, time and frequency and implementing and supervising agencies. The monitoring shall comply with the standards mentioned in Chapter II. The applicable standards to be followed on ambient air, surface water, and noise, and the pollutant discharges are given in **Table VI-5**.

222. Internal monitoring. During the construction phase, the CSCs and the PIU will be responsible for conducting the internal environmental monitoring in accordance with the monitoring plan. Results will be reported through the CSC monthly reports to the PIU.

223. External monitoring. The PIU will contract and fund at least one EMA to conduct the external environmental monitoring described in **Table VI-5**. The external monitoring will be conducted during the entire construction phase and operation phase. The EMA will prepare monitoring reports and the EMA will submit the reports to the PIU.

224. Compliance monitoring for EMP. The PIU safeguard officer will review project progress and compliance with the EMP based on field visits, and review of the monitoring reports by the CSCs and EMA(s). The site visits will include comparison of the works and conditions observed with the EMP mitigation and monitoring measures of the EMP. There is no set frequency for these inspections: the PIU safeguard officer will make site visits as often as possible within the available budget, focused especially on periods of peak construction. The findings will be reported to AIIB through the semi-annual environment monitoring reports.

225. Semi-annual environment monitoring reports. The PIU will submit these reports to AIIB. They will include: (i) progress made in EMP implementation, (ii) overall effectiveness of the EMP implementation (including public and occupational health and safety), (iii)

environmental monitoring and compliance, (iv) institutional strengthening and training, (v) public consultation (including GRM), and (vi) any problems encountered during construction and operation, and the relevant corrective actions undertaken. PIU will prepare the reports and submit the English report to AIIB for review.

Table VI-4: Environmental Reporting Plan

Report	From	To	Frequency of Reporting
A. Construction Phase			
Internal monitoring reports	CSC	PIU	Monthly
External environment monitoring reports	EMA	PIU	Semi-annual
EMP progress report. To include the external environment monitoring reports	PIU	AIIB	Semi-annual
B. Operation Phase			
EMP progress reports	PIU	AIIB	Semi-annual

Table VI-5: Environmental Monitoring Program for "Internal" and "External" Monitoring.
See text for description of "compliance monitoring".

Subject	Parameter*	Location	Frequency	Compliance Standard	Implement	Supervise
CONSTRUCTION STAGE						
1. Internal monitoring – by the contractors, CSCs, and PIU safeguard officer						
Ambient air quality	Compliance with dust mitigation measures	Visual inspection at all construction sites	1 time / week	PRC GB 3095-2012 and EHS guidelines. See EIA tables II-7.	Contractor	CSC
Noise	LAeq: measured with hand-held meter **Contractor performance targets: (i) noise level meets standard at site boundary.**	Construction site boundary	1 time / week	PRC GB12523-2011; GB12348-2008.	Contractor	CSC
Solid waste	Domestic waste and construction waste **Contractor performance target: no uncollected waste at end works each day**	Visual inspection at all construction sites and work-camps	Daily	NA	Contractor	CSC
Soil erosion and re-vegetation	Soil erosion intensity and survival rate of re-vegetation	Visual inspection at spoil sites (if any) and all construction sites	1 time / week; and immediately after heavy rainfall	NA	Contractor	CSC
Occupational health and safety	Camp hygiene, safety, availability of clean water, EMRs **Contractor performance target: camps clean, EMRs in place; 100% of workers aware of EMR procedures**	Visual inspection at all construction sites and work-camps	1 time / month	NA	Contractor	CSC

Subject	Parameter*	Location	Frequency	Compliance Standard	Implement	Supervise
2. External monitoring – by a certified environment monitoring agencies						
Quality of sewage and discharge channels at work camps	pH, SS, NH_3-N, COD_{Cr},	Domestic wastewater discharge at work-camps	2 times/year during construction	PRC GB3838-2002 and GB8978-1996.	EMA	EEB, PIU
Construction wastewater	SS, pH	At wastewater discharge points of all construction sites	2 times/year during construction	PRC GB3838-2002 and GB8978-1996.	EMA	EEB, PIU
Ambient air quality	PM_{10}	All construction sites (at least 1 point upwind, 1 point downwind) and nearby sensitive receivers (Section IV of EIA)	2 times / year during construction	PRC GB 3095-2012 and World Bank EHS standard.	EMA	EEB, PIU
Noise	LAeq	Boundaries of all construction sites and sensitive receivers (Chapter V-sensitive receivers within project area of influence)	2 times / year (twice a day: once in day time and once at night time)	PRC GB12523-2011 and GB12348-2008.	EMA	EEB, PIU
OPERATION PHASE – external monitoring, by certified environment monitoring agencies						
Wastewater	pH, SS, NH_3-N, COD_{Cr}, petroleum	Wastewater emission point	4 times / year	PRC GB 14554-93.	EMA	PIU, EEB
Noise	LAeq	Boundaries of each subproject site	2 times / year (twice a day: 1 in day and 1 at night for 2 consecutive days)	Word Bank EHS standard for communities in rural and urban areas. PRC standard for industrial area.	EMA	PIU, EEB

BOD_5 = 5-day biochemical oxygen demand; COD_{cr} = chemical oxygen demand; CSC = construction supervision company; EMA = environmental monitoring agency; EMR = emergency response plan; EEB = ecology and environment bureau;; LAeq = equivalent continuous A-weighted sound pressure level; NA= not applicable; NH_3-N = ammonia nitrogen; NO_x = nitrogen oxide; PM_{10} = particles measuring $\leq$10μm; PIU = project implementation unit; SO_2 = sulfur dioxide; SS = suspended solids; TSP = total suspended particle, WWTP = wastewater treatment plant.

* In the event that monitoring detects that standards are exceeded: (i) this will be immediately reported to the PIU; (ii) actions will be taken within one week to address the issue; (iii) compliance with standards will be confirmed by immediate subsequent testing; and (iv) all issues will be included in the environment monitoring reports from the PIU to AIIB.

F. Public Consultation and Awareness Raising

226. Information disclosure and public consultation were conducted during project preparation (EIA Section VIII). During construction and operation, the project will continue to seek public consultation and raise awareness of project activities, especially those may impact the public such as noise, dust. The public consultation plan is in **Table VI-6**. The PIU safeguard officer will be responsible for public participation during project implementation, supported by the PIU.

Table VI-6: Public Consultation and Participation Plan

Organizer	Approach	Times/Frequency	Subjects	Participants
Construction				
PIU	Questionnaire survey, site visits, informal interviews	Once a year during peak construction	Construction impacts; effects of mitigation measures; feedback	Workers, residents in construction areas
	Public hearing meeting	At least once during peak construction period	EMP implementation progress; construction impacts; effects of mitigation measures; feedback	Affected persons
Operation				
PIU	Consultation and site visits	At least once in first year of operation	Effects of mitigation measures, impacts of operation, feedback	Affected persons
	Public workshop	As needed based on consultations	As above	As above
	Public survey	At least once after 1 year of operation	Comments and suggestions	Project beneficiaries

EIA = environmental impact assessment, PIU = project implementation unit.

G. Cost Estimates

227. This section provides an estimate of the cost of EMP implementation. The cost comprises expenses for three categories: the mitigation measures described in **Table VI-2**; monitoring plan (**Table VI-5**); and training (**Table VI-4**). Costs are presented for the construction phase of five years and the first five years of operation i.e. a total of ten years. The costs do not include: (i) detailed design revisions and adjustments; (ii) internal monitoring and inspection, as this will be included in the construction and construction supervision contracts. Costs for mitigation measures and training are based on estimates in the DEIA and/or the experience from other similar projects. All costs were discussed with the PIU and confirmed by the PIU.

228. Construction-phase costs will be paid by the contractors (as part of their contracts). Operational-phase costs will be paid by PIU.

Table VI-7: Estimated Cost for EMP Implementation for Five Years Construction and Five Year Operation (CNY10,000).

No.	Item	Total cost
1	Training and workshops (as estimated)	15
2	Public consultation (as estimated)	10
3	Mitigation measures during construction (as estimated)	160
4	Mitigation measures during operation (as estimated)	20
5	Monitoring during construction (as estimated)	31
6	Monitoring during operation (as estimated)	9
7	Salaries of PIU staff (as estimated)	120
8	Consultant (as estimated)	60
Total		**425**

H. Mechanisms for Feedback and Adjustment

229. Based on environmental inspection and monitoring reports, the PIU shall decide, whether (i) further mitigation measures are required as corrective actions, or (ii) some improvements are required for EMP. The effectiveness of mitigation measures and monitoring plans will be evaluated by a feedback reporting system. Adjustment to the EMP will be made, if necessary. The PIU safeguard officer will play critical roles in the feedback and adjustment mechanism.

230. If during inspection and monitoring, substantial deviation from the EMP is observed or any changes are made to the project that may cause substantial adverse environmental impacts or increase the number of affected people, then the PIU will immediately consult with AIIB and form an environmental assessment team to conduct additional environmental assessment. If necessary, further public consultation will be undertaken. The revised DEIAs and project EIA, including this EMP, will be submitted to the AIIB for review, appraisal, and public disclosure. The revised EMP will be passed to the contractors, CSCs and PIU for implementation.

VII. ALTERNATIVE ANALYSIS

231. An analysis of alternatives was considered for (i) soil erosion, waste and wastewater management, and flood control with or without the project scenario, (ii) selection of dredging technology, and (iii) selection of a suitable site for proposed sewage and waste treatment plant for project 8.

A. No Project Alternative

232. Because ZIH doesn't have cold storage facilities now, ZIH needs to rent cold storage facilities. The average transport distance is around 20km between ZIH and the rented cold storage facilities, which result in cost increase and efficiency reduction. Based on FSR, there will be 42,637 tons demand for refrigerated and frozen cargo for ZIH in 2024. For these reasons the "no project" alternative for subproject 1 is considered unacceptable.

233. Now most of the vehicle import ports in China are on the coasts and the imported vehicles are mainly transported by sea with a small amount transported by air. For the six provinces in central part of China including Henan Province, Hubei Province, Hebei Province, Shanxi Province and Shaanxi Province, both transportation methods will result in cost and transport time increase. For these reasons the "no project" alternative for subproject 2 is considered unacceptable.

234. Now ZIH's imported and exported cargo are stored separately, which result in cost increase and efficiency reduction. Besides, the parallel vehicle imports facility of the project will also need customs clearance service. For these reasons the "no project" alternative for subproject 3 is considered unacceptable.

235. Since July 2015, the State Council issued the "Guidance on Promotion of the Internet Plus Action". There are 11 key actions in the document including promotion of internet plus based logistics. Informatization, automation and smart of logistics have become development trends. ZIH already developed an information platform. Considering the implementation of the project, the platform will need to be updated based on the project. For these reasons the "no project" alternative for subproject 4 is considered unacceptable.

236. The outcome of the No-Project alternative would be (i) cost and transport time increase for vehicle transport, cold chain transportation increase; (ii) limited improved efficiency of HMT; (iii) limited improved capacity of ZIH and China-Europe block train. After the project is completed, China-Europe Block Train (Zhengzhou section)'s throughput capacity as well as cold chain storage transportation capacity will be increased, efficiency of logistics turnover will be increased, logistics turnover cost will be reduced, and promote the economic development and provide job opportunities to the countries along the China-Europe Block Train.

B. Alternative Types of Coolants for Subproject 1

237. Subproject 1 will use coolants for cold storage. The coolants suitable for fruit storage are medium temperature coolants (condensing pressure is less than 20kg/cm and evaporating temperature is more than -60 °C). The potential candidates of the coolants include R22 (a widely used coolant in the past in China), R507 (a coolant initially proposed by PIU and CO_2+R507 proposed by design institute.

Table VII-1: Comparison and Selection of Coolants

No.	Factor	R22	R507	CO_2+R507

				(Selected Option)
1	Global Warming Potential	1700	3985	1825
2	Ozone depletion	Contains ozone-depleting substances	Does not contain ozone-depleting substances	Does not contain ozone-depleting substances
3	Comparison	R22 will be prohibited in developed countries from 2020 and developing countries from 2030 base on the Montreal Protocol. Hence not recommended.	High global warming potential, not recommended	Recommended since it does not contain ozone-depleting substances and lesser global warming potential compared to R507

238. Based on the analysis given in the above table, R407F was selected for the proposed project 6 due to its advantage over the other options.

C. Alternative Locations for Project Sites

239. The subproject 1 and 2 are phase II of ZIH's on-going projects, therefore, there is no alternative for the locations of subproject 1 and 2.

240. Subproject 4 is non-structural project and will update the existing ZIH's system, therefore, there is no alternative.

241. Subproject 3 is a bonded logistics center. The location should be closed to the railway hub and parallel vehicle imports facility as much as possible to improve the efficiency. The subproject 3's site is close to the ZIH and subproject, making it a good option.

D. Alternative Locations for Project Technologies

242. The subproject 1 and 2 are phase II of ZIH's on-going projects, therefore, there is no alternative for the technology and processes of subproject 1 and 2.

243. Subproject 3 is a bonded logistics center. The whole process is determined based on customs requirements.

244. Since July 2015, the State Council issued the "Guidance on Promotion of the Internet Plus Action". There are 11 key actions in the document including promotion of internet plus based logistics. Informatization, automation and smart of logistics have become development trends. To achieve one-stop command and dispatch service, information display in one window function, big data, cloud computing, internet plus and other information technologies are utilized by subproject 4.

E. Overall Alternative Analysis

245. Based on the analysis of alternatives, the component has selected the most appropriate site location, coolant and technologies.

VIII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

246. This Chapter presents the objectives and findings of the initial public and stakeholder consultations which were conducted during the development of the present EIA. The Chapter also defines the requirements of consultations to be carried out during the project implementation, in addition to describing the disclosure requirements.

247. Meaningful public participation and consultation during project feasibility study, design and implementation are important safeguard requirements. The PRC Environmental Protection Law and Regulations on the Administration of Construction Project Environmental Protection (Order No. 253 of the State Council), and Measures on Public Participation in Environmental Impact Assessment (Order No.4 of the Ministry of Ecology and Environment, April 2018), require that a DEIA solicits the opinions of organizations concerned, and villagers and residents within and near the project sites. In August 2012, the PRC National Development and Reform Commission (NDRC) issued a requirement for "Social Risk Assessment of Large Investment Projects", which emphasizes the importance of public consultation in an effective manner and requires that the results of public consultation are clearly summarized in the DEIA report, including the dates of consultations, number of stakeholders, who the affected people are, and the comments received.

248. AIIB's ESP also requires meaningful public participation, consultation and information disclosure. The consultation process for this project followed both the PRC law/regulation and the AIIB's ESP.

A. Objectives of Consultations

249. Stakeholder consultations (or public consultation) during the environmental and social assessment process of development projects is increasingly considered an important notion and requirements which increases the authenticity and acceptability of assessment itself but more importantly can possibly enhance the quality of decisions making as well. Stakeholder consultation/participation during various stages of developmental projects helps to improve decision making and ultimately leads towards sustainable development.

250. Stakeholder consultation is a two-way process. For stakeholders, the consultation process is an opportunity to obtain project information, to understand its potential impacts, to raise issues and concerns, and ask questions. For the project proponents, the consultation process offers an opportunity to understand the stakeholders and their concerns about the project, their needs and aspirations, and also their suggestions that can potentially help shape the project and its design. Listening to stakeholders' concerns and feedback can be a valuable source of information that can improve project design and outcomes and help the project proponent to identify and control external risks. It can also form the basis for future collaboration and partnerships.

251. Specific objectives of the consultation process that has been initiated while preparing the present EIA are listed below.

- Sharing of information with stakeholders on the proposed project and key findings of the EIA;
- Obtaining their feedback about the project, perceived impacts and preferred mitigation measures, and to collect information on environmental, ecological, and socio-economic baseline in the project area;
- Understanding the stakeholders' concerns regarding various aspects of the project, including the existing situation, construction works and the potential impacts of the construction-related activities
- Developing and maintaining communication links between the project proponents and

stakeholders,

- Ensuring that views and concerns of the stakeholders are incorporated into the project design and implementation as much as possible with the objectives of reducing or offsetting negative impacts and enhancing benefits of the proposed project.
- Managing expectations and misconceptions related to the project;
- Obtaining local and indigenous knowledge about the people living in the project area;
- Interaction with the project affected population and other stakeholders for the collection of primary as well as secondary data relating to the project activities.
- Engaging stakeholders for maximization of the project benefits.

B. Stakeholder Identification

252. Stakeholders are considered to be individuals or organizations which have an interest in the proposed project or knowledge that would provide insight into issues or affect decision making related to the proposed project. On the basis of interest and role criteria there are two types of stakeholders for the proposed project as described below.

253. The primary stakeholders (also called direct stakeholders) are the grass-root stakeholders, such as project affected persons and general public including women residing in the project area. These are the people who are directly exposed to the project's impacts though in some cases they may not be receiving any direct benefit from the project.

254. The communities living near the project site and the staff working in the office building near the project site are the key primary stakeholders.

255. The secondary stakeholders (also called institutional stakeholders) are the people, department, institutions, and/or organizations that may not be directly affected by the project however they may influence the project and its design. They include project proponent, other concerned departments that may have a role during various phases of the project, regulatory agencies, other relevant departments, non-governmental organizations (NGOs), the broader interested communities including academia and journalists, and general public.

C. Public Consultation

256. The public consultations for the project were conducted in three types: (i) two separate consultation meetings with the primary stakeholders in the ZIH's office building near the project site held at 25 September, 2020 and March 23, 2021; (ii) interview with the primary stakeholders living and working near the project site at 25-26 September, 2020; and (iii) interview with the secondary stakeholders- EEB, Planning Bureau, Approval center, Supervision Bureau at 26 September, 2020. The pictures of pubic consultation are presented in **Figure VIII-1**.

257. Two separate consultation meetings were organized by the PIU. Persons from nearby communities, staff from nearby companies and staff from government departments were invited to the meeting. In addition, all information was provided in the Chinese language to ensure accessibility for participants.

258. During the first meeting, the PIU introduced the project information; the adverse impacts and beneficial impacts brought to the surrounding environment and residents during construction and operation; and proposed mitigation measures. The first public meeting was used as an opportunity to: (i) present the main anticipated impacts and the final proposed mitigation measures as defined in the FSR and the DEIA; and (ii) introduce the project GRM. Besides, summary of the EIA was also made provided to the participants. Because of the COVID19, the participants completed the

questionnaire surveys by wetchat app or internet during the first public consultation meeting (the link is www.wjx.cn/jq/92026812.aspx). 55 completed questionnaires were received. The information of the participants was presented in **Table VIII-1**.

259. The first meeting was attended by 55 people (31 male and 24 female). The consultation meetings were followed by a questionnaire survey. All the 55 participants have completed the questionnaire surveys. The breakdown of participants and the results of questionnaire surveys are listed in **Table VIII-1** and **Table VIII-2**.

260. During the second meeting, the PIU introduced the finalized project information; summary of environmental and social impacts of mitigation measures, the established GRM and information disclosure and public consultation plan during the project implementation. During the meeting, the staff from EEB of ZETDZ and sub-district office of Chaohe Street of ZETDZ expressed the importance of the compliance of the national laws, regulations, and standards. PIU and the contractors promised that the mitigation measures, monitoring plan included in the domestic EIAs and EMP will be well implemented. The nearby residents said that based on the past experiences, they believed that the environmental and social impacts of the project during construction and operation periods can be mitigated and they were familiar with the GRM process and staff from ZIH said that the staff right and benefit can be guaranteed. All the participants believed that the project can bring significant social benefits. The minutes of the second meeting is presented in Appendix II.

Table VIII-1: Participants of Public Consultations

Information of Consulted PAPs		**25 September 2020**	
		55 Valid resp.	%
Gender	Male	31	56.4%
	Female	24	43.6%
Age Group	<20	0	0.0%
	20-40	42	76.4%
	41-60	11	20.0%
	≥60	2	3.6%
Education	Illiteracy	0	0
	Primary school	0	0
	Junior high school	2	3.6%
	Senior high school	11	20.0%
	Vocational school	14	25.5%
	College and above	28	50.9%
Ethnic	Han	55	100%
	Hui (minority)	0	0
Occupation	Peasant	0	0
	Civil servant	2	3.6%
	Employees	53	96.4%
	Others	0	0

First public consultation meeting

Interview with the driver working for the ZIH

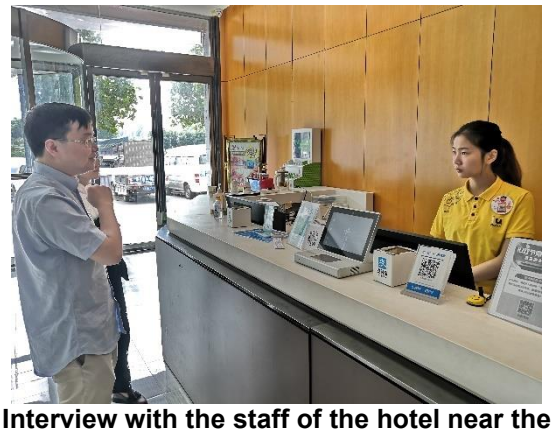
Interview with the drivers working for the railway port

Interview with the managers working for the railway port

Interview with the director of ZETDZ's EEB

Interview with the staff of ZETDZ's planning bureau

Interview with the staff of ZETDZ's supervision bureau



Interview with the staff of the hotel near the project site

Interview with the resident near the project site

Interview with the resident near the project site

Second public consultation meeting

Figure VIII-1: Public consultation

Table VIII-2: Results of Questionnaire Survey

Question	Choices	Yes	%
1. Please provide your name	NA	NA	NA
2. What is your gender	Male	31	56.4%
	Female	24	43.6%
3. What is your age?	NA	NA	NA
4. What is your nationality?	Han	55	100%
	Hui nationality	0	0
	Uygur	0	0
	Other	0	0
5. What is your education level?	Illiteracy	0	0
	Primary school	0	0
	Junior high school	2	3.6%
	Senior high school	11	20.0%
	Vocational school	14	25.5%

	College and above	28	50.9%
6. What is your occupation?	Peasant	0	0
	Civil servant	2	3.6%
	Employees	53	96.4%
	Others	0	0
7. Please provide your contact information	NA	NA	NA
8. Please provide your address	NA	NA	NA
9. In your opinion, what are the major environment pollution issues in your areas?	Ambient air	26	47.3%
	Noise	30	54.5%
	Surface water	3	5.5%
	Groundwater	0	0
	Soil	2	3.6%
	Solid waste	3	5.5%
	Odor	0	0
	Risks associated with chemicals and hazardous chemicals	1	1.8%
	Other concern	15	0
10. Distance between your working place and project site	<1 km	44	80.0%
	1-3 km	8	14.5%
	3-5 km	1	1.8%
	> 5km	2	3.6%
11. Distance between your house and project site	<1 km	13	23.6%
	1-3 km	7	12.7%
	3-5 km	8	14.5%
	> 5km	27	49.1%
12. Do you know this project before this public consultation?	Yes	44	80.0%
	No	11	20.0%
13. Do you understand the potential adverse impacts during the construction of the proposed project projects?	Clearly understand	13	23.6%
	Somewhat understand	24	43.6%
	Barely understand	14	25.5%
	Do not understand	4	7.3%
14. What would be the major impacts during project construction?	Noise	21	38.2%
	Dust	14	25.5%
	Solid waste	2	3.6%
	Traffic congestion	6	10.9%
	No major impacts	12	21.8%
15. After learning about mitigation measures during the construction, do you accept anticipated construction phase impacts?	Accept	42	76.4%
	Barely accept	12	21.8%
	Do not accept	0	0.0%
	Have no idea	1	1.8%
16. Do you understand all the anticipated environmental and health and safety adverse impacts of the project during operation?	Clearly understand	15	27.3%
	Somewhat understand	27	49.1%
	Barely understand	10	18.2%
	Do not understand	3	5.5%
17. What are the major impacts of this project during operation period?	Noise pollution	27	49.1%
	Air pollution	8	14.5%
	Solid waste	16	29.1%
	Waste water pollution	2	3.6%
	Other	2	3.6%
18. Do you accept the adverse impacts of the project after you understand the mitigation measures?	Accept	44	80.0%
	Barely accept	10	18.2%
	Do not accept	0	0
	Have no idea	1	1.8%
	Yes	54	98.2%

19. Do you think construction of this project can improve local economic development or not?	No	0	0.0%
	I do not know	1	1.8%
20. Do you support the project?	Yes	54	98.2%
	No	0	0
	I do not know	1	1.8%
Suggestions or requirements for environment protection of the project			

261. **Results of the first public consultation meeting**. About 80% of respondents knew about the project either from other people, newspapers, or information signs. The top two environmental issues respondents identified in their neighborhoods are noise (54.5%) and ambient air (47.3%). About 7.3% of the respondents indicated that they still didn't understand the adverse impacts of the project during the construction period. Noise (38.2%) and dust (25.5%) and noise (58.8%) were identified as the top two issues during the construction phase. Noise (49.1) and solid waste (29.1) were identified as the top two issues during the operation phase. These concerns are addressed by integration of safeguard mitigation measures in the project environmental management plan into the project design.

262. Overall support for the project is very strong; 98.2% of the respondents indicated that the project would improve local economic development and 98.2% of respondents indicated that they support the proposed project.

263. **Results of the stakeholder interview.** The concerns raised by the residents living and working near the project sites is the noise. The concern is addressed by implementation of the noise mitigation measures of EMP.

264. The drivers and managers of the logistic companies working near the project sites supported the project because the project will provide more job opportunities to them. Some drivers thought that the working hours may be increased and risks from fatigue driving will be increased. Based on the communication with the managers, all the vehicles of the logistics companies are installed with GPS equipment to provide the location of the vehicles to the control system of the companies. If the drivers have dried more than 4 hours, the control system will force the driver to rest for no less than 20 minutes.

265. Based on the interview with the relevant departments of ZETDZ, the project has obtained all necessary permit for construction. If the mitigation measures from the DEIA is well implemented, the environmental impacts of the project can be accepted. The concern from the departments is the dust control during construction period and can be addressed by implementation of the dust mitigation measures of EMP including the mitigation measures of DEIA.

D. Information Disclosure

266. Information disclosure for the proposed project was conducted by the EEB during preparation of DEIAs. After the DEIAs were submitted to EEB for approval, the information was disclosed on the website of EEB. The information disclosed included (i) the name and major content of the project, (ii) contact of the implementing agency, (iii) name and contact of the EIA institute, (iv) internet link of the public comment form, and (v) ways of submitting the public comment form. The second round of information disclosure was undertaken after the DEIAs were approved by local EEB. to seek public feedback on the findings, including potential impacts and mitigation measures, and included consultations with communities and villages in and near project sites. The documents and information disclosed in the second round of information disclosure comprised: (i) a description of the project and projects, including project locations, scope and construction methods; (ii) the

potential impacts and risks during construction and operation; (iii) a summary of the DEIA and EMP (key findings, impacts, proposed mitigation measures); (iv) a summary of national laws and regulations ensuring the rights of communities to express their views; (v) methods and contact channels for public feedback (to the EEB, DEIA Institute and the PIU), and duration of public access to DEIA report.

267. No public feedback was received during the information disclosure of the subproject 1, 2 and 3.

268. The final EIA document will be disclosed at the website of ZIH from May 2021. The EIA will be translated in Chinese languages and placed on the same website, in addition to being available locally at the project site (PIU office, contractor's office).

E. Future Stakeholder Engagement Program

269. Stakeholder engagement program (SEP) will be maintained with project stakeholders throughout project implementation, including: (i) before and after key works, to ensure residents are informed of and have the opportunity to respond to, pending works and procedures, (ii) broader consultations about project progress will be implemented during project period. SEP will be undertaken by the PIU, via questionnaire surveys, household visits, workshops, and public hearings.

270. The SEP is an ongoing process and will continue throughout the project implementation. The SEP could be scheduled on a regular basis with the stakeholders including but not limited to the concerned government departments, local administration, nearby companies and the community representatives from the proposed project area with specific focus on women empowerment.

271. A framework has been developed for the SEP to be carried out during the project implementation and is presented in **Table VIII-3**.

Table VIII-3: SEP Framework during Project Implementation

Description	Target Stakeholders	Timing	Responsibility
Consultations with the communities during project implementation	Communities at/around subproject area	Before commencement of project activities.	PIU
Establishment of GRM	Communities at/around project area	Before commencement of project activities.	PIU
Grievance redress	PIU staff; consultants; relevant line departments; and communities (as needed).	Project implementation Stage	PIU
Informal consultations and discussions.	Communities at/around project area	Project implementation Stage	PIU
Consultations with the stakeholders during project implementation	Secondary stakeholders	Project implementation Stage	PIU

IX. GRIEVANCE REDRESS MECHANISM

272. The existing mechanisms of addressing project related complaints in China and the existing GRM of ZIH have been reviewed. The existing Grievance Redress Mechanism of ZIH will be improved for the proposed project in accordance with AIIB's ESP and applicable ESSs. The GRM is designed to address concerns and complaints promptly, using an understandable and transparent process that is culturally appropriate and readily accessible to all project affected persons as well as workers to be involved in this project. The GRM includes time-based steps for receiving, documenting, and resolving grievances. Any concerns raised through the GRM will be addressed quickly and transparently, and without retribution to the affected persons and workers.

A. Existing Grievance Redressal Mechanism of ZIH

273. Currently, in Zhengzhou (and generally in the PRC), when residents or organizations are negatively affected by construction or development, they may complain, individually or through their village or community committee, to the contractors, developers, the local EEB, the local government or by direct appeal to the local courts.

274. The Supervision Office of ZIH is responsible for dealing with the complaints including the complaints from the staff of ZIH and the affected residents or organizations. The process of existing GRM is reviewed. There are dedicated personnel in Supervision Office to address grievances. After the grievance is received by the Supervision Office, the dedicated staff will contact the complainant to collect information about the grievance. Then the dedicated staff will inform relevant departments or units to immediately stop the causal activity and give a clear reply to the affected person and implement the action plan to address the grievance as far as possible. If ZIH can't resolve the grievance, the dedicated staff will submit the grievance to the local governments including management committee of ZETDZ to address the grievance.

275. Generally speaking, the existing GRM is operated with adequate personnel to address grievances and records of all grievances received including contact details of complainant, date of the complaint was received, nature of grievance, agreed corrective actions are well kept. The weaknesses of this GRM are: (i) the lack of information disclosure to project stakeholders; and (ii) the lack of a specific timeframe for the redress of grievances.

276. The existing Grievance Redress Mechanism of ZIH will be improved for the proposed project to addresses these weaknesses in accordance with AIIB's ESP and applicable ESSs. The GRM is designed to achieve the following objectives: (i) provide channels of communication for communities to raise concerns about environmental and social-related grievances which might result from the project; (ii) prevent and mitigate adverse environmental and social impacts to villages and communities caused by project construction and operation, including those associated with resettlement through improved awareness; (iii) promote trust between the project agencies and communities; and (iv) build community acceptance of the project. The GRM is accessible to all members of the villages and communities, including women, youth, minorities and poverty-stricken villagers and residents. Multiple points of entry are available, including face-to-face meetings, written complaints, telephone conversations, e-mail, Wechat and social media.

277. The Supervision Office of ZIH (+860371-56551703) will lead the coordination of the GRM. However, all project agencies and staff will be trained in the GRM and are expected to take an active role for implementing the GRM. Capacity building will be provided to contractors and CSCs on the GRM procedures, and Supervision Office will coordinate with the local EEBs and other government divisions as necessary. Staff of Supervision Office will be trained. The Supervision Office will establish a GRM tracking and documentation system, conduct coordination with the CSCs,

contractors, local EEB and ZETDZT arrange meetings and conduct site visits as necessary, maintain the overall project GRM database, and prepare the reporting inputs for progress reports to AIIB.

278. The contact information for different GRM entry points, such as the Supervision Officer, contractors, operators of project facilities, and local EEB will be identified prior to construction and part of the information is presented below. The contact details for the entry points (phone numbers, addresses, e-mail addresses) will be publicly disclosed on information boards at construction sites and at the operation sites.

Table IX-1: Contact information of GRM entry points

Name	**Contact information**
Supervision Office of ZIH	+860371-56551703
Sub-district office of Chaohe Street of ZETDZ	+860371-66777586
EEB of ZETDZ	+860371-86186912
City Urban Administrative Enforcement Bureau of ZETDZ	+860371-66785373
Citizen hotline	+860371-12345
Environmental protection hotline	+860371-12369

B. Project-level Grievance Redressal Mechanism for Project Affected Persons

279. Grievances to be addressed by the GRM will most likely be of disturbances e.g. dust emissions, construction noise, caused by project constructions, inappropriate disposal of construction wastes, safety measures for the protection of the public and construction workers and noise and waste caused by project operation.

280. The GRM meets the regulatory standards of the PRC that protect the rights of citizens from construction-related environmental and/or social impacts. Decree No. 431 Regulation on Letters and Visits, issued by the State Council of PRC in 2005, codifies a complaint acceptance mechanism at all levels of government and protects the complainants from retaliation. Based on the regulation, the Ministry of Environmental Protection (MEE)[10] published updated Measures on Environmental Letters and Visits (Decree No. 15) in December 2010.

281. The details of the GRM, including a time-bound flow chart of procedures, are described in below (**Figure IX-1**).

282. If a complaint is received and filed, the PIU officer shall first review the content of the complaint, and determine whether the complaint is relevant with the Project. If it is relevant with the Project, regardless whether the complaint belong to environmental and social issues or not, the PIU officer should coordinate resolution process to address the complaints. For issues not directly involved with the Project, PIU officer will on behalf of the complainant to raise it to the relevant authority. All complaints should also be documented in the records, and basic steps of GRM will be informed to person involved. The basic steps and time frame for GRM is listed in the following:

- **Phase 1 (5 calendar days)**: When the issues appear during construction or operation, the affected person could first bring his complaint to the environmental and social officer (ESO)/focal point of the contractor (during construction) or operator (during operation) in written form or verbally. The ESO or focal point of the contractor or operator should first verify the problem and stop relevant construction activities (such as noise of construction, which is too loud for local

10 The new name for the MEP is Ministry of Ecology and Environment.

residents). (2) Before the issue is resolved, relevant construction activities should not resume. (3) On the same day of receiving the complaint, the contractor should inform the environmental and social officer of the PIU about the complaint and measures to be adopted to address such complaint. This would then be documented in the complaints log at the PIU. (4) Within two days, the contractor should provide a definite response to the affected person; and (5) the problem should be resolved within five days of the complaint. PIU should inform the incident to local residential committee or local environmental bureau and keep them posted.

- **Phase 2 (5 calendar days)**: If the contractor or operator could not resolve the issue during phase 1, PIU should try best to resolve it. PIU should first evaluate the complaint and propose resolution to affected person in two days. If affected person agrees the resolution, contractor or operator will resolve the issue within 5 days. All measures will be documented in the record. In the conclusion of Phase 2, PIU will inform the result to AIIB

- **Phase 3 (15 calendar days)**: If PIU could not determine a resolution or the affected people does not satisfy the proposed resolution, PIU will organize a meeting with key stakeholders, including contractor, affected people, local environmental department and PIU. A resolution acceptable to all parties should be developed include key steps to resolve the issue. The contractor or operator should immediately implement the resolution and resolve the issue within 15 days. All measures and outcomes should be documented in the record. Once the phase 3 is complete; PIU will report the outcome to AIIB.

283. The contractor or operator and PIU should keep affected person informed during the process of GRM. GRM will not prevent the affected people to make such claim to other institutions, such as local residential committee, sub-district, city government, court, and AIIB.

284. The Project-affected People's Mechanism (PPM) has been established by AIIB to provide an opportunity for the independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by the AIIB's failure to implement its ESP in case when their concerns cannot be addressed satisfactorily through the Project-level GRM or the processes of the AIIB's Management. For information on the Project-affected People's Mechanism, please visit: https://www.aiib.org/en/policies-strategies/operational-policies/policy-on-the-project-affected-mechanism.html

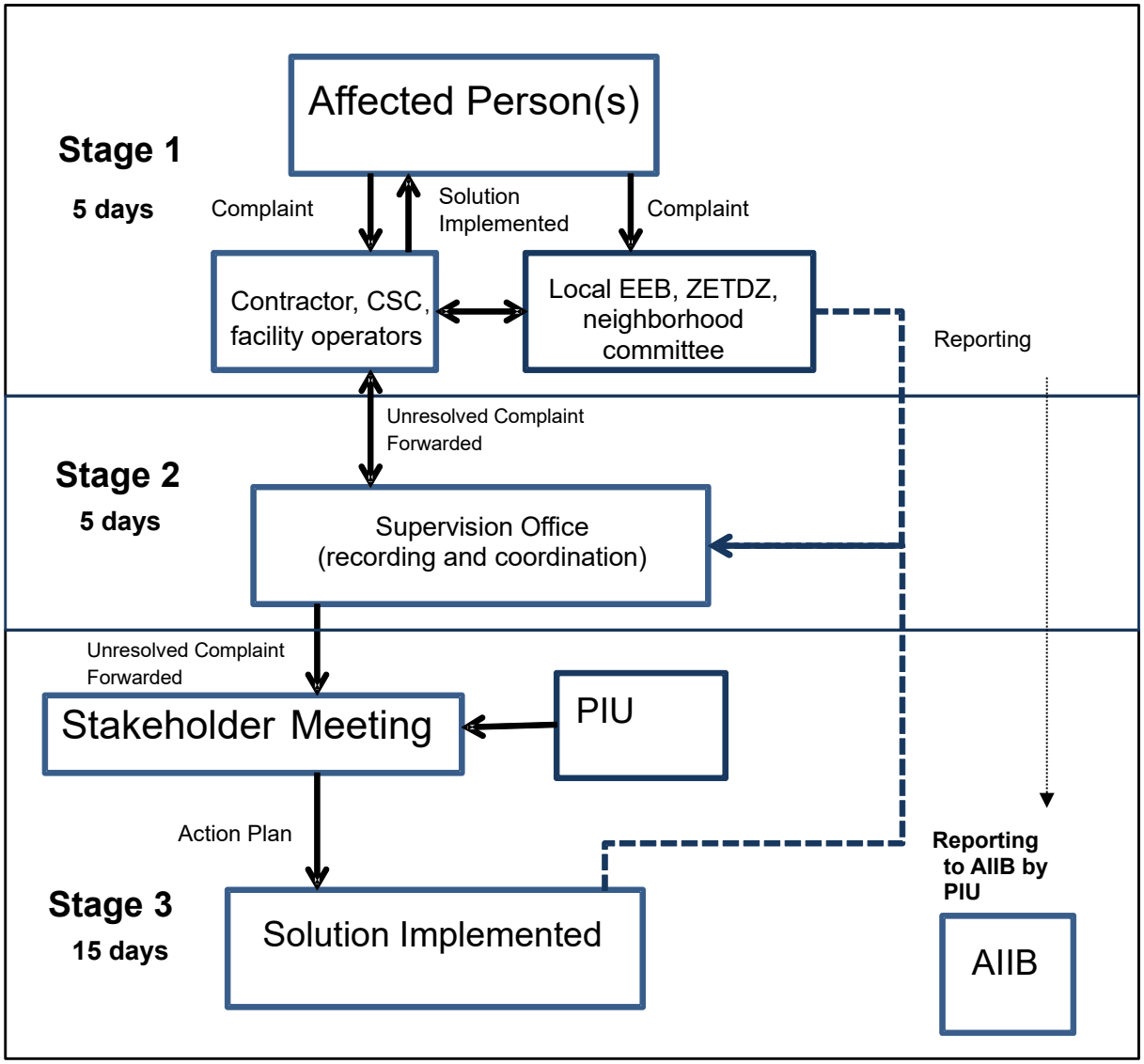


Figure IX-1: Operation Chart of the Grievance Redress Mechanism

AIIB = Asian Infrastructure Investment Bank, CSC = construction supervision company, EEB = ecology and environmental bureau, GRM = grievance redress mechanism.

C. Project-level Grievance Redressal Mechanism for Workers

285. Based on past experience, it is necessary to set up a separate GRM to address any complaints brought by workers who work on the construction sites for selected contractors. Such complaints could cover wages, overtime pay, timely delivery of wages, lack of proper accommodation or facilities related with drinking water, sanitation condition, and medical services.

286. The proposed Project will set up a grievance redress committee (GRC) to deal with any complaints brought by the project workers, including both directly or indirectly involved workers. The GRC will include following members: ESO staff in PIU, supervision engineers, and representatives of workers and contractors. ESO staff of PIU will be responsible for handling complaints and ensure that affected workers will not be laid off due to make any complains, and complain will not be withdrawn before formal hearing due to threat.

287. To ensure fairness and openness, the formal hearing will be held in secured environment and to be accessible to other workers. GRC will document the following information during the hearing: (1) the detailed content of complaint; (2) reasons for accepting the complaint or rejecting complaint as well as number of complaints accepted or rejected; (3) the resolution scheme agreed with affected persons. PIU will keep the records of all complaints and outcome of resolutions, and will report to AIIB through semi-annual environmental or social monitoring reports. When it is required, such records should be made available for review by relevant parties and AIIB.

D. Record keeping and Periodic Review

288. The PIU shall bear any and all costs of implementing the GRM, including meeting, travel, and/or accommodation costs of the project staff or affected person. The GRM will be implemented throughout project implementation period.

289. All complains received should be documented clearly in the record, including contact details of affected people, date of receiving complains, content of complains, measures agreed upon to address complains. The records of complains and their outcomes will be disclosed in the office of PIU and included in semi-annual monitoring report to be submitted to AIIB.

290. PIU staff should regularly review the functions of GRM and verify effectiveness of GRM, particularly on information of capacity of GRM in avoiding complains and resolving issues raised by complains.

APPENDIX I. COVID 19 – PROJECT HEALTH & SAFETY PLAN (DRAFT GUIDELINES)

Item	Good Practices	Who implements	Who supervises
Awareness materials	• Preparation of awareness materials on COVID-19 e.g., signs, posters • Installation of awareness signs at work sites, for visibility to workers and the general public	Contractor	CSC, PIU
Detection Measures	• Control and document the entry/exit to the work site for both workers and other parties. • Prevent sick workers from entering the site through checking temperatures of workers and other people entering the site. Require self-reporting prior to entering the site. • All workers will take their body temperature regularly.	Contractor	CSC, PIU
Physical Distancing measures	• Keep a distance of at least 1 meter between workers and minimize physical contact, ensure strict control over external access, and queue management (marking on the floor, barriers). • Reduce density of people in the building (no more than 1 person per every 10 square metres), physical spacing at least 1 meter apart for construction sites and operation sites and common spaces, such as entrances/exits, lifts, pantries/canteens, stairs, where congregation or queuing of employees or visitors/clients might occur. • Avoid crowding by staggering working hours to reduce the congregation of employees at common spaces such as entrances or exits. • Implement or enhance shift or split-team arrangements, or teleworking. • Minimise the movement of local workers in and out of the site (e.g., avoid workers returning home to medium and/or high risk areas, or returning to site form medium and/or high risk area areas). • Minimise the workers' contact with local community.	Contractor	CSC, PIU
Respiratory measures	• All workers should wear a face mask. • If a worker is sick, they should not come to work if a member of staff or a worker feels unwell while at work, provide a medical mask so that they may get home safely. • Where masks are used, whether in line with government policy or by personal choice, it is very important to ensure safe and proper use, care and disposal	Contractor	CSC, PIU
Hand Hygiene measures:	• Regular and thorough handwashing with soap and water or hand hygiene with alcohol-based hand-rub. • Hand hygiene stations, such as hand washing and hand rub dispensers, should be put in prominent places around the workplace and be made accessible to all staff, contractors, clients or customers, and visitors to promote hand hygiene	Contractor	CSC, PIU
Cleaning and Disinfection	• Cleaning and Disinfection off all site facilities, including offices, accommodation, canteens and common spaces: • Cleaning (soap, water, and mechanical action) to remove dirt, debris, and other materials from surfaces. Disinfection of dirty surfaces and objects only after cleaning. • Disinfectant solutions must always be prepared and used according to the manufacturer's instructions, including instructions to protect the safety and health of disinfection workers, use of personal protective equipment, and avoiding mixing different chemical disinfectants. • Provide appropriate PPEs to the cleaners. • Manage the waste as the medical waste, and dispose of it in	Contractor	CSC, PIU

Item	Good Practices	Who implements	Who supervises
	accordance with local regulations.		
Response measures if workers found with COVID-19 symptoms	• Workers who are unwell or who develop symptoms consistent with COVID-19 to stay at home, self-isolate, and contact a medical professional or the local COVID-19 information line for advice on testing and referral (consider telemedicine and flexible sick leave policy). • Standard operating procedures to be prepared to manage a person who becomes sick at the workplace and is suspected of having COVID-19, including isolation, contact tracing and disinfection. • People who were in close contact at the workplace with persons with laboratory-confirmed COVID-19 should be quarantined for 14 days from the last time of the contact in accordance with WHO recommendations. • Set out differentiated procedures for the treatment of sick persons, based on the case severity. Pay workers throughout periods of illness, isolation or quarantine. • Set aside a part of worker accommodation for precautionary self-quarantine. • Establish communications with local medical services and refer sick workers to there.	Contractor	CSC, PIU
Adjusting Work Practices and Manage Work Related Travels	• Consider changes to work processes and timings to minimize contact between workers (e.g., decreasing the size of work team, changing to a 24-hour work rotation). • Cancel or postpone non-essential travel to areas with community transmission of COVID-19. • Provide hand sanitizer to workers who must travel, advise workers to comply with instructions from local authorities where they are travelling, as well as information on whom to contact if they feel ill while travelling. • Workers returning from an area where COVID-19 transmission is occurring should monitor themselves for symptoms for 14 days and take their temperature twice a day; if they are feeling unwell, they should stay at home, self-isolate, and contact a medical professional.	Contractor	CSC, PIU
Communication and Contact with the Community	• Carefully manage the relations with the community with clear and regular communication. • Made aware of the procedures put in place at the site to address issues related to COVID-19. • Practice social distancing with the local community.	Contractor	CSC, PIU
Risk communication, training, and education	• Provide posters, videos, and electronic message boards to increase awareness of COVID-19 among workers and promote safe individual practices at the workplace, engage workers in providing feedback on the preventive measures and their effectiveness. • Provide regular information about the risk of COVID-19 using official sources, such as government agencies and WHO, and emphasize the effectiveness of adopting protective measures and counteracting rumors and misinformation. • Train the workers on procedures in place by the project, and their own responsibilities in implementing them.	Contractor	CSC, PIU

APPENDIX II. MINUTES OF THE SECOND PULIC CONSULTATION MEETING

Time: 14:30-16:30 on Mar. 22, 2021
Location: Conference room B402 in North building
Host: Shi Yunhe

Attendees from AIIB: Sun Chongwu Zhu Youxuan
Attendees from ZIH: Tan Zhiyuan(SIA consultant) Dai Lei(EIA consultant)

Meeting content and requirements

1. In the first part of the forum, Shi Yunhe, the representative of ZIH, recipient of AIIB project, introduced the reasons for the invited stakeholders as representatives, as well as the objectives of the forum and the basic situation of the project construction, and communicated with AIIB to understand the relevant requirements for the forum.

2. In the second part of the forum, the persons in charge of E&S topics communicated with the representatives of all stakeholders respectively to clarify whether they had a basic understanding of ZIH project, focused on whether they had a clear understanding of the grievance redress mechanism (GRM), and whether they could find the right channels to deal with the infringement of their rights and interests. Through the communication in this part, everyone had a comprehensive understanding of the basic situation of the project and GRM, and all the stakeholders also indicated that they would exercise the right of supervision during the construction and operation period of the project.
3. In the third part of the forum, the E&S consultants respectively made a brief introduction of the social impact analysis and assessment and environmental impact analysis that have been carried out at present from a professional perspective, further popularizing the importance of a good social atmosphere and environment for stakeholders.

4. In the last part of the forum, Ms. Sun Chongwu and Mr. Zhu Youxuan from AIIB raised relevant questions about the forum respectively, and the representative of the recipient gave timely answers. At the same time, Ms. Sun mentioned that social and environmental forums are meetings that need to be maintained for a long time during the implementation and operation of the project and should be listed as routine work. She also hoped that the recipient could provide more detailed and accurate materials for representatives of stakeholders when organizing the next meeting, so as to conduct the forum more effectively.

Collator: Shi Yunhe
March 25, 2021