Ministry of Transport of the Republic of Kazakhstan

JSC National Company "QazAvtoJol"

RECONSTRUCTION OF A-27 ATYRAU-DOSSOR HIGHWAY PROJECT KAZAKHSTAN

Environmental and Social Impact Assesment (ESIA)

(Draft)

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List of Acronyms

AOI	Area of Influence
AIIB	Asian Infrastructure Investment Bank
AF	Associated Facilities
CERC	Committee For Environmental Regulation and Control
CFW.KLKJWM	Committee For Forestry and Wildlife
CHS	Community Health and Safety
CSC	Construction Supervision Consultant
DBM	Design, Build and Maintain
ESCP	Environmental and Social Action Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy
ESSS	Environmental and Social Standards
EIA	Environmental Impact Assessment
EHS	Environmental, Health, And Safety
ESHS	Environmental, Social, Health, And Safety
GBV	Gender-Based Violence
GHG	Greenhouse Gas
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
IEP	Integrated Environmental Permits
IFC	International Finance Corporation
LMP	Labor Management Procedures
PMC	Project Management Consultant
LRAP	Land Acquisition and Resettlement Action Plan
QAJ	QazAvtoJol
SEP	Stakeholder Engagement Plan
SEA	Strategic Environmental Assessment
ECOCODE	The Environmental Code
TPV	Third-Party Validation
TIA	Transboundary Impact Assessments
CBD	Un Convention on Biological Diversity
UNCCD	Un Convention to Combat Desertification
UNFCCC	Un Framework Convention on Climate Change
VOC	Vehicle Operating Costs
WHO	World Health Organization

Executive Summary

Introduction. The Committee of Roads of the Ministry of Transport of the Republic of Kazakhstan, through Joint Stock Company (JSC) "National Company "QazAvtoZhol" under the Government of the Republic of Kazakhstan, with financing from Asian Infrastructure Investment Bank (AIIB), is planning to implement the **"Reconstruction of A-27 Highway Atyrau-Dossor km 598-512 Section Project, with a length of 87 km."** A key component of this project includes reconstruction and upgrading (from 2- to 4- lanes) of an 86 km road section between the city of Atyrau and Dossor, Atyrau Region, Republic of Kazakhstan. To address the environmental and social impacts, Environmental and Social Impact Assessment (ESIA) report has been prepared in compliance with AIIB's Environmental and Social Framework (ESF), relevant national laws and regulations. In accordance with AIIB's Environmental and Social Policy, the project has been classified as Category "B," requiring an ESIA study. Under Kazakhstan's Environmental Code (2007, amended 2021), the project falls under Appendix 1, subparagraph 8.3, section 1, which mandates an Environmental Impact Assessment (EIA). This ESIA should be read together with other plans prepared for the project, including the Stakeholder Engagement Plan (SEP), Land Acquisition and Resettlement Framework/ Plan (LARF/P) and Labor Management Procedures (LMP) and Environmental and Social Action Plan (ESAP).

Project Description. The proposed project is designed to modernize a critical section of the A-27 highway to meet rising traffic demand, improve safety, and facilitate uninterrupted transport flows. The 87 km section will be reconstructed in two phases, beginning with the construction of a new direction of traffic, followed by the reconstruction of the existing carriageway. The upgrade will raise the road's technical category from III to I-b, with two separate carriageways for each direction. The design also includes new bridges, culverts, interchanges, bypasses, improved drainage, and enhanced road safety features. Once completed, the project will reduce travel time, expand road capacity, improve safety standards, and strengthen transit connectivity between Central Asia, China, and Russia. The salient features of the project are as follows:

Table: Salient features of the project

Sr. No.	Name of indicators	Units	Quantity
1	Road category	-	I-b
2	Length of Road	km.	87
3	Design Speed	Km/h	120
4	Number of lanes	state.	2x2
5	Width of the subgrade	m.	2x15.0
6	Lane width	M	3,75
7	Width of the carriageway	M	2x7.5
8	Type of pavement	-	capital non-rigid type
9	Type of coating	-	Advanced Asphalt Concrete (SMA)
10	Culverts	state.	136
11	Cattle runs	state.	30
12	Bridges	state.	4
13	Overpasses at a traffic interchange, across the railway	state.	3
14	Overpasses for the passage of agricultural machinery	state.	18
15	Two-level transport interchange	state.	1
16	Recreation areas	state.	6
17	Allied works	--	Structures, taking into account the available transport entrances and facilities, energy, heat, water supply and sewerage, as well as the provision of storage facilities.

Project Alternatives. For the proposed project, alternatives were assessed to ensure technical feasibility, cost efficiency, social acceptance, and environmental sustainability. **No Project Alternative:** Without the project, transport conditions will worsen, accidents will increase, mobility will remain constrained, and negative environmental impacts will rise. This would impede national economic growth and reduce the quality of life for communities along the road. **Route Plan Alternatives:** Three options were considered: Option I (separate northern roadbed), Option II (southern split subgrade), and Option III (reconstruction of existing road). Option I was selected as the most optimal, ensuring traffic continuity, reducing land acquisition costs, minimizing socio-economic risks, and improving safety. **Pavement Alternatives:** Concrete offers durability but is costly and time-consuming. Asphalt, with lower costs, faster construction, and resilience to Kazakhstan's climate, was chosen as the preferred option. **Workforce Alternatives**: Options included local workers, migrant workers, or a mix. The selected approach prioritizes local labor to support communities, reduce environmental impacts, and promote social cohesion, while bringing in external specialists where required.

Legal and Regulatory Framework. This ESIA has been prepared to address the requirements detailed in the AIIB's ESF addressing environmental and social aspects and considerations taking due cognizance of Kazakhstan's environmental and social requirements AIIB's Environmental and Social Standards (ESSs) relevant to the proposed Project are ***ESS-1: Environmental and Social Assessment and Management and ESS-2: Land Acquisition and Involuntary Resettlement.*** In addition, the ESIA addresses the requirements defined in the national regulations, most importantly, the ***Environmental Code of the Republic of Kazakhstan, 2021.*** The project shall also consider the World Bank Group's General Environmental, Health, and Safety (EHS) Guidelines, in particular, the EHS Guidelines for Construction Materials Extraction and Toll Roads. In the same context a number of other relevant laws, guidelines and policies have been discussed in Chapter 4.

Route Alignment. The beginning of the section of km 294/598 of the highway begins from the junction with the Azattyk passage in the village of Novokirpichnoye, at the border of the transition of a four-lane road into a two-lane one. Further at km 300+500/592+500, the highway crosses a traffic interchange of the "Pipe" type, which is being built according to the detailed design "Construction of the Northern Bypass Road of the city of Atyrau", then crosses the Aktobe River, the Sokolok River. To ensure unhindered passage of vehicles during the reconstruction of the road section km 301 + 200 / 591 + 800 – km 377/516, when the route passes in the existing direction, the project provides for separate tracing of the roadbed for opposite directions of traffic. The existing road will be used for the passage of public transport for the period of construction of a new road structure (roadbed, pavement, culverts, etc.) with the parameters of a highway of I-b technical category for one direction of traffic. On the right side of the road in the direction of the village of Dossor there are industrial enterprises, such as the GATE Inshaat Company, the North Caspian Operating Company N.V., ASPAR Kashagan LLP, and the Karabatan Petrochemical Complex. At km 321+700/571+300, the road crosses the railway tracks at the Karabatan thermal power plant. At km 349-544, the road crosses the burial place of Onay Ata. The project's technical design will ensure the preservation of the cultural site by implementing measures to avoid any direct impacts during all phases of the project. This includes ensuring that the site will be physically avoided and that appropriate buffer zones are established. Many people make pilgrimages to his tomb in the hope of finding peace of mind and physical health. At km 379/514 at the entrance to the village of Dossor, it is planned to build a traffic interchange at different levels of the "Pipe" type with the allocation of a priority direction for the Atyrau-Aktobe highway. Further, the road bypasses the village of Dossor from the north along free lands and adjoins the existing A-27 highway "Aktobe-Atyrau-gr. RF (to Astrakhan)." The end of the section corresponds to km 381/512.

Stakeholder Engagement and Disclosure. Stakeholder Engagement (SE) helps not only unearthing potential risks and impacts but also enables inclusion and equity as it results in measures to promote development benefits to the public, particularly, road users and communities along the corridor. Accordingly, a stakeholder analysis has been done --identifying different stakeholder groups; assessing their influence/ impact on/ by the project; devising appropriate approach and methods to reach out to each of them (individually and/ or group wise); and share and evince feedback on the project. As SE activities can promote roping in the local work force into the project as it enables promoting engagement

with local stakeholders such as Akimats, local training providers and universities who are expected to facilitate skills training.

Stakeholder engagement activities will be/ have been carried out as early as the design stage to ensure that concerns and feedback are systematically captured and addressed as part of the design decisions and implementation modalities. The ESIA was prepared in consultations with a broad range of stakeholders, including government agencies, potentially affected parties and interested stakeholders to inform the management approach and required measures to prevent and mitigate potential impacts. Key stakeholder groups include national and regional authorities, professional associations, private sector interests in transport sector, non-governmental organizations and community groups. These include Immigration Department and Labor Inspectorates, Ministry of Environment, and other relevant organizations. The SE is expected to be a continuous activity throughout the project cycle. The SEP has been prepared, disclosed, and consulted prior to project's appraisal.

Environmental and Social Impact Risks and Impacts. The AIIB's Environmental and Social Framework (ESF), including ESP, ESEL and ESS1&2, will apply to this Project. ESS3 is not relevant, as no indigenous people are present in the country as per ESS3 definition. The identified potential ES risks and impacts relate to land acquisition and the resultant economic displacement and livelihood disruptions, occupational and community health and safety risks, and social issues from labor influx including habitat disturbance, dust generation, noise and vibration from construction, risks of pollution from construction wastes, fuel spills, and improper waste disposal, Given the scale, terrain, and risks, the Project is classified as Category B under AIIB's (ESF). Extensive discussions were held during the mission on, and concluded that, there are no Associated Facilities related issues.

Environmental Impacts and Risks. The project corridor between Atyrau and Dossor largely traverses modified habitats, consisting of areas already altered by existing road infrastructure, settlements, and industrial activity. No areas that qualify as critical or natural habitats such as those high biodiversity value, or designated protected areas were identified within the project's direct impact zone. Accordingly, the project area is classified as modified habitat, as per the classification provided in the ESF, therefore, direct impacts on biodiversity and natural resources are not anticipated. The project interventions will not be carried out in any natural/critical habitats or in close proximity.

The project's environmental impacts and the risk thereof is likely to be substantial mainly due to the Project's potential environmental and Occupational Health and Safety (OHS) risks and impacts associated with the construction activities (highway expanding and upgrading as well as the supporting infrastructure) and potential capacity constraints within QAZ in terms of ensuring compliance. Other potential risks typical to the construction works include: i) increased pollution due to construction waste- - soil and water contamination likely to occur due to inappropriate disposal of wastes (including hazardous and non-hazardous), material extraction, and poor drainage, ii) generation of dust, noise, and vibration due to the movement of construction vehicles and machinery, iii) operational or accidental spills of fuel and lubricants from the construction machinery, v) traffic and road safety risks to workers, affected communities and road users as well as OHS issues, and vi) improper reinstatement of construction sites upon completion of works. The anticipated road upgrading works impacts can be effectively prevented, mitigated, or minimized on-site in a predictable manner through good engineering design, and effective implementation of the ESMP and Contractor's Environmental and Social Management Plans (C-ESMPs).

Social Impacts and Risks. The project's social impacts and risks thereof too are assessed as substantial due to potential impacts likely to be associated with land acquisition and restrictions on land use during construction, labor management as well as community health and safety associated with potential labor influx. The project recognizes 'gender equity' as an important aspect requiring attention, specially, from the point of view of women empowerment.

Land Acquisition and Resettlement. Apart from widening of the roadbed and the smoothing of the existing slopes, Kazakhstan Law on Roads, the project has to provide for the permanent right-of-way for the road with a width of 70 mts. Further, arrangements are to be made for rest areas, stops, power transmission towers, intersections and junctions, transport interchanges, exits. Along the entire length of the highway (within the administrative boundaries of the districts), There are no structures, buildings, businesses, trees, crops, or other assets and livelihoods in the project's right-of-way that may be affected. The project does not anticipate major physical displacement and / or livelihoods disruption impacts associated with land acquisition. In all, it is estimated that about 2,200 Ha of lands will have to be acquired permanently, and 334 Ha temporarily. In all, 63 persons/ entities are likely to be affected due to the acquisition. Out of 63 PAPs enumerated, 43 or 68% are either private sector/corporate entities or public sector companies. The remaining seem to be individual persons or households. There are 32 cases of land leased, of these, lease period for 16 has ended, and the other 16 are still active. Lease rents have been paid for all those which are active. Towards addressing land acquisition issues, a Land Acquisition and Resettlement Framework (LARF) has been prepared. This will guide preparing a Land Acquisition and Resettlement Plan (LARP) once the design and layout contours are firmed up.

Other social risks are expected to be residual, due to inappropriate construction practices resulting in restrictions on land uses, property damages, pollution, road safety risks and other disruptions. These are to be addressed as early as possible, else; it impacts adversely livelihoods, public safety and public health. Further, given the shortages of skilled local labor forces locally, inflows of labor from other regions and countries are anticipated. Hence, there could be labor influx risks that could affect the local communities and available services and resources due to sudden presence of workers with their operating facilities. Sexual Exploitation & Abuse and Sexual Harassment (SEA/AH) (constituent of Gender Balanced Violence) risks are expected to be low. However, project will have to put in planned efforts to ensure gender equity.

Labor and Working Conditions. Road construction is expected to bring a substantial number of workforces from different parts of the country and abroad. The estimated number is expected to be about--- How they will be sourced will only be known following contract awards and submission of workplans by winning contractors. The majority of the project's workers will consist of construction workers hired by contractors, including their sub-contractors, and workers hired by supervision engineers and design/ implementation consultants. Direct workers include government secondees and consultants hired as project staff. OHS and risks around working conditions are most pertinent to construction workers. Hence, it requires the preparation of Labor Management Procedures (LMP) for guiding the management of 'labor'. As a policy the project shall not employ any child or forced labor and accordingly employment contracts will be audited. The LMP will include a grievance mechanism for workers. LMP has been prepared, disclosed, and consulted prior to the project's appraisal.

Gender Equality. Kazakhstan has achieved significant efforts and progress in respect of gender equity in the past two decades. However, some areas still require further attention. The ESIA identifies such areas, in general and the issues specific to the project, To address the same, a Gender Acton Plan has been prepared.

Most of the above-stated risks and impacts are temporary site-specific, largely reversible in nature and manageable by adopting mitigation measures provided in this ESIA, in accordance with the mitigation hierarchy. In the longer term, the project is expected to deliver significant positive outcomes by reducing traffic accidents, lowering transport costs, creating employment opportunities, and enhancing Kazakhstan's role as a transit hub in the region.

Environmental and Social Management Plan (ESMP). An Environmental and Social Management Plan (ESMP) has been developed to guide the mitigation of negative impacts and ensure compliance

throughout the project lifecycle. The ESMP will be a part of the construction contract agreement and will be strictly enforced during the implementation of the project. The Contractor(s) will be responsible for implementation and adherence to all the mitigation measures and monitoring arrangements outlined in the ESMP associated with their respective activities through dedicated ESHS staff. During implementation, the QAJ will conduct regular monitoring using an E&S checklist based on the ESMP. Internal monitoring on Quarterly Basis and external monitoring on Annual Basis (through third-party) will be carried out during project implementation. Periodic evaluation of the process and the outcomes will enable the PIU to identify deficiencies and implement corrective measures to achieve the desired goals and objectives of the ESIA. All environmental and social safeguards reports and documents shall be disclosed on the websites of AIIB in English and of QazAvtoZhol in the local language.

Institutional and Implementation Arrangements. The Committee on Roads (CoR) under the Ministry of Ministry of Industry and Infrastructure Development, acts as the state institution responsible for road sector governance. It is responsible for (i) policy development and legal framework; (ii) strategic implementation; (iii) monitoring & evaluation as well as compliance and quality control; and (iv) contractors' accountability. The Committee manages the construction and operations through its operational arm, QazAvtoZhol (QAJ) who, acts as the employer / proponent having a Project Implementation Unit (PIU). The other key players include: (ii) Construction Supervision Consultant (s), the Third-Party Validation Consultant; and (ii) the Contractor(s) and their consultants. The QAJ will make Contractors bound through contract documents to implement the E&S instruments and other terms and conditions of the relevant Permits including NOCs from other ministries and concerned agencies. The E&S instruments, including ESMPs, LARF/P, SEP. LMP will be included as a clause of the contract documents. QAJ also shoulders responsibility for establishing and making functional Grievance Redressal Mechanisms.

Total cost of ESMP implementation is $ 1.2 million (650.7 million Kazakhstani tenges). This tentative cost will be included in the overall project cost. The Contractor(s) however shall be paid against the actual execution with evidential proof of relevant E&S instruments activity.

Grievance Redress Mechanism. The project will have two Grievance Redress Mechanisms (GRM). One, to address exclusively the issues related to labor management; and another to address all other issues, especially those arising out of an interface with the communities. A separate window exists in both the mechanisms to ensure that certain sensitive grievances such as SEA/SH are handled confidentially and with ensuring privacy.

Environmental and Social Action Plan (ESAP). An Environmental and Social Action Plan (ESAP) has been prepared which identifies the required actions during pre-construction, construction and operation of the Project to ensure compliance with the national environmental and social requirements of the Republic of Kazakhstan (RoK) and the applicable AIIB Environmental and Social Policy (ESP) and associated Environmental and Social Standards (ESSs). It includes specific actions, timelines, responsible parties, and resource requirements to implement the ESF and ESSs based on the E&S assessment including Environmental and Social Impact Assessment (ESIA), including Environmental and Social Management Plan (ESMP), Stakeholder Engagement Plan (SEP), Land Acquisition and Resettlement Framework (LARF) and Labor Management Procedures (LMP) of project, undertaken and corresponding actions identified and agreed upon.

The E&S instruments that shall be adopted and implemented under the Project, all of which shall be subject to prior consultation and disclosure, consistent with the ESSs, and in form and substance, and in a manner acceptable to the AIIB. Implementation of the material measures and actions set out in this ESAP will be monitored and reported to assess progress and completion of the material measures and actions throughout implementation of the Project. The ESAP will be updated when necessary, during project implementation to reflect adaptive management of Project changes and unforeseen circumstances or in response to Project performance.

1 Introduction

The Committee of Roads of the Ministry of Transport of the Republic of Kazakhstan, through Joint Stock Company (JSC) "National Company "QazAvtoZhol" under the Government of the Republic of Kazakhstan, with financing from Asian Infrastructure Investment Bank (AIIB), is planning to implement the **"Reconstruction of A-27 Highway Atyrau-Dossor km 598-512 Section Project, with a length of 87 km."** A key component of this project includes reconstruction and upgrading (from 2- to 4- lanes) of an 86 km road section between the city of Atyrau and Dossor, Atyrau Region, Republic of Kazakhstan. To address the environmental and social impacts, Environmental and Social Impact Assessment (ESIA) report has been prepared in compliance with AIIB's Environmental and Social Framework (ESF), relevant national laws and regulations.

This ESIA should be read together with other plans prepared for the project, including the Stakeholder Engagement Plan (SEP), Land Acquisition and Resettlement Plan (LARP) and Labor Management Procedures (LMP) and Environmental and Social Action Plan (ESAP).

1.1 Background

The road network is an important component of the industrial and social infrastructure, ensuring the geographical and economic connectivity of territories and industries and their balanced development, contributing to the implementation of the country's significant transit and logistics potential due to the geographical location of the country. The Atyrau region, also known as Kazakhstan's oil capital, is a vital industrial hub where the oil and gas sector dominate the economy, as it accounts for 88% of total industrial output. Despite its economic importance and rapid development, the region faces significant transportation challenges, particularly in road infrastructure. Only 41.9% of the 1,117.6 km of republican roads are currently in good condition. The Atyrau-Dossor highway, a key transport artery critical to supporting the growing traffic from the National Industrial Petrochemical Technopark (FEZ NINT), is in urgent need of reconstruction. This road section, is part of the international automobile transit corridor Aktobe - Kandyagash - Makat - Atyrau - gr. RF to Astrakhan", which provides transit of the countries of Uzbekistan and Turkmenistan through the territory of Kazakhstan, Russia to Europe, respectively. This section of the road (Atyrau-Dossor) was reconstructed in 2009 according to the standards of the III technical category. In this regard, according to the national project "Strong Regions: Driver of the Country's Development", it was decided to transfer it to the first technical category, directly aligning with President Tokayev's directives and multiple national development programs. The condition of the section of the Atyrau-Dossor highway, km 598-512, does not meet modern requirements, since no planned reconstruction and overhaul work was carried out, which led to the premature destruction of the road. To date, the section of the Atyrau-Dossor highway is a two-lane highway with heavy traffic, which has an extremely negative impact on the technical condition of the pavement. Also, the current intensity on the section of the Atyrau-Dossor highway km 598-512 is 7,972 cars / day (according to data for 2024), which exceeds the capacity of the road by more than 2.5 times. All this leads to an increase in dangerous areas in terms of the concentration of accidents. In connection with the increase in the intensity of traffic flow, it is planned to begin expanding the Atyrau-Dossor regional road to a four-lane one.

Thus, the Ministry of Transport of the Republic of Kazakhstan, in order to increase the transit potential and ensure uninterrupted and safe traffic, supports the project "Reconstruction of the highway of republican significance A-27 "Atyrau-Dossor" km 598-512".

1.2 Environmental and Social Impact Assessment (ESIA) Study

According to the AIIB ESP, the Project has been categorized as Category B, which requires the preparation of ESIA.

As per national regulations, the proposed Project is classified under Appendix 1 of the Environmental Code of the Republic of Kazakhstan, subparagraph 8.3 of clause 8, section 1 — 'Construction of new and/or reconstruction of existing public roads of the first technical category with a continuous length of 10 km or more.' Accordingly, the Conclusion on determining the scope of the Environmental Impact Assessment (No. KZ85VWF00220661, dated 27 September 2024) was issued, confirming that the activity is subject to a mandatory EIA. The conclusion is provided in the Annex-1.

The Project will utilize the Design, Build and Maintain (DBM) Contract for this Project. This ESIA report has been prepared based on the feasibility study prepared on preliminary road outline by the Client. The ESIA report will be finalized based on the final technical designs to guide the implementation of environmental and social management plans throughout the project lifecycle.

1.3 ESIA Objectives

- Identify and assess the potential environmental impacts and social and risks stemming from the project in the planning, construction and operation phases.
- Design appropriate mitigation, management, and monitoring measures (to avoid, minimize, mitigate, offset or compensate for them), to implement an environmentally benign and socially responsible project without compromising its technical and economic feasibility and to help determine crucial elements that facilitate the making of choices and decisions.
- Identify stakeholders that are likely to be affected or have interest or a stake in the project, with emphasis on disadvantaged and vulnerable groups and carry out consultation to solicit their concerns regarding the project.
- Provide Environmental and Social Management Plan (ESMP) for the project as a tool for the implementation of the suggested measures, along with monitoring and evaluation mechanism with adequate resources to successfully implement the provisions of the ESIA.
- Mechanisms for disclosure of project documents as well as redress of possible grievances.
- Establish the budget requirements for implementation of the ESIA.

1.4 ESIA methodology

During the ESIA study, relevant legislation, standards, guidelines, AIIB's ESF requirements, and project details were reviewed to understand the proposed activities and to evaluate potential Environmental, Social, Health, and Safety (ESHS) impacts and risks across the design, construction, and operation phases. The assessment was informed by field surveys (e.g., socioeconomic surveys, census, environmental quality monitoring, and biodiversity studies) and data from government sources such as census reports and statistical yearbooks, stakeholder consultations, and professional insights drawn from comparable projects.

Each receptor was assessed for its sensitivity to changes in its external environment. Potential project-induced changes and hazards associated with project activities were analyzed to

determine their potential impacts on receptors, as well as the risks posed to workers and the surrounding community.

Based on this assessment, appropriate mitigation measures, risk controls, and management, monitoring strategies and budget were developed to eliminate, avoid, minimize, compensate or offset for potential impacts and risks effectively.

1.5 Document Structure

Chapter 2: Project Description - The details of the technical features of the Project have been presented in this chapter based on the feasibility study.

Chapter 3: Analysis of Alternatives - The alternatives considered during project planning and design phase have been discussed in this chapter.

Chapter 4: Legal and Regulatory Framework – The national legal provisions related to environmental and social protection, AIIB's ESSs, World Bank Group EHS Guidelines international treaties relevant to project are discussed in this chapter.

Chapter 5: Environmental and Social Baseline Conditions- Baseline environmental conditions covering the climatic conditions, physical environment including land, air, water, noise, aesthetic, waste, and traffic conditions in the project area of influence. The Chapter also presents biodiversity of the project area covering ecosystem, protected areas, habitats of important species, description of flora and fauna, mammals, birds, and fish.

Chapter 6: Stakeholder Engagement and Disclosure - This chapter describes the process and outcome of the consultations carried out involving various types of stakeholders for determining the environmental and social impacts and risks associated with project implementation, along with the feedbacks/concerns/views on the Project.

Chapter 7: Environmental and Social Impacts and Risks - This chapter assessed potential risks and impacts of the project on physical, biological and socioeconomic environment. A cumulative impact assessment is also included in this chapter.

Chapter 8: Environmental and Social Management Plan - This chapter presents the Environmental and Social Management Plan (ESMP) of the project, to manage adverse impacts and risks of proposed project interventions in a way that minimizes the environmental and social impact and risk on the environment. This chapter also includes the institutional arrangements, third party monitoring, reporting mechanism, capacity building measures and estimated budget to implement measures.

Chapter 9: Grievance Redress Mechanism - This Chapter provides the information on Grievance Redress Mechanism (GRM), Grievance Redress Committees (Site Level, Central and Regional) and their key functions, GRM Monitoring and Evaluation.

2 Project Description

2.1 General

This Chapter presents the detailed project description along with project cost, land requirement, traffic data, construction materials, workers camp, road safety implementation schedule, workforce and water requirements, etc.

2.2 Objectives of the Project

The main objective of this investment project is to create a road infrastructure capable of meeting the needs of the economy and the population in high-quality and safe road transportation. The other associated objectives of the proposed project are to:

- Complete reconstruction of the section of km 598-512 (Atyrau-Dossor).
- Increase in the capacity of the designed road.
- The level of accidents and the negative impact of transport on the environment will be reduced Development of the flow of transit of freight vehicles and and ensure uninterrupted and safe traffic.
- Conditions will be created for the emergence of new jobs
- Increase in the operating speed of motor vehicles.
- Development of related road infrastructure.

2.3 Project Location

The reconstructed section of the highway is administratively located on the lands of the city of Atyrau, Makat district of the Atyrau region.

2.4 Project Benefits

The main beneficiaries of the project include participants in the transport process - carriers, passengers, shippers and consignees, authorized bodies for traffic control and regulation, as well as (indirectly) the entire population and business community of the Atyrau region.

The final result of the implementation of this investment project is:

- Increase in the length, share and significance of republican roads in the Atyrau region in the standard condition by 87 km.
- Increase in the share of republican roads in the Atyrau region in good condition by 7.8%.
- Increase in the share of roads of republican significance in the Republic of Kazakhstan as a whole, covered by the toll collection system by 4.0%.
- Reduction of travel time along the designed section of the highway to 0.5 hours from 2029.
- Reducing the costs of transport enterprises for the transportation of goods an increase in cargo and passenger traffic, as well as an increase in transit potential and communications with the countries of Central Asia, China and Russia.
- Achievement of the socio-economic effect associated with saving time for users of the designed road in the amount of 1,963.1 billion tenge (in nominal terms for the entire accounting period of the project).
- Creation of new jobs, both during the construction period (1118 people for the entire construction period) and during the operation (46 people) of the designed road.
- Achievement of the socio-economic effect from the creation of new jobs during the period of operation and associated with the operation of the projected road in the amount of 5.9 billion tenge (in nominal terms for the entire accounting period of operation).

- Achievement of the socio-economic effect from the creation of new jobs during the construction of the projected highway in the amount of 4.0 billion tenge (in nominal terms for the entire accounting period of construction).
- Achievement of the socio-economic effect associated with the reduction of deaths from road accidents in the amount of 133.8 billion tenge (in nominal terms for the entire period of operation).
- Reduction in Vehicle Operating Costs (VOC) by reduction in wear and tear and fuel consumption.

2.5 Project Administrative Location and Jurisdiction

The proposed reconstruction of the highway of republican significance A-27 "Atyrau-Dossor" is administratively located on the lands of the city of Atyrau, Makat district of the Atyrau region. The total length of this project is 87 km from 294/598 to 381/512.

2.6 Project Brief

The project provides for the reconstruction of the existing road with the transfer of category III to category I-b with the installation of a separate roadbed in 2 stages (stage 1 - construction of a new direction of traffic, stage 2 - reconstruction of the existing road).

The beginning of the section of km 294/598 of the highway begins from the junction with the Azattyk passage in the village of Novokirpichnoye, at the border of the transition of a four-lane road into a two-lane one. Further at km 300+500/592+500, the highway crosses a traffic interchange of the "Pipe" type, which is being built according to the detailed design "Construction of the Northern Bypass Road of the city of Atyrau", then crosses the Aktobe River, the Sokolok River. To ensure unhindered passage of vehicles during the reconstruction of the road section km 301 + 200 / 591 + 800 – km 377/516, when the route passes in the existing direction, the project provides for separate tracing of the roadbed for opposite directions of traffic. The existing road will be used for the passage of public transport for the period of construction of a new road structure (roadbed, pavement, culverts, etc.) with the parameters of a highway of I-b technical category for one direction of traffic.

On the right side of the road in the direction of the village of Dossor there are industrial enterprises, such as the GATE Inshaat Company, the North Caspian Operating Company N.V., ASPAR Kashagan LLP, and the Karabatan Petrochemical Complex. At km 321+700/571+300, the road crosses the railway tracks at the Karabatan thermal power plant. At km 349-544, the road crosses the burial place of Onay Ata. Many people make pilgrimages to his tomb in the hope of finding peace of mind and physical health. The mausoleum on the burial site of the saint was built in 1999 on the initiative of Fariza Ongarsynova. The project's technical design will ensure the preservation of the cultural site by implementing measures to avoid any direct impacts during all phases of the project. This includes ensuring that the site will be physically avoided and that appropriate buffer zones are established.

At km 379/514 at the entrance to the village of Dossor, it is planned to build a traffic interchange at different levels of the "Pipe" type with the allocation of a priority direction for the Atyrau-Aktobe highway. Further, the road bypasses the village of Dossor from the north along free lands and adjoins the existing A-27 highway "Aktobe-Atyrau-gr. RF (to Astrakhan)." The end of the section corresponds to km 381/512.

Within the framework of this investment project, after the commissioning of the designed section of the A-27 "Atyrau-Dossor" highway of republican significance, km 598-512, it is planned to introduce tolls on these sections.

2.7 Project Salient Features

The proposed project involves widening and reconstruction of the A-27 road. The salient features of the project are as follows:

Table 2-1: Salient features of the project

Sr. No.	Name of indicators	Units	Quantity
1	Road category	-	I-b
2	Length of Road	km.	87
3	Design Speed	Km/h	120
4	Number of lanes	state.	2x2
5	Width of the subgrade	m.	2x15.0
6	Lane width	M	3,75
7	Width of the carriageway	M	2x7.5
8	Type of pavement	-	capital non-rigid type
9	Type of coating	-	Advanced Asphalt Concrete (SMA)
10	Culverts	state.	136
11	Cattle runs	state.	30
12	Bridges	state.	4
13	Overpasses at a traffic interchange, across the railway	state.	3
14	Overpasses for the passage of agricultural machinery	state.	18
15	Two-level transport interchange	state.	1
16	Recreation areas	state.	6
17	Allied works	--	Structures, taking into account the available transport entrances and facilities, energy, heat, water supply and sewerage, as well as the provision of storage facilities.

The typical cross section of the proposed Project is shown in **Figure 2.1.**

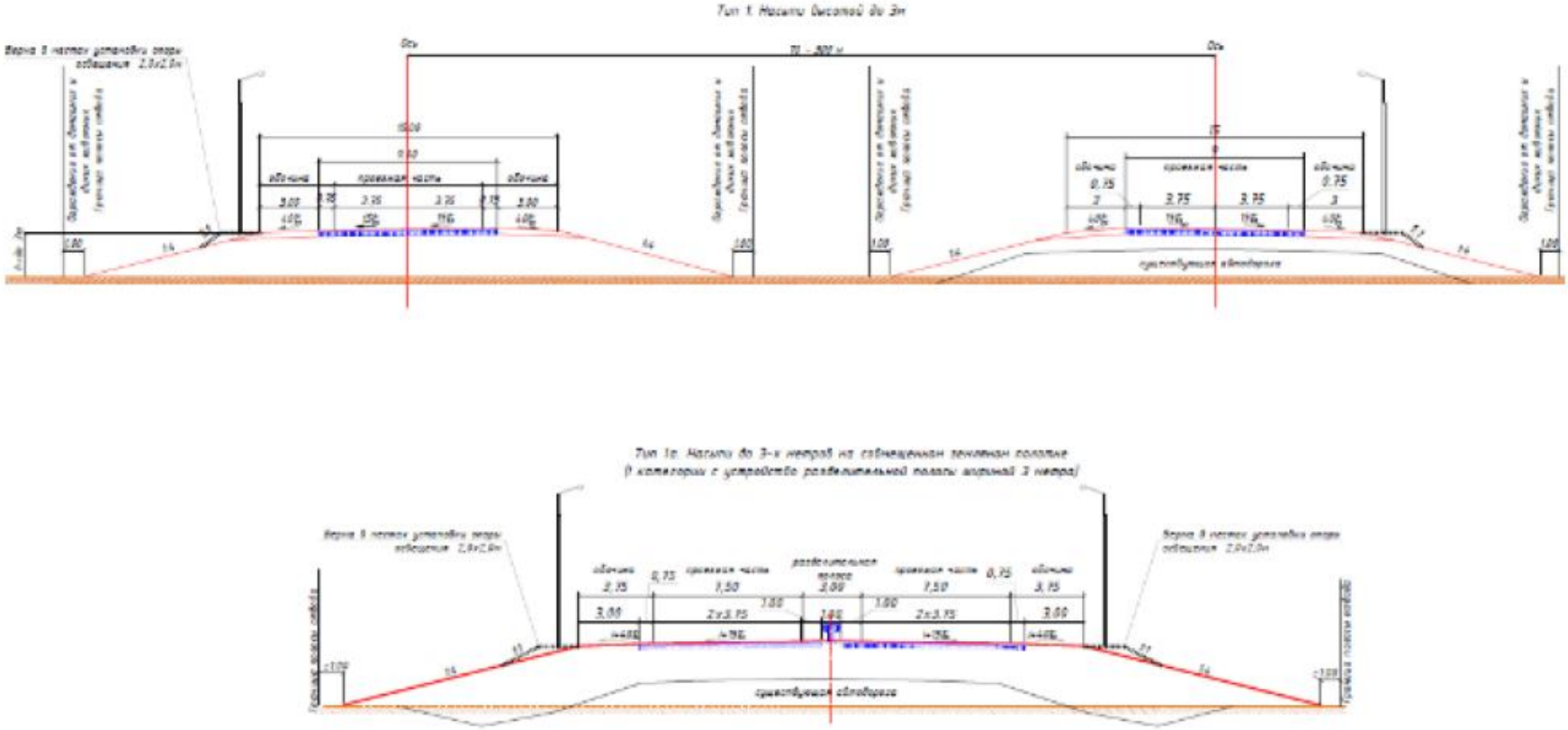

Figure 2-1: Typical Cross Section of the Proposed Road

2.8 Traffic Data and Forecast[1]

Traffic intensity was recorded on the A-27 highway "Aktobe-Atyrau-gr.RF (to Astrakhan)"
For the second quarter of 2024. The structure of motor transport is represented by the following groups.

1. Passenger cars.
2. Minibuses, medium and heavy.
3. Single trucks:
    a. 2-axle, with a carrying capacity of 2 tons to 5 tons, from 5 to 10 tons;
    b. 3-axle, with a lifting capacity of up to 10 tons, from 10 to 12 tons and more than 12 tons.
4. Road trains with trailers code 11-11, 11-12, 12-11, 12-12.
5. Truck tractors with semi-trailer, codes 111, 112, 113, 121, 122, 123.
6. Tractor:
    a. light with a trailer;
    b. Heavy with a trailer.
7. Motorcycles the average percentage of traffic intensity growth adopted in the feasibility study is 1.05% in the future for 20 years.

The coefficient of increase in the volume of traffic with an increase of 1.05% is 2.52. The weighted average prospective traffic intensity on the road will be 10,175 x 2.07 = 25,710 vehicles/day, in the future for 20 years, where 10,175 vehicles/day is the traffic intensity for the first year of service in 2029. In view of the fact that the share of passenger cars is more than 50% of the total composition, the road category is established according to the estimated traffic intensity reduced to a passenger car, which is 43,592 units per day.

A forecast of traffic intensity for 2048 has been carried out. To calculate prospective intensity, the average annual actual intensity data provided by JSC NC "QazAvtoZhol" for 2024 "Information on the intensity of road traffic and the composition of traffic flow for 12 months; the calculation of the annual rate of increase in intensity is 4%. The calculation of the intensity for the prospective overhaul period of 2048 was 9066 vehicles/day, reduced to a passenger car 25,209 units/day.

[1] Information on the existing intensity of vehicle traffic was provided by the Atyrau regional branch of NC QazAvtoZhol JSC.

Years	Cars	Buses		Single trucks						4-axle, cargo lifting.	Trailer Trucks				Trailer Trucks					Tractors		Motorcycles	Altogether
				2-axle, payload			3-axle, load capacity																
		Average	Heavy	Up to 2 tons.	Up to 5 tons.	5-10 tons.	5-10 tons.	10-12 tons.	More 12 tons	More 12 tons	2 main (11-11)	2 main (11-12)	3-main (12-11)	3 bases. (12-12)	2 bases. (111)	2 bases. (112)	2 bases. (113)	3 bases. (122)	3 bases. (123)	Light with trailer	Heavy Duty with Trailer		
2024	5976		108	43	50	50	3	3	2	8	2	2	6	7	4	30	65	546	0	0	0	8	7972
2029 (planned commissioning) 2048 (overhaul period 20 years)	7627	138	138	55	775 64	332 4			3	10	3	3 8	9 5	38 83	697	175	0 0					10	10175
Intensity reduced to a passenger car 2048, units/day	19273	348	348	139	1958	161 839	10		6	26	6	6	19	23 13	67	210	1761	442	0 0			26	25710
	1,00	*3,00*	*3,00*	*1,50*	*2,00*	*2,50*	*3,00*	*3,00*	*3,50*	*3,50*	*4,00*	*4,00*	*4,00*	*4,00*	*5,00*	*5,00*	*5,0 0*	*6,00*	*6,00*	*2,50*	*3,50*	*0,50*	
	19273	1045	1045	208	3915	403 2516	29		23	90	26	26	77	90 65	484	1048	105652651	0 0				13	43592
Coefficient. Casting Sm		*0,011*	*0,23*	*0,00*	*0,06*	*0,32*	*0,17*	*0,35*	*2,72*	*2,67*	*0,89*	*0,89*	*3,30*	*3,30*	*0,61*	*2,55*	*4,73*	*3,90*	*6,08*	*0,00*	*0,01*	*0,00*	
Intensity reduced to design load, av/day 2029 108		2	32	0	46	20	56	1	7	27	2	2	25	29 3	98	392	2718	106	3	0		0	0	4525
Intensity reduced to the design load taking into account the number of lanes, auto/day																							1584
Estimated Total Number of Design Load Applications																							19 115 754

Figure 2-2 Average Daily Traffic and its Forecast till 2048

2.9 Associated Facility

Associated facilities (AF) are activities that are not included in the description of the Project set out in the agreement governing the Project, but which, following consultation with the Client, AIIB determines are: (a) directly and materially related to the Project; (b) carried out, or planned to be carried out, contemporaneously with the Project; and (c) necessary for the Project to be viable and would not be constructed or expanded if the Project did not exist. In case of the proposed project, there is no associated facility.

2.10 Construction Aspect

2.10.1 Construction Materials

The materials used in construction would include coarse aggregates (crush), fine aggregates (sand), soil, water, asphalt, reinforcement, cement etc. Almost all these raw materials are locally available in the area. The quantity of construction material required for the proposed project has been estimated tentatively and provided in Table 2.2.

Table 2-2: Quantification of Construction Material

Sr. No.	Description	Unit	Total Quantity
Inert Materials			
1.	Construction sand	C.M.	45234,14
2.	Construction quartz sand	C.M.	14.5235
3.	Crushed stone mixture fr.20-40 mm	C.M.	28219,471
4.	Sand and gravel mixture of nature	C.M	17654,61
5.	Cement mortar	C.M	1.37862
6.	Portland cement without additives	Tons	928,457
7.	Min. paste composition (mortar)	Tons	4.64115
8.	Lime builds quicklime lump	Tons	0.425632

The project will not use any asbestos containing materials in any activities or components. This includes, but is not limited to, construction materials, insulation, and other project elements. The Project fully complies with the prohibition of asbestos-containing materials to ensure the health and safety of workers and the surrounding community. All design, procurement, and construction practices will adhere to this requirement in line with the Bank's Environmental and Social Framework and international best practices.

2.10.2 Sources of road construction materials

The project provides for the delivery of hot asphalt concrete from a stationary asphalt concrete plant located in Atyrau. Projects of the contractor's construction base and the development of soil reserves are developed separately. In the area of the road, all transportation is carried out by road transport with a carrying capacity of 15-20 tons and by rail. The entire volume of road-building materials, products and semi-finished products is planned to be obtained from the basic reserves and nearby operating enterprises:

- Fractionated crushed stone, crushing screening, rubble stone, sand– delivered from Aktobe region, Mugalzhar village

- ShGPS C4 mixture is prepared in the HPU at the base and transported to the road.
- Hot asphalt concrete mixtures– ABZ plant, located in Atyrau
- Sand and gravel mixture (natural)- from Aktobe
- Cement– delivered from Shymkent
- Bitumen– Aktau,
- Sand for artificial structures- delivered from Aktobe
- Road signs, paint for markings– from Atyrau
- Barrier fences– delivered from Nur-Sultan
- Monolithic concrete– RBU located in Atyrau
- Prefabricated reinforced concrete bridge products are delivered from Almaty and Aktobe.
- Prefabricated reinforced concrete products for small artificial structures- from Almaty and Aktobe.

The terms of delivery of materials are given in the list of sources of receipt and methods of transportation of basic building materials, products and semi-finished products. During the construction process, suppliers of road construction materials can be additionally renegotiated. The contractor for each batch of materials (crushed stone, bred-in, sand and gravel mixture, construction sand, cement, mineral powder, etc.) must have a sanitary and epidemiological conclusion on their radiation safety. These sources of obtaining road construction materials, as well as soil quarries, are not mandatory for the contractor. At the discretion of the Contractor, and based on the results of mandatory agreement with the Customer and Technical Supervision, any other sources that meet the requirements of GOST, SNiP, SN RK and recommendations in force in the territory of the RK may be used. Changes in the adopted design solutions at the construction stage, as well as the use of road-building materials adopted in the project are not allowed without the consent of the author of the project and technical supervision.

2.10.3 Construction Activities and Required Machinery

General construction activities involve following:

- Earth work (clearing of vegetation/ trees and top soil);
- Roadwork (levelling, preparation of sub grade, sub base, base and wearing course); and
- Structure works.

No blasting activity is proposed along the proposed Project as the proposed project does not passes through any hilly terrain. However, considering the propose project the road construction activities includes nut not limited to the:

- Milling and removal of the existing road surface.
- Excavation and grading to adjust road elevation and alignment.
- Installation of a new road base layer (typically aggregate or asphalt).
- Pavement overlay with a new asphalt or concrete surface.
- Compaction of the new pavement layers to ensure stability.
- Bridge rehabilitation, repair or replacement of damaged or deteriorated bridge components
- Installation of new expansion joints, bearings, and guardrails.
- Culvert reconstruction by removal of the old culvert structure and installation of a new culvert, often made of concrete or corrugated metal.
- Backfilling and compaction around the culvert.
- Repair and reinforcement of road shoulders to prevent erosion and provide a stable surface.

- Grading and shaping of the shoulders.
- Application of appropriate materials, such as aggregate or asphalt.
- Installation of new road markings, such as lane lines, crosswalks, and stop bars.
- Placement of signage for traffic guidance, warnings, and regulatory purposes.
- Ensure compliance with relevant road safety standards and regulations.

Rehabilitation work on existing road will include but not limited to the:

- Patching and repair of localized road surface defects.
- Resurfacing with a new layer of asphalt or concrete.
- Crack sealing and joint repair to prevent water infiltration.
- Smoothing and leveling of road surfaces.
- Surface repairs of bridges to address spalling, cracks, and other concrete or asphalt issues.
- Rehabilitation of bridge expansion joints and bearings.
- Cleaning and maintenance of existing culverts.
- Repair or replacement of damaged sections.
- Relining or coating of the culvert interior to extend its lifespan.
- Refreshing existing road markings and signage.
- Replacing faded or damaged signs.
- Repair and maintenance of existing shoulders.
- Grading and re-graveling as needed.
- Clearing obstructions and debris from culverts and ditches for improve drainage.

The list of the machinery and the equipment required for the proposed project is provided in **Table 2.3**.

Table 2-3: Machinery and Equipment Requirement

Sr. No.	Type of Machinery/ Equipment
1	Asphalt sprayers
2	Polyethylene pipe welding units
3	Mobile welding units
4	Road trailed rollers
5	Self-propelled road rollers
6	Stump pickers with tractor
7	Pipelayers
8	Mobile bitumen boilers
9	Drilling machines
10	Watering machines
11	Crawler tractors

2.10.4 Construction Camps

Camp sites will be selected based on following considerations:

- Number of workforces deployed;
- Type and quantity of machinery mobilized;
- Availability of adequate area for establishing camp sites including parking areas for machinery, stores and workshops;
- Access to communication and local markets and away from the local population settlements; and

- Appropriate distance from sensitive areas including settlements and religious and/or cultural facilities.

Based on the above criteria and consultant's experience, construction camps including Contractor's office, construction equipment yard, parking spaces etc. should be established. However, numbers and locations will be selected by the construction contractor with the assistance of Construction Supervision Consultant employed by the NC QazAvtoZhol JSC, which will be finalized after the approval from Project Management Consultant. Care will be taken to safeguard the existing environment of the area and location shall be selected away from settlements. It will not be possible to locate camp sites within the RoW. The contractors may acquire land on lease from private landowners.

The contractors shall analyze different number of construction camp sites by considering following criteria guidelines:

- There should be no resettlement issue for the location of the camps;
- Camp site should be away from the residential areas and sensitive receptors;
- Selection of sites for construction camps shall be near the Project area having proper access to the nearby main/link road;
- The camps must be located in a place where the drainage from and through the camps will not threaten any domestic or public water supply;
- Camp site must be adequate in size to prevent overcrowding of necessary structures;
- The camp site should consider avoiding any damage of property, vegetation, irrigation, and drinking water supply systems;
- The camp site must not be subject to periodic flooding; and
- Here should not be any ecological sensitive areas e.g. wildlife sanctuaries, game reserves, national parks, forest areas, etc. near to the construction camp site.

2.10.5 Work Force

Manpower demand estimation is an essential component to facilitate deployment of manpower. The number of workers employed in construction and installation works, transport, services and other facilities in the accounting year is determined by the average annual output of one worker according to the formula (according to the document "Recommendations for calculating the economic effects of construction, reconstruction and repair and maintenance of roads at the macro and micro economic levels, developed and approved by JSC "Kazakhstan Road Research Institute JSC KazdorNII" of the Committee of the Ministry of Investment and Development of the Republic of Kazakhstan"). Thus, for the entire period of implementation (construction) of the project, direct jobs will be created in the amount of 1,118 people, including by years of construction:

- 2026 – 224 people;
- 2027 – 335 people;
- 2028 – 447 people (Peak Labor);
- 2029 – 112 people.

Moreover, during the period of operation, including for the maintenance and current repair of the designed road, it will be necessary to involve at least 46 people on a permanent basis for a long period.

2.10.6 Water Requirement

Water consumption during the construction of the facility will be 3788.4 m^3 for household needs, and 1755654.773 m^3 for technical needs (according to estimates).

Drinking water supply is from the water intake of the Atyrau oblysy Su Arnasy municipal enterprise or using purchased bottled drinking water. According to the information presented in the feasibility study, it is planned to receive technical water supply from the Chernaya Rechka canal and the Ural River. [2]

2.10.7 Wastewater Generation and Disposal

Water used for household needs is discharged into the existing sewerage networks through the septic tanks which will be constructed to provide primary treatment after which the wastewater will be discharged in accordance with the requirements of the Sanitary Rules SP No KR DSM-49 dated 06/16/2021. However, water for technical needs is used irretrievably (dust suppression).

2.10.8 Solid Waste Generation and Disposal

The approximate volume of waste generated will be:

- 2026 - 2009.52 tons, of which hazardous - 0.07 tons, non-hazardous - 2009.45 tons.
- 2027 - 2012.81 tons, of which hazardous - 0.08 tons, non-hazardous - 2012.73 tons;
- 2028 - 2012.68 tons, of which hazardous - 0.08 tons, non-hazardous - 2012.60 tons;
- 2029 - 2008.69 tons, of which hazardous - 0.29 tons, non-hazardous - 2008.40 tons;

Responsibility for the timely removal of generated waste during construction and installation work rests with the contractor. Waste generated during construction and installation work will be transferred to a third-party specialized organization under a contract that has permits in the field of environmental protection.

Due to construction activities waste will be generated at construction site and contractors camp. These wastes will be generated due to the construction activities and the up to the extent possible the excavated materials will be reused, where applicable, for construction purposed. Solid waste generated during construction and camp sites shall be safely disposed in demarcated waste disposal sites. Solid waste from camp sites will mostly include paper waste, plastic waste, food waste, other organic waste, metal waste etc. The Contractor shall be responsible to ensure segregation of waste at site and record actual quantities of different types of waste generated at site.

2.10.9 Energy Sources

At project energy will be required to run project vehicles, construction machinery, batching plants, asphalt plants, offices, residential colonies, and labour camps etc. The main sources of energy required at the project are diesel, petrol, natural gas and electricity. However, the Contractors will be required to keep record of all quantities related to energy sources. The contractors will get

[2] When withdrawing and (or) using water resources from surface and underground sources with the use of structures or technical devices, it is necessary to issue a Permit for special water use in accordance with Article 66 of the Water Code of the Republic of Kazakhstan.

diesel, petrol and natural gas from the nearest gasoline stations, which are widely located in all cities, towns and existing roads/highways. As regards electricity it will be taken from the nearest sub-stations and lines of local power supplying companies.

2.10.10 Climatic Conditions

The difficult natural conditions of Kazakhstan should be noted. The sharply continental climate, with a large amplitude between winter and summer temperatures and a long winter period, differs significantly from the climate of countries leading in international road quality ratings. These climatic features affect soil conditions and negatively influence the operational characteristics of roads, while also limiting the construction season to May–October. This short working period forces contractors to maintain staff and equipment during winter downtime, whereas in more favorable climates road construction continues year-round. Such complicated conditions place increased demands on the efficiency of technological processes, the durability of materials, and the overall effectiveness of road sector development activities.

2.10.11 Road Arrangement and Road Safety

In accordance with **SP RK 3.03-101-2013**, the project ensures traffic organization and road safety through the provision of **road signs, barriers, and markings**.
Road signs are installed in compliance with **ST RK 1125-2021 "Road Signs"**, designed as per standard project **3.503.9-807**, and placed following **ST RK 1412-2017** to ensure visibility and avoid vehicle damage. Signs are mounted on 70 mm white-painted metal posts with a black skirt (0.6 m height), installed at 2.5 m above the road surface, in accordance with the "List of Road Signs".

Barrier fences are adopted in line with **ST RK GOST R 52607-2010**, **ST RK GOST R 52606-2010**, **ST RK 2368-2013**, and standard design series **3.503.1-89**. The selected galvanized steel fences on metal posts meet retention capacity, deflection, working width, and height requirements. For group **B roads (GOST 52289-2004)**, the required holding capacity is **U3 (250 kJ)** with a minimum fence height of **0.75 m**, including initial and final sections of 24 m and 12 m.

Road markings (0.15 m wide) follow **ST RK 1124-2019** and standard project series **3.503-79**, while signal poles at 50 m intervals are provided per **SP RK 3.03-101-2013**.
During all stages of construction, temporary and permanent safety measures including road signs and barriers will be installed as required to maintain safe traffic flow.

All road-building materials shall comply with Clause 31 of the State Sanitary Rules (Order No. KR DSM-71, 05.08.2022) on radiation safety. Construction management follows the sanitary rules Order No. KR DSM-49 (16.06.2021), covering safe working conditions, worker facilities, water supply, and hygiene standards. Materials are sourced from approved local quarries and plants, transported via the road network, and stored in designated areas.

2.11 Project Implementation Schedule

The implementation period of this investment project is 24 years, including:
- 2025 – development of design and estimate documentation for this investment project;
- 2026 to 2029 (four years) – the period of construction of the designed road;
- 2029 to 2048 (20 years) is the period of operation of the designed road.

The construction period of the designed road is 37 months, including 2026 to 2029 is the period of construction of the projected highway.

2.12 Cost of the Project

The total cost of the project (investment costs) in national currency is 141,068.1 million tenge (including VAT), including:

- Construction and installation works – KZT 135,161.5 million (including VAT);
- Equipment - KZT 1,805.8 million (including VAT);
- Costs for sewage pumping stations – KZT 1,976.3 million (including VAT);
- Costs of the Municipal Unitary Enterprise – KZT 1,707.5 million (including VAT);
- Other expenses - 417.0 million tenge (including VAT).

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3 Analysis of Alternatives

3.1 General

This chapter provides a detailed examination of the alternatives considered for the proposed project during the design phase. The analysis covers the No Project Alternative, Route Plan Alternatives, Pavement Alternatives, and Workforce Alternatives, with each assessed in terms of technical, economic, social, and environmental factors. Through this comparative analysis, the chapter aims to identify the most balanced and optimal solution that ensures the project's long-term success and sustainability.

3.2 No Project Alternative

Kazakhstan's vast territory and central Eurasian location make its transport complex critical. Despite major Europe–Asia corridors crossing the country, limited sea access via the Caspian raises costs and reduces competitiveness. Road transport, especially where rail is underdeveloped, remains essential for connectivity, trade, and regional economic activity.

This section of the road (Atyrau-Dossor) was reconstructed in 2009 under III category standards. Currently, it operates as a two-lane highway with daily traffic of 7,972 vehicles (2024), exceeding its designed capacity by more than 2.5 times. The condition of the Atyrau–Dossor highway (km 598–512) no longer meets modern requirements. The pavement has lost its structural integrity due to repeated patching and is heavily deformed, with longitudinal and transverse cracks, alligator cracking, waves, edges, pitting, peeling, and shearing. In hot seasons, the coating loses rigidity entirely. Bridges have a narrowed roadway and show damage to surfaces, sidewalks, and railings, while spans and supports suffer from cracks, chipped protective layers, and exposed reinforcement. Culverts are also in unsatisfactory condition, with cracked and corroded reinforced concrete, damaged seams, and serious defects at inlet and outlet heads. The overall road safety infrastructure is inadequate, as markings are incomplete or absent, and road signs, signal poles, fencing, and kilometer posts require major improvement. Poor road conditions limit access to education and healthcare, increase road accident fatalities and disabilities, and worsen environmental impacts, raising transport costs by 20–25%, vehicles consume up to 1.5 times more fuel, with maintenance costs rising 2.5–3.4 times, service life cut by 30%. According to NC QazAvtoZhol (2024), eight accidents occurred on this section, causing four fatalities and four injuries.

The project will add 87 km of standard roads in Atyrau, improve road quality by 7.8%, and expand toll coverage nationally by 4%. It will cut travel time to 0.5 hours by 2029, save users 1,963.1 billion tenge, and create over 1,100 construction jobs and 46 permanent jobs, delivering significant socio-economic benefits.

The project will ensure safe, uninterrupted travel, improve service quality, reduce accidents and environmental impacts, create jobs, enhance transit capacity, thereby enhancing public health, and road safety, ensuring reliable year-round travel under Kazakhstan's harsh climate and generating economic benefits for society. It will also enable private investment in roadside

facilities such as hotels, service stations, and cafes, supporting the growth of various industries and boosting small and medium-sized businesses in the Atyrau region.

Without it, transport conditions will worsen, accidents will rise, the population's mobility would remain constrained by weather, limiting access and connectivity and negative environmental effects will increase. Given these concerns, it is clear that the "No Project Alternative" would not only impede national economic growth but also negatively impact local and regional development and the overall quality of life for the communities along the road.

3.3 Route Plan Alternatives

The project considered three main options for the direction of the route

Option I: Separate roadbed (on the northern side) the beginning of the section at km 295/598 from the junction with the Azattyk passage in the village of Novokirpichnoye, at the transition of a four-lane road to a two-lane one. To ensure the continuity of traffic during the reconstruction of the section, km 301+200/591+800— km 377/516, a separate location of the roadbed for opposite directions of traffic is proposed. The new axis of the route runs north of the existing road at a distance of 70-500 m.

Option II: Split subgrade (south side): The new axis of the route passes south of the existing road at a distance of 50-150 m.

Option III: Reconstruction of the existing road (combined roadbed) It is planned to reconstruct the existing road to four lanes with a 3 m wide dividing strip along the entire length of the section. It is necessary to build at least six multi-level transport interchanges and a temporary bypass road of a capital type.

The comparative analysis between three options is provided in Table 3-1.

Table 3-1 Comparative Analysis Between Three Options

Options	Advantages	Disadvantages
Option-I	• Ensure continuous traffic: The existing road remains operational, eliminating the need to build temporary bypasses. • Minimization of land withdrawal: The route passes through vacant land, reducing buyout costs and reducing socio-economic risks. • Increased traffic safety: Separate traffic of oncoming traffic reduces the risk of head-on collisions.	• Increase in the number of engineering structures: the construction of separate bridges, overpasses and culverts for each direction is required, which increases capital costs. • Increased land allotment: A separate roadbed requires more land withdrawn for permanent use.

Options	Advantages	Disadvantages
	• No need for barrier guardrails on the median strip, simplifying road construction and reducing construction and operating costs. • Exclusion of dazzle by oncoming headlights, which increases the comfort and safety of traffic in the dark. • Reduced overall costs: No need to build interchanges at different levels.	
Option-II	• Maintain traffic continuity: Similar to Option I, the existing road is used for traffic during construction.	• High costs for the seizure of land plots: The route crosses the territories of industrial enterprises, hotel complexes and gas stations, requiring significant investments in the purchase and demolition of facilities. Socio-economic impacts: The need to relocate enterprises and the legal and social difficulties associated with it. • Extended project timeline: Land expropriation and demolition processes can significantly delay construction time.
Option-III	• Use of the existing road corridor: Minimization of additional land allotment and optimization of the use of current infrastructure. • Road modernization: Improving the technical characteristics and bringing the road in line with modern standards.	• High capital investments: Significant costs for the construction of a temporary bypass road and multi-level interchanges. • Negative impact on traffic flow: Reconstruction can lead to serious traffic difficulties and an increase in accidents during the construction period. • Challenges in organizing work: Limited construction conditions increase risks and complicate project management.

Selected Option: The analysis showed that Option I is the most optimal from a technical and economic point of view: It ensures the continuity and safety of traffic without the need to build

temporary bypass roads. Reduces the cost of land alienation and minimizes socio-economic risks. Improves road safety due to the separate arrangement of directions.

3.4 Pavement Alternatives

Alternatives Considered:

- **Option 1:** Asphalt pavement.
- **Option 2:** Concrete pavement.

Evaluation:

- **Cost:** Asphalt is cheaper initially but requires frequent maintenance. Concrete has a higher upfront cost but longer lifespan. Concrete extends project duration due to longer curing time. Hot asphalt concrete is readily available from Atyrau plants and bitumen supply from Aktau, reducing logistical risks.
- **Construction Issues:** Concrete takes longer to cure, delaying project completion. Asphalt allows faster installation and phased construction.
- **Social Impact:** Asphalt provides a smoother ride but wears out faster. Concrete is more durable, especially for heavy traffic.
- **Environmental Impact:** Asphalt emits more CO_2 during production, concrete's cement production is also highly. However, asphalt recycling offers opportunities for circular use. Asphalt provides smooth driving experience and less noise, whereas concrete is more sustainable in the long run but generates high noise level.

Asphalt pavement is the most suitable choice for the project due to its superior adaptability to Kazakhstan's sharply continental climate. With temperature fluctuations ranging from −37.9 °C in winter to +44.6 °C in summer, asphalt offers the necessary flexibility to accommodate thermal expansion and contraction without severe structural damage. In addition, the region's short construction season, limited to May–October, makes asphalt particularly advantageous, as its faster placement and curing allow project timelines to be met efficiently while maintaining traffic continuity. This combination of climatic resilience and construction feasibility provides a compelling justification for selecting asphalt as the preferred pavement option. Moreover, due to its low initial investment cost, asphalt pavement is considered the most practical choice in the design.

3.5 Alternative Workforce Options

Alternatives Considered

- **Option 1:** Local Worker
- **Option 2**: Migrant Worker
- **Option 3:** Mixture of Local and Migrant Workers

Evaluation

- **Cost:** Recruiting a mix of local and migrant worker provides an optimal balance between cost efficiency and workforce availability. Relying solely on local labor may reduce transportation and accommodation costs but could lead to inefficiencies due to skill gaps such as especially in specialized areas such as bridgeworks, artificial structures, and ITS installation could create inefficiencies. Conversely, bringing in an entirely external workforce increases costs associated with travel, housing, and allowances. A blended approach ensures cost-effectiveness while maintaining quality and productivity.
- **Construction:** The feasibility of construction depends on having a workforce with the right skill set. As noted in the project's scope, construction requires diverse expertise ranging from asphalt pavement laying to reinforcement works for artificial structures. Local worker alone may not provide the necessary mix of skilled, semi-skilled, and unskilled workers, leading to potential delays. Hiring all worker from outside might address skill shortages but could disrupt workflow integration and increase logistical challenges. A combination of local and external labor ensures a balanced workforce capable of meeting the project's technical requirements while maintaining steady progress.
- **Social Impact:** The social implications of worker recruitment are significant. Employing a majority of local workers supports community livelihoods, fosters social cohesion, and minimizes displacement risks. Over-reliance on migrant worker could cause social disruptions and resentment within the local community. Public consultations have emphasized the importance of prioritizing local employment opportunities, recommending that maximum of the workforce be sourced locally.
- **Environmental Impact:** A mixed labor approach also has environmental benefits. Hiring more local workers reduces transportation-related carbon emissions and minimizes the environmental footprint of worker accommodations. On the other hand, bringing in a large number of migrant workers could strain local resources such as water, energy, and housing and generate higher carbon emissions linked to travel and temporary facilities. Therefore, adopting a strategy where the majority of labor is hired locally helps mitigate negative environmental impacts.

Selected Option: Considering these factors, it is recommended that majority of the labor force be recruited from local areas, with external hires limited to specialized skills and management. This approach ensures cost efficiency, timely construction, social acceptance, and minimal environmental disruption.

4 Legal and Regulatory Framework

This section deals with the current legal and administrative framework required to prepare the ESIA of the proposed Project. Environmental and Social Policy (ESP) and Environmental and Social Standards (ESSs) of AIIB, guidelines and national regulations laid out by the Government of Kazakhstan have been duly discussed and the Implementing Agency will be required to adhere to these regulations throughout the course of the proposed Project.

4.1 Key National Requirements of the Republic of Kazakhstan

4.1.1 Basic Environmental Laws of the Republic of Kazakhstan

Environmental legislation of the Republic of Kazakhstan is based in the Constitution. Article 31, which states that: "The state shall aim to protect the environment in favour of human life and health", while Article 61 (provision 3, no. 3) also states that the "Parliament shall have the right to issue laws that regulate the most important public relations and establish fundamental principles and standards relating to Environmental protection. Based on these provisions, the Environmental Code (EcoCode) serves as the core legal framework. Its latest amendment, signed by President Kassym-Jomart Tokayev on January 2, 2021, establishes requirements for EIA of all activities with potential environmental or health impacts. State regulation of environmental relations is ensured through mandatory environmental requirements and regulatory instruments defined in the EcoCode (Article 31).

The current E&S legislation system in Kazakhstan is based on the key principles, as introduced in the Environmental Code are presented in Table 4-1.

Table 4-1 Key principles of the environmental and social legislation system in Kazakhstan

Key Principles of the current National Environmental and Social Legislation System	
[1]	**Prevention principle:** any activity that causes or may cause environmental pollution, degradation of the natural environment, environmental damage, and harm to human life and (or) health shall be allowed if all necessary measures to prevent being taken at the source of the environmental impact.
[2]	**Remedial principle:** environmental damage occurred must be remedied in full. If it is impossible to fully remedy the inflicted environmental damage, its implications shall be minimized as much as possible given the current level of scientific and technological development.
[3]	**Precautionary principle:** if an activity creates a risk of environmental damage with significant and irreversible implications for the natural environment and (or) its individual components or harm to human life and (or) health, effective and proportionate measures shall be taken to prevent impacts.
[4]	**Proportionality principle:** environmental protection measures are provided and sufficient for achieving the goal and objectives of the environmental legislation of the Republic of Kazakhstan.
[5]	**'Polluter pays' principle**: a party whose activities cause or may cause environmental pollution, degradation of the natural environment, environmental damage in any form or harm to human

Key Principles of the current National Environmental and Social Legislation System	
	life and (or) health shall bear all costs of compliance with the requirements under the environmental legislation of the Republic of Kazakhstan to prevent and control negative implications of their activities, including the elimination of caused environmental damage in line with the remedial principle.
[6]	**Sustainable development principle:** Nature and its resources constitute the wealth of the Republic of Kazakhstan, and their use shall be sustainable. The State ensures the balanced and rational management of natural resources for the benefit of present and future generations. Environmental decision-making shall prioritize the conservation of natural ecological systems and ensure their sustainable functioning, water conservation, energy conservation, and energy efficiency, reducing the consumption of non-renewable energy and raw material resources, using renewable energy sources, minimizing waste generation, and using it as secondary resources.
[7]	**Integration principle:** the state policy of the Republic of Kazakhstan, it is underlined that all spheres of economic and social activity are subject to seeking a balance between the socio-economic development and the need to ensure the ecological foundations of sustainable development of the Republic of Kazakhstan.
[8]	**Principle of environmental information accessibility:** the State guided by international treaties of the Republic of Kazakhstan ensures the public right of access to environmental information.
[9]	**Principle of public participation:** Public participation in decision-making on matters related to environmental protection and sustainable development of the Republic of Kazakhstan is ensured from an early stage, when all project development alternatives are open for consideration, and when effective public participation can be ensured. State bodies and officials ensure the publicity of planned decision-making with the possible environmental impact on terms that allow the public to express its views to be taken into account in the decision-making process.
[10]	**Ecosystem approach principle:** integrity and natural interconnections of natural ecological systems, living organisms, natural landscapes, other natural, natural-anthropogenic and anthropogenic objects, and the need to preserve the natural balance of the natural environment shall be taken into account during planning phase of a prospective development. Upon that, priority should be given to the conservation of natural landscapes, natural complexes, and biodiversity, to the conservation and sustainable functioning of natural ecological systems, and to avoiding negative impacts on the services provided by such ecological systems.

The Environmental Code defines the general management aspects associated with various environmental topics, such as water, air, land, waste, and E&S management practices. In addition, this act sets out the process for environmental appraisal and permitting, and more specifically, it defines the environmental impact assessment (EIA) procedure. The Environmental Code has specific chapters regarding greenhouse gas (GHG) emissions and ozone-depleting substances.

4.2 Environmental Assessment in Kazakhstan

In the general context, the Environmental Assessment (EA) of a development can be carried out in the form of:

- Strategic Environmental Assessment (SEA)
- Environmental Impact Assessment (EIA)
- Transboundary Impact Assessments (TIA)

Assessment of transboundary impacts - the process of identifying, studying, describing and evaluating, on the basis of appropriate studies, possible significant negative impacts, in an area under the jurisdiction of one state (affected party), from a source that is associated with the implementation of a plan, program or proposed project / activity and is physically located under the jurisdiction of another state (party of origin).

4.3 Environmental Assessment in accordance with the simplified procedure (screening EIA)

Environmental Assessment in accordance with a simplified procedure (screening EIA) is carried out for planned and ongoing projects / activities that are not subject to mandatory EIA, when:

- Development of draft emission standards for objects of categories I and II; and
- Development of the section "Environmental Protection" as part of the project documentation (e.g. Project Feasibility Study or Project Technical Design) and in the preparation of the declaration on the impact on the environment.

4.4 National EIA Process and Permitting

Among other provisions, the Environmental Code (Chapter 7. ENVIRONMENTAL ASSESSMENT) provides the regulatory framework for the environmental impact assessment.
The types of projects that require an EIA are determined by the Environmental Code. Under this law, projects are classified in two groups (annexes): projects listed in Annex 1[3] are all subject to compulsory EIA while for projects in Annex 2[4], the assessment contains an element of discretion, noting that an EIA procedure will, in any event, be required for projects with potentially significant environmental impacts. The public and other parties are to be consulted on the EIA.

Road developments fall within the scope of the Environmental Code:

(i) in Section 1. List of planned activities and installations that shall be made subject to a mandatory environmental impact assessment: Item 8 - Road, rail and air transport, point 8.3 - Construction of new and (or) reconstruction of existing public roads of the 1-st technical category with a continuous length of 10 km or more.

(ii) in Section 2. List of planned activities and installations that shall be made subject to a mandatory environmental impact assessment: Item 7 - Transport, point 7.2.-

[3] *Annex 1 to the Environmental Code of the Republic of Kazakhstan, dated 2 January 2021 (No. 400-VI ZRK) - Section 1. List of planned activities and installations that shall be made subject to a mandatory environmental impact assessment*

[4] *Annex 2 to the Environmental Code of the Republic of Kazakhstan, dated 2 January 2021 (No. 400-VI ZRK) - Section 2. List of planned activities and installations that shall be made subject to a mandatory screening procedure for impacts of the planned activity*

Construction of highways with a length of 1 km or more and (or) with a capacity of 1,000 vehicles per hour or more.

This act and the associated secondary legal acts regulate the scope the EIA study (EIA Report), the administrative / consenting procedure, the requirements for stakeholder engagement and the public involvement process.

As per national regulations, the proposed Project is classified under Appendix 1 of the Environmental Code of the Republic of Kazakhstan, subparagraph 8.3 of clause 8, section 1 — 'Construction of new and/or reconstruction of existing public roads of the first technical category with a continuous length of 10 km or more.' Accordingly, the Conclusion on determining the scope of the Environmental Impact Assessment (No. KZ85VWF00220661, dated 27 September 2024) was issued, confirming that the activity is subject to a mandatory EIA. The conclusion is provided in the Annex-1.

4.5 Key National Laws and Regulations relevant to the Project

With respect to road development projects, the main governing laws, regulations and standards in Kazakhstan are summarized in the Table below.

Table 4-2 – Key national legislation relevant for the Project

Legislation	Last amendments (Year)
The Constitution (Article 24) (1995)	
The Environmental Code (2007)	2021
The Water Code (2003)	2022
The Law on Protection, Reproduction and Use of the Fauna (2004)	2023
The Law on the Protection, Reproduction and Use of Wildlife (2004)	2023
The Forest Code (2003)	2017
The Law on Access to Information (2015)	
The Land Code (2003)	2022
The Labour Code (2015)	2021
The Law on Trade Unions (2014)	
Law on Culture (2006)	2019
The Law on State Guarantees of Equal Rights and Opportunities for Men and Women (2009)	
Concept of Family and Gender Policy to 2030 (implemented via the national Action Plan) (2016)	
Administrative Procedural Code (for grievances) (2020)	
The Law on Civil Protection (2014)	2023
SanPiN Standards (for air quality, water quality, soil contamination, noise, vibration, radiation, etc.)	

4.6 Environmental Quality Standards

The project will comply with the national environmental quality standards established under the Environmental Code of the Republic of Kazakhstan (2021), particularly those relating to air, water, and noise, as stipulated in Article 36 on environmental quality standards and SanPiN Standards (for air quality, water quality, soil contamination, noise, vibration, radiation, etc.). These national standards are legally binding and provide the baseline for project compliance. However, in line with good international practice, it is recommended that the project adopt the more stringent values set out in the World Health Organization (WHO) and the International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) Guidelines, where they offer stronger protection. This dual approach ensures that both national legal obligations and international benchmarks are met, thereby maintaining the highest level of environmental and health safeguards. Adopting stricter limits for pollutants, noise, and water quality parameters will help protect community health, safeguard workers, and demonstrate the project's alignment with international best practice in sustainable infrastructure development.

4.7 ASIAN INFRASTRUCTURE INVESTMENT BANK'S ENVIRONMENT AND SOCIAL FRAMEWORK AND STANDARDS

AIIB's ESF provides an overview of the AIIB concerning, (a) environmental and social sustainability; and (b) its role in meeting the challenge of sustainable development in Asia. The pursuit of complete objectives of development is framed within the ESF in terms of both local impacts, and global challenges, especially in climate change. The Environmental and Social Policy (ESP) in the ESF comprises essential E&S requirements for each Project and is accompanied by: (a) three associated mandatory E&S Standards (ESSs) setting out requirements applicable to clients on, respectively, E&S Assessment and Management, Land Acquisition and Involuntary Resettlement and Indigenous Peoples; (b) an E&S Exclusion List (ESEL); and (c) a Glossary of certain terms used in the ESP and ESSs.

4.8 Project Categorization

The Bank assigns each proposed Project to one of the following four categories and determines the type of assessment and instrument required, as noted below and further elaborated throughout this ESP:

Category A*:* A Project is categorized A if it is likely to have significant adverse environmental and social impacts that are irreversible, cumulative, diverse or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works and may be temporary or permanent in nature.

Category B: A Project is categorized B if: (i) it has a limited number of potentially adverse environmental and social impacts; (ii) the impacts are not unprecedented; (iii) few if any of them are irreversible or cumulative; (iv) they are limited to the Project area; and (v) they can be successfully managed using good practice in an operational setting.

Category C: A Project is categorized C if it is likely to have minimal or no adverse environmental and social impacts. The Bank does not require an environmental and social assessment, but does require the Client to prepare an analysis of the environmental and social aspects of the Project.

Category FI: A Project is categorized FI if the financing structure involves the provision of funds to or through a financial intermediary (FI) for the Project, whereby the Bank delegates to the FI

the decision-making on the use of the Bank funds, including the selection, assessment, approval and monitoring of Banks supported activities based on a sound environmental and social management system (ESMS) adopted by the FI.

AIIB, in its environmental and social review, classified the Project as 'Category B' as per the Environmental and Social Risk Classification, the proposed project would have some potential adverse environmental and social impacts, but of lesser degree and/or significance than those of category A projects.

4.9 Applicability of AIIB Environmental and Social Standards

The ESF has provisions for identify measures to avoid, minimize, or mitigate potentially adverse impacts on and risks to physical, biological, socioeconomic and cultural resources, safety of both workers and affected community and natural resources during the design, construction, operation, and decommissioning of the project. Specific AIIB funded Investment Project Financing are required to follow the ESF consisting of three (3) ESS's. ESS2 and ESS3 are only triggered in specific projects, i.e., when land acquisition, resettlement and/or Indigenous People are present. A summary of the applicable ESSs and their relevance to the proposed project is provided in Table 4-3.

Table 4-3: Applicability of the AIIB ESS to the Project

AIIB ESS Policy and Standards	Brief Description	Relevance to Project
ESS-1 Environmental and Social Risks Assessment and Management	The types of E&S risk and impacts that should be considered in the environmental and social assessment. The use and strengthening of the Borrower's environmental and social framework for the assessment, development and implementation of AIIB financed projects where appropriate.	Relevant: The adverse environmental and social risk and impacts[5] are anticipated due to proposed construction/ rehabilitation activities during the implementation of proposed project. To ensure the compliance with the requirement of ESS1, relevant mitigation measures have been proposed, following the mitigation hierarchy, in the ESIA report. Resource efficiency requirements are also incorporated in the ESIA Report. In addition, to address risks and impacts related to project workers and stakeholders, standalone Labor Management Procedures (LMP) and

[5] The risks and impacts associated with soil and water contamination likely to occur due to inappropriate disposal of wastes (including hazardous and non-hazardous), material extraction, drainage, flora and fauna, climate change, air quality, noise and vibration, workers camp, quarry and borrow areas, traffic, physical

AIIB ESS Policy and Standards	Brief Description	Relevance to Project
		the Stakeholder Engagement Plan (SEP) have been developed in accordance with the requirements of the ESF. This ESIA report also has a section on GRM and will also be referring to the AIIB information disclosure policies to engage the stakeholders both these systems will enable the affected parties to raise project related concerns and grievances for efficient and timely resolution.
ESS-2 Involuntary Resettlement	Applies to permanent or temporary physical and economic displacement resulting from different types of land acquisition and restrictions on access. Does not apply to voluntary market transactions, except where these affects third parties. Provides criteria for "voluntary" land donations, sale of community land, and parties obtaining income from illegal rentals. Prohibits forced eviction (removal against the will of affected people, without legal and other protection including all applicable procedures and principles in ESS 2). Requires that acquisition of land and assets is initiated only after payment of Compensation and resettlement has occurred. Requires community engagement and consultation, disclosure of information and a grievance mechanism.	Relevant. The project establishes a 70 m permanent right-of-way (compared to the existing 30 m), with additional land to be acquired for rest areas, utilities, and interchanges. Compensation for affected structures, businesses, and loss of livelihoods will be provided in accordance with the provisions of the ESS2. Additionally, a separate Land Acquisition and Resettlement Plan (LARP) will be prepared in accordance with AIIB's ESF requirements and same will be implemented prior to the commencement of project works.
ESS-3 Indigenous Peoples	Applies when the Indigenous Peoples are present or have a	As per the AIIB definition, there are no groups of people in the project area

culture resources, natural and man-made disaster, health and safety, road safety, exclusion of disadvantaged and vulnerable groups, GBV, forced labor, use of child labor etc.

AIIB ESS Policy and Standards	Brief Description	Relevance to Project
	collective attachment to the land, whether they are affected positively or negatively and regardless of economic, political or social vulnerability. The option to use different terminologies for groups that meet the criteria set out in the Standard. The use of national screening processes, providing these meet AIIB criteria and requirements. Coverage of forest dwellers, hunter Gatherers, and pastoralists and other nomadic groups. Requirements for meaningful consultation tailored to affected parties and a grievance mechanism. Requirements for a process of free, prior and informed consent in three circumstances.	who could be categorized as indigenous people, therefore this ESS does not apply to the proposed project.

4.10 Gap Analysis: Kazakhstan Legislation vs AIIB ESS

The table below presents a comparison between Kazakhstan's national legislation and the requirements of the AIIB ESS. It highlights areas where gaps exist and identifies gap-filling measures to ensure compliance with AIIB standards. The Gap analysis is provided an Annex-2

4.11 World Bank Environmental, Health and Safety Guidelines

World Bank Group's Environmental, Health, and Safety (EHS) Guidelines are applicable to the proposed project. In particular, contractors will be required to implement the General EHS Guidelines, the EHS Guidelines for Construction Materials Extraction and Toll Roads.

4.12 International Obligations

In addition to national legislation and regulations on environmental requirements, Kazakhstan is also a party to several international treaties focused on E&S issues (Table below).

Table 4-4 - Overview of international treaties ratified by Republic of Kazakhstan, relevant for the Project

Sr. No	Name conventions, agreements	Document of accession of the Republic of Kazakhstan / ratification
1.	UN Convention on Biological Diversity (CBD). Rio de Janeiro, May 22, 1992	Law on ratification of 19.08.1994, No 918
2.	UN Convention to Combat Desertification (UNCCD). Paris, June 17, 1994	Law on ratification of 07.07.1997 No 149-1
3.	UN Framework Convention on Climate Change (UNFCC). Rio de Janeiro, June 16, 1992	Law on ratification of 04.05.1995 № 2260
4.	Stockholm Convention on Persistent Organic Pollutants. Stockholm, May 22, 2001	Law on ratification of 07.06.2007. N 259
5.	Convention on Long-range Transboundary Air Pollution. Geneva, 13 November 1979	Law on ratification of 23.10.2000, No 89-II
6.	Vienna Convention for the Protection of the Ozone Layer. Vienna, March 22, 1985	Act of accession of Kazakhstan to the Vienna Convention on30.10.1997 No 177-I
7.	Montreal Protocol on Substances that Deplete the ozone layer. Montreal, September 16, 1987	Law on joining from 30.10.1997g. No 176
8.	Paris Agreement under the UNFCCC, Paris, 12 December 2015	Law on Ratification, 28.10.2016, No. 505-V

In addition, Kazakhstan has ratified a number of core labour standards of the International Labour Organisation, including the following as in table below:

Table 4-5 Core labour standards of the International Labour Organisation,

Convention	Date of Ratification
C029 – Forced Labour Convention, 1930	18 May 2001
C105 – Abolition of Forced Labour Convention, 1957	18 May 2001
C087 – Freedom of Association and Protection of the Right to Organise, 1948	13 Dec 2000
C098 – Right to Organise and Collective Bargaining, 1949	18 May 2001
C100 – Equal Remuneration Convention, 1951	8 May 2001
C111 – Discrimination (Employment and Occupation), 1958	06 Dec 1999
C138 – Minimum Age Convention, 1973 *(Minimum age set at 16 years)*	18 May 2001
C182 – Worst Forms of Child Labour, 1999	26 Feb 2003
C155 – Occupational Safety and Health (OSH), 1981	30 Jul 1996
C148 – Working Environment (Air Pollution, Noise, Vibration), 197	30 Jul 1996
C167 – Safety and Health in Construction, 1988	18 Jun 2008
C098 – Right to Organise and Collective Bargaining, 1949	18 May 2001

4.13 Administrative Framework

The Ministry of Ecology and Natural Resources (MENR) of Kazakhstan is the central executive body responsible for state policy and management in environmental protection, green economy development, waste management (excluding municipal, medical, and radioactive waste), sustainable use of natural resources, geology, water resources, sanitation, forestry, biodiversity, and specially protected areas. Within MENR, the Committee for Environmental Regulation and

Control (CERC) ensures environmental quality and safety, regulates emissions, issues permit, and conducts state environmental expertise, while the Committee for Forestry and Wildlife (CFW) manages forests, wildlife, and protected natural areas.

During construction, the proponent/ Implementing Agency must comply with all approval and permit conditions, monitor project activities, and report regularly to MENR. The monitoring program should identify potential breaches early, with corrective measures taken promptly. MENR may issue warnings or require suspension of activities if breaches occur, and approvals or conditions may be reviewed in consultation with the Environmental Review Expert Group.

- The Department of Environmental Protection under MENR periodically monitors environmental compliance on behalf of the Government.
- MENR issues licenses and permits for plant operations and use of material sources, with regional and local offices exercising strict oversight.
- If additional quarries are needed during construction, the contractor must obtain an environmental permit from MENR and prepare a reinstatement (re-cultivation) plan in line with national laws and regulations.
- Opening a new borrow pit for aggregate extraction requires a permit from the Ministry of Ecology and Natural Resources (MENR). The application must include an Ecological Passport with details such as the pit location, proposed extraction volume, and rate. MENR conducts a geological assessment, registers the site through its regional branch, and performs regular inspections to ensure permitted volumes are not exceeded. The permitting process typically takes about one month. After closure, the contractor must implement a reinstatement (re-cultivation) plan agreed with MENR, usually within one month, under the supervision of MENR's local branches.
- Opening a new borrow pit for aggregate extraction requires a permit from the Ministry of Ecology and Natural Resources (MENR). The application must include an Ecological Passport with details such as the pit location, proposed extraction volume, and rate. MENR conducts a geological assessment, registers the site through its regional branch, and performs regular inspections to ensure permitted volumes are not exceeded. The permitting process typically takes about one month. After closure, the contractor must implement a reinstatement (re-cultivation) plan agreed with MENR, usually within one month, under the supervision of MENR's local branches.
- Monitoring of surface water quality is carried out by National Hydro meteorological Department of MENR.

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5 Environmental and Social Baseline Conditions

5.1 General

The following section provides an overview of the information on physical, ecological and socio-economic environment of the proposed project collected from primary as well as secondary sources. Considering the potential impacts of the project, existing baseline environmental conditions has to be used as a benchmark for comparison of the physical, ecological and socio-economic conditions before and after construction phases of the project. The existing E&S conditions of the proposed project have been considered within the project area with respect to physical, biological and socio-economic aspects.

5.2 Area of Influence

The Area of Influence (AoI) refers to the geographic area where project activities may cause direct or indirect environmental and social impacts. It covers all land and water areas affected by the project, including adjacent communities that may experience secondary impacts such as traffic safety risks, noise, or visual changes during construction and operation. For this project, the AoI includes all construction activity zones within the right-of-way (70 m), as well as a buffer zone measured from its outer boundary. Given that the project will be implemented in an already modified environment, the AoI for impact assessment is defined as ranging from 70 m to 1,000 m

5.3 Physical Resources

5.3.1 Physiography

The section of the highway (Atyrau-Dossor) passes through the Makat district of the Atyrau region and along the land of the territory of Atyrau. The area of the region is relatively small- 118.6 km^2, which is the 13th place among the 20 regions of the republic. The population density is below the national average - 4.8 people per 1 km^2.

The beginning of the section of km 295/598 of the highway begins at the junction with the Azattyk passage in the village of Novokirpichnoye, Further, at km 300+500/592+500, the highway crosses a traffic interchange of the "Pipes" type, then crosses the Aktobe River. On the right side of the road in the direction of Dossor village there are industrial enterprises, such as GATE Insaat Company, North Caspian Operating Company N.V., ASPAR KASHAGAN LLP and Karabatan Petrochemical Complex. At km 321+700/571+300, the road crosses the railway tracks at the Karabatan thermal power plant. At km 349/544, the road crosses the burial site of Onay Ata. Many people make pilgrimages to his tomb in the hope of finding peace of mind and physical health. The mausoleum on the burial site of the saint was built in 1999 on the initiative of Fariza Ongarsynova. At km 379/514 at the entrance to the village of Dossor, it is planned to arrange a traffic interchange at different levels of the "Pipe" type with the allocation of a priority direction for the Atyrau-Aktobe highway. Further, the

road bypasses the village of Dossor from the north along free lands and adjoins the existing A-27 highway "Aktobe-Atyrau-gr. RF (to Astrakhan)." The end of the section corresponds to km 381/512.

5.3.2 Topography

The section of the highway where the reconstruction will be carried out is located within the Caspian lowland, which in turn is located between the Common Syrt in the north, the Pre-Ural plateau in the east and the Caspian Sea in the southwest. In the southeast, the lowland borders on the Ustyurt plateau and Mangyshlak. It is composed of marine and river deposits (sands, clays, silt). Near the coast of the sea, the Caspian lowland lies between 20m to 27 m below sea level.

5.3.3 Geology

The most ancient rocks found within the lowland are the Permian deposits of the Kungur age. At their base there are rock salt rods. The Permian deposits are overlain by Triassic rocks that come to the surface in places of tectonic disturbances, as well as by rocks of the Jurassic, Cretaceous, and Paleogene. Neogene sediments in the form of Akchagyl clays with a thickness of up to 80-100 m line the entire Caspian depression. On the deposits of Akchagyl there are strata of Apsheron with a thickness of more than 400 m, which, in turn, are overlain by Quaternary sediments, represented by alternating sediments of marine and continental genesis, with a total thickness of 30-40 m and only in some places more than 100 m. In the marine Quaternary deposits, four main horizons are distinguished: Baku, Khozar,

Nizhnekhvalynsky and Upper Khvalynsky, represented by clayey, sandy-argillaceous and sandy deposits with marine fauna. Marine sediments are separated by continental, pronounced sands. Loess-like loams, silts, peat bogs with the remains of large mammals. The Caspian lowland is located within the Caspian syneclise, which was laid down in the Paleozoic. The folded basement of the syneclise, lowered to a depth of 3000-4000 m, is overlain by the thickness of Paleozoic and Mesozoic-Cenozoic deposits, the thickness of which reaches the greatest value for the Russian platform.

5.3.4 Seismology

The seismicity of the section of the route of the designed highway according to SP RK 2.03-30-2017 and the map of seismic zoning of the territory of the Republic of Kazakhstan is five points of Atyrau. The category of soils in terms of seismic properties is the second and third and depends on the composition of soils, water content and moisture content of soils, flow and density indicators.

5.3.5 Climate and Meteorology

The climate of the region is characterized by a sharp continental, aridity, manifested in large annual and daily amplitudes of air temperature and in the instability of climatic indicators over time (from year to year). The area is characterized by an abundance of heat and the predominance of clear dry

weather. The annual number of hours of sunshine is 2600-2700. The influence of the Caspian Sea on the climate of the adjacent territories is very limited. It is noticeable only in a narrow strip of the coast and is expressed in a slight increase in air humidity, an increase in its temperature in the winter months and in its decrease in the summer months, in a decrease in both annual and daily temperature amplitudes, that is, in smaller fluctuations in temperature between winter and summer, day and night. However, there is no noticeable increase in precipitation in the coastal zone. Annual rainfall is low. Annual rainfall on the east coast is as low as in the desert. The main climatic parameters typical for the work area are given on the basis of the analysis of statistical data obtained from the data of the Atyrau meteorological station, as well as in accordance with SP RK 2.04-01-2017* "Construction Climatology".

1. Climatic Parameters of the Cold Period

The air temperature of the coldest five-day period, -27.8°C (with a probability of 0.95). The air temperature of the coldest days is -29.4ºC (with a probability of 0.98), -25.6ºC (with a probability of 0.92) and -11.7ºC (with a probability of 0.94). The average minimum air temperature of the coldest month is 7.7ºC. The absolute minimum air temperature is 37.2ºC. The average annual relative humidity is 59%. The amount of precipitation in November-March is 86 mm. The prevailing wind direction in December-February is NE. The maximum of the average wind speeds along the rhumbs in January is 6.4 m/s. The average wind speed for the heating period is 2.7 m/s.

2. Climatic Parameters of the Warm Season

The air temperature is +32.6ºC (with a probability of 0.95) and +35.4ºC (with a probability of 0.98). The average maximum air temperature in the warmest month is +34.4ºC. The absolute maximum temperature is +45.6ºC. The average monthly relative humidity at 15 hours in July is 0.24. The amount of precipitation in April-October is 715 mm. The prevailing wind direction in June-August is NE. The minimum of the average wind speeds along the rhumbs in July is 1.8 m/s.

The continentally of the climate is manifested in large fluctuations of meteorological elements, in their daily, monthly and annual course. Summers are hot and long. There are no sharp differences in temperatures during this period. Everywhere the average temperature in July is 36 to 39^0C. The absolute maximum temperature in the prevailing part of the region is 44 to 48^0C. In winter, the difference in temperatures between the north and south of the region is noticeable. For example, the average temperature of the coldest month - January – 35 to -36^0C. Openness to the north allows cold air masses to freely penetrate into the territory of the region and cause sharp cold snaps, especially in winter. The absolute minimum air temperature reaches -42^0C.

Aridity is one of the distinctive features of the climate of the region. There is very little precipitation. Their average annual amount does not exceed 100-190 mm and is distributed unevenly over the seasons of the year: 60% of all precipitation falls on the winter-spring period. The entire territory of the region is characterized by frequent and strong winds, mainly from the northeast. Their average

annual speed ranges from 3.1 to 6.0 m/s. Strong winds in winter at low temperatures blow away a slight snow cover from the elevated parts of the relief, which causes deep freezing and cracking of the upper layers of the soil. In summer, dust storms are observed.

The climatic conditions of the project area and its surrounding are provided in Table 5-1.

Table 5-1 Climatic Conditions in Project Area

Sr. No.	Name of indicators	Unit of Measurement	Atyrau Weather Station
1	**Air temperature:**		
	- average annual	°C	9.7
	- absolute minimum	°C	-37.9
	- absolutely maximum	°C	44.6
	- the coldest days with a probability of 0.98 and 0.92	°C	-30.7; -29.0
	- the coldest five-day period with a probability of 0.98 and 0.92	°C	-27.3; -24.9
	- air temperature with a probability of 0.94	°C	-11.3
	- duration of the period with an average daily temperature of ≤ 0 °C : - average temperature	Days / °C	114 / -4.7
	- duration of the period with an average daily temperature of ≤ 8 °C : - average temperature	Days / °C	172 / -1.5
	- duration of the period with an average daily temperature of ≤ 10 °C : - average temperature	Days / °C	185 / -0.9
	- the date of the beginning and end of the heating period (the period with the air temperature not exceeding 8 °C)	Date	18.10 ; 08.04
	- average maximum of the warmest month of the year July	°C	33.4
	- air temperature of the warm period with a probability of 0.95 and 0.96	°C	30.0 and 31.9
	- air temperature of the warm period with a probability of 0.98 and 0.99	°C	34.1 and 33.7
2	**Average number of days per year with air temperatures below and above specified limits**		
	with a minimum equal to and below -35.0 °C, -30.0 °C, -25.0 °C	Days	0.1; 0.2; 2.0
	with a maximum equal and higher 25.0 °C, 30.0 °C, 34.0 °C	Days	113.2; 72.0; 32.5
3	**Average monthly relative humidity**		
	the coldest month (January) at 3 p.m.	%	79
	for the heating period	%	78
	the warmest month (July) at 3 p.m.	%	29
	per year	%	63
4	**Average monthly atmospheric pressure at barometer installation altitude**		
	for January	hPa	1026.5
	for July	hPa	1012.2
	average for the year	hPa	1021
5	**Barometer altitude above sea level during the warm season**	m	-22.1

Sr. No.	Name of indicators	Unit of Measurement	Atyrau Weather Station
6	Average rainfall:		
	for November-March	mm	73
	for April-October	mm	103
	per year	mm	176
7	**Daily maximum precipitation per year**		
	average of the maximum	mm	23
	the largest of the maximum	mm	56
8	**Snow cover height:**		
	the average of the largest ten-day seasons for the winter	cm	12
	the maximum of the largest ten-day	cm	42
	maximum daily allowance for the winter on the last day of the decade	cm	30
9	**Duration of stable snow cover**	days	55
10	**Prevailing wind direction for:**		
	December-February	Bearing	IN
	June-August	Bearing	SKID
11	**Average wind speed:**		
	January (the highest of the average by rhumbs)	m/s	8.5
	July (minimum of the rhumb average)	m/s	3
	for the heating period	m/s	4.3
12	**Average days at a speed of ≥10 m/s at sub-zero temperatures**	days	5
13	**Recurrence of calms per year**	%	10
14	**Average number of days with atmospheric phenomena per year:**		
	dust storms	days	24.1
	Fog	days	31
	Snowstorm	days	5
	Thunderstorm	days	10
	with the thaw in December-February	days	7

5.3.6 Hydrology

The hydrogeological conditions of the region are complex and are due not only to its structural and tectonic features, lithological and facies variability of rocks, but also to climatic conditions. As a result of long-term hydrogeological studies of scientific and industrial organizations of the republic, slightly brackish (1-3 g/dm^3), in some places almost fresh (1.2-1.5 g/dm^3) high-pressure waters in the thick stratum of the Albian-Cenomanian sediments were also found within the South Embensky artesian basin. The area of their distribution is closest to the northeastern coast of the Caspian Sea, the eastern zone of this basin is suitable. It covers a significant area of the inter-dome part of the area of the structures of Yesekzhal, Binkzhal, Ushkan, Kumshete, Konysbai, Zhanasu, Turesay and East

Tugarakchan. Here, within the depths of 300-500 m, sulfate-chloride and chloride sodium waters with a mineralization of 2-3 g/dm^3 are developed. Regional inferred production resources, their resources are large, and the possible flow rates of wells are quite high. These resources can be attracted to meet technical and other production needs, as well as to create irrigated areas on the north-eastern coast of the Caspian Sea. By the way, by now, according to the results of groundwater prospecting in 4 areas southeast of the village of Kulsary, the total operational reserves have been estimated at 250 thousand m^3/day. Fresh and slightly brackish groundwater with a salinity of 0.3-3 g/dm^3 of alluvial deposits in the valleys of the left channels of the Volga, the Ural, Emba and other shallower rivers occur at depths of 0.5-3.0 m, sinking at a distance of up to 4-7 m from the floodplains. Alluvium water is hydraulically connected with the surface waters of rivers, in connection with which their levels during spring floods increase at a decreasing rate as they move away from the floodplain to higher terraces, accompanied by a significant decrease in salinity. In the same direction, the amplitude of groundwater level fluctuations varies from 1-2.8 to 0.2-0.5 m. The level of installation was 3.1 m. Sands are water-bearing rocks. The amplitude of water oscillation ± 1.5 m. As a result of the floods, there was widespread soaking of the soils of the roadway.

5.3.7 Archaeological Sites

At km 349/544, the road crosses the burial site of Onay Ata. Many people make pilgrimages to his tomb in the hope of finding peace of mind and physical health. The mausoleum on the burial site of the saint was built in 1999 on the initiative of Fariza Ongarsynova. The territory of the examination is 100 m to the left and right of the axis of the designed road section.The identified objects of historical and cultural heritage are funerary and cult monuments, reflecting the material and spiritual culture of the ancient population of Kazakhstan, date back to the Early Iron Age, the Middle Ages, and are of scientific, cultural and historical value.[6]

On the territory of the buffer zone, no work is carried out that has a harmful effect on the safety of the object of historical and cultural heritage, on its historical and cultural perception. The protected zone of an archaeological monument is at least 40 meters from the outer boundaries of the outermost objects. Before the start of archaeological work on the ground, archival materials were studied, satellite images were examined for the presence of visible objects of historical and cultural heritage. Field visits showed the absence of objects of historical and cultural heritage. Intelligence showed the presence of only modern Kazakh graves.

5.3.8 Ambient Air Quality

[6] *Legal status of the identified objects of historical and cultural heritage. Archaeological monuments are state-protected historical and cultural monuments of local significance. In accordance with Article 30 of the Law of the Republic of Kazakhstan dated December 26, 2019 No 288-VI ZRK "On the Protection and Use of Objects of Historical and Cultural Heritage", "Rules for Determining the Buffer Zone, Development Regulation Zone and Protected Natural Landscape Zone of a Historical and Cultural Monument and the Mode of Their Use, approved by the Order of the Minister of Culture and Sports of the Republic of Kazakhstan dated April 14, 2020 No 86, the archaeological monument is surrounded by a buffer zone.*

According to the Department of Ecology of Atyrau Region, the main pollution sources are oil refining and transport facilities, including the Atyrau Oil Refinery, Tengizchevroil LLP, NCOC, Atyrau Thermal Power Plant JSC, Embamunaigas JSC, and West Dala LLP. Two industrial discharge ponds (Kvadrat in the northwest and Tukhlaya Balka in the east) release untreated effluents, forming a 1000-hectare storage tank that generates hydrogen sulfide. The region has 74 first-category enterprises. Atyrau, Kulsary, and Makat are fully gas-supplied, with 80,030 autonomous boiler houses in Atyrau and 1,783 in Makat.

Observations of the state of atmospheric air in the territory of Atyrau are carried out at 6 observation posts, including 2 manual sampling posts and 4 automatic stations. In general, the city is determined by 16 indicators: 1) suspended particles (dust); 2) suspended particles PM-2.5; 3) suspended particles PM-10; 4) sulfur dioxide; 5) carbon oxide; 6) nitrogen dioxide; 7) nitric oxide; 8) ammonia; 9) Hydrogen sulfide; 10) ozone; 11) phenol; 12) formaldehyde; 13) benzene; 14) toluene; 15) ethylbenzene; 16) orthoxylene (C_2H_6).

According to the data of air quality monitoring in Atyrau for the 1st half of 2024 at the stationary observation network, the level of atmospheric air pollution was assessed as increased, it was determined by the SI value equal to 3.4 (increased level) and NP = 4.5% (increased level) for nitrogen dioxide in the area of post No8. The maximum one-time concentrations were: nitrogen dioxide – 3.4 MPC, ozone (ground) 2.6 MPC, hydrogen sulfide – 1.8 MPC. Suspended particles (dust) – 1.4 MPC, suspended particles (RM-2.5) – 1.1 MPC. For other indicators, no exceedances of the MPC were observed. The average concentrations were: ozone (ground) – 8.57 MPC, the concentrations of other pollutants did not exceed the MPC. Cases of extremely high and high pollution (ELT and EOI): EOI (more than 10 MAC) and EWZ (more than 50 MAC) were not noted.

As can be seen from Figure 5-1, the level of air pollution for the 1st half of Atyrau over the past five years, in 2023 and 2024 was assessed at an "increased" level, in 2020, 2022 the level of pollution was at a "high" level, and in 2021 the air quality was assessed at a "very high" level. The number of exceedances of the maximum one-time MPC was for suspended particles (dust) (11 cases), for suspended particles (PM-2.5) (16 cases), nitrogen dioxide (6 cases), ozone (ground) (1006 cases), hydrogen sulfide (34 cases).

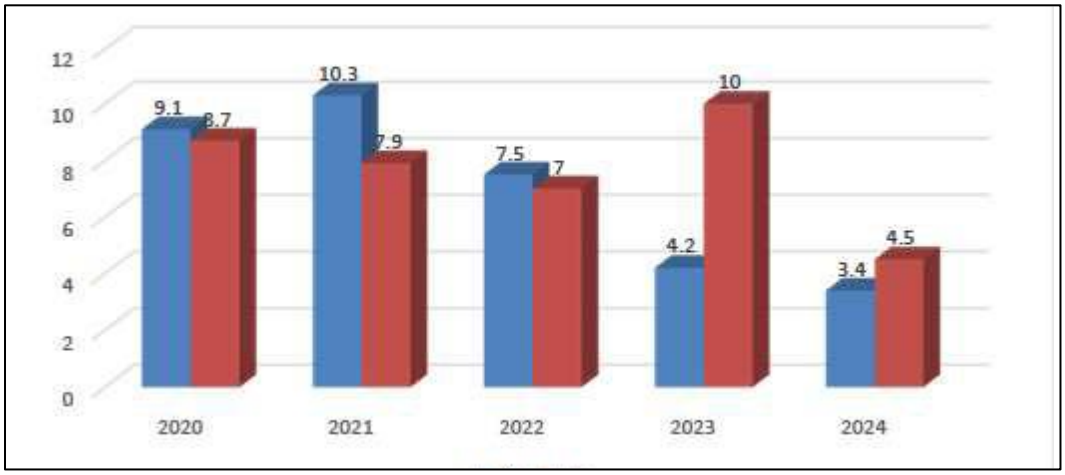

Figure 5-1 Comparison of SI and NP for 2020-2024 in Atyrau

The increase in the concentration of hydrogen sulfide is facilitated by the oil refining, transportation and industrial discharge storage pond "Tukhlaya Balka", located on the eastern leeward side of the city, which are the main sources of air pollution with hydrogen sulfide. Frequent winds in the region, which raise dust from the underlying surface of the earth, contribute to an increase in the concentration of suspended particles in the air.

Weather conditions in the Atyrau region for the first half of 2024 were formed by the influence of high-pressure fields and cyclonic impacts. In the first quarter with the passage of frontal sections, unstable weather was observed, in some places there was precipitation, snowstorm, increased wind, at the beginning and at the end of the second quarter there were rains, with thunderstorms and wind intensification in places up to 15-23 m/s. The calculation of the dispersion of pollutants was made taking into account the existing background concentrations provided by the RSE "Kazhydromet". Background concentrations were established taking into account the observational data for the city of Atyrau (post No6) for the period 2021-2023. The list of controlled substances and the values of background pollution of atmospheric air are given in Table 5-2.

Table 55-2: Values of Background Pollution of Atmospheric Air

Post number	Admixture	Sf concentration – mg/m3				
		Calm 0-2 m/sec	North	East	South	West
№6	Suspended PM2.5 particles	0,022	0,215	0,196	0,194	0,059
	Suspended PM10 particles	0,022	0,304	0,238	0,226	0,061
	Nitrogen dioxide	0,037	0,017	0,018	0,021	0,021
	Sulfur dioxide	0	0,001	0,002	0,001	0,001
	Carbon Oxide	1,309	0,373	0,436	0,659	0,706

5.4 Ecological Resources

The AOI (as explained in above section) along the alignment of the proposed project was considered for the purposes of the assessment to present the biodiversity baseline. The AOI is considered as representative and sufficient to identify the current key biodiversity status in the affected area and to assess the direct and indirect impacts from the Project. This AOI was selected based on the available desk-based information and initial surveys undertaken for the purposes of this assessment. The surveys were focused on terrestrial vegetation, habitats, flora and fauna along the road alignment.

Based on field surveys and secondary data, the project corridor between Atyrau and Dossor largely traverses modified habitats, consisting of areas already altered by existing road infrastructure, settlements, and industrial activity. No areas that qualify as critical or natural habitats such as those high biodiversity value, or designated protected areas were identified within the project's direct impact zone. Accordingly, the project area is classified as modified habitat, as per the classification provided in the ESF, therefore, direct impacts on biodiversity and natural resources are not anticipated. The project interventions will not be carried out in any natural/critical habitats or in close proximity.

Importantly, the prevailing physical and ecological conditions within the Project area, namely high aridity, poor soil quality and extensive habitat fragmentation, severely limit the potential for supporting diverse and sensitive biological communities. The region's climate is characterized by extreme continental conditions, with large annual and diurnal temperature fluctuations, limited precipitation and unstable climatic indicators. It experiences abundant heat and predominantly clear, dry weather, which creates an environment with low ecological productivity. Soils are mainly sandy to loamy, providing limited nutrients and moisture retention, which constraints vegetation growth and reduces habitat complexity. Additionally, the long-term human disturbance from infrastructure development and industrial activity has led to further fragmentation and degradation of natural habitats. These harsh environmental conditions and human-induced disturbances have created a modified habitat, dominated by species tolerant of aridity, which provides limited resources for more sensitive fauna. Consequently, the project area does not support significant biodiversity, and the expected impacts will be minor and localized. Explicit recognition of these environmental constraints is essential for settling realistic expectations regarding biodiversity-related mitigation and monitoring measures.

5.4.1 Methodology

Methodology for habitats, flora and fauna comprised the following basic steps:
Desk Study

Initially, collection of respective data from published scientific sources (journal articles, monographs, proceedings, etc.) as well as from published relevant reports has been done. This phase also targeted collection of comprehensive legislative base (laws and bylaws, national lists of protected species, national and international red lists, etc.).

Field work

The project team carried out ecological surveys along the proposed alignment, traversing the route and conducting observations. These surveys focused on documenting ecological features, habitat conditions, and potential environmental sensitivities within the project influence area.

Following are the outcomes of the desk study and field observations.

5.4.2 Flora

The flora in the project area includes many species of plants adapted to local conditions. Despite the homogeneous flat relief, the vegetation cover of the region is diverse. The flora of the Atyrau region consists of 819 species belonging to 391 genera and 81 families. Wild flora by life forms consists of: 7 species of trees; 82 - shrubs; 44 - subshrubs; 256 - perennials; 267-annuals; 11-annuals and biennials; 23-biennials.

Tugai and saxaul forests are widespread in the region. Tugai forests develop on the riverbed ramparts of the Syr Darya River and a discontinuous narrow ribbon with a width of up to 20 m.

There are no specially protected natural areas and lands of the state forest fund in the area of construction of the facility (road) and on its territory. The State Institution "Atyrau Oblast Territorial Inspectorate of Forestry and Wildlife" submitted a letter No06-02/619 dated 04.07.2024. on the absence of lands of the state forest fund and protected areas in the territory under consideration.

The formation of soil and vegetation cover is influenced by the geographical location of the site of the designed works. In the area under consideration, Yerkek-Astrakhan-wormwood (Artemisia terrae-albae - *Artemisia austriaca*) vegetation is widespread, along with brown saline soils, meadow and estuary-meadow soils are widespread.

The proposed construction activities are not expected to result in significant adverse impacts on local flora. Baseline surveys confirmed the absence of rare, endangered, or protected plant species listed in the Kazakhstan National Red Book.

5.4.3 Fauna

There are no specially protected natural areas and lands of the state forest fund in the area of construction of the facility (road) and on its territory. The State Institution "Atyrau Regional Territorial Inspectorate of Forestry and Wildlife" submitted a letter No06-02/619 dated 04.07.2024 on the absence of lands of the state forest fund and protected areas in the territory under consideration.

The fauna in the project area includes a variety of wildlife species, including: Mammals: such as the saiga antelope (*Saiga tatarica*), the Siberian roe deer (*Capreolus pygargus*), the Corsac fox (Vulpes

corsac) and various species of rodents. Birds: including steppe eagles (*Aquila nipalensis*), larks (*Alaudidae spp.)* and steppe buzzards (*Buteo buteo*). Reptiles: for example, the steppe runner (*Eremias arguta*) and various species of snakes. Invertebrates: Including butterflies, beetles, and other insects.

The construction of the proposed project is not anticipated to cause significant adverse impacts on local wildlife. Although the wider Atyrau region provides habitat for notable species such as the Saiga antelope (*Saiga tatarica*) and the Steppe eagle (*Aquila nipalensis*), field surveys and consultations confirmed that these species are not present within the immediate project footprint or its zone of influence. Consequently, no rare, endangered, or protected fauna species listed in the Kazakhstan National Red Book were recorded in the project area, and no significant impacts on such species are anticipated during project implementation.

5.4.4 Endangered Fauna

There are no endangered species of flora and fauna within the project area.

5.4.5 Wetlands

There are no notified wetlands within the project area. However, few small water nullahs and gullies exist along the proposed section of A27 which is not majorly directly impacted by the proposed reconstruction activities.

5.4.6 Game Reserves/ Sanctuaries/ National Parks

There are no key biodiversity area, game reserve, wild sanctuaries and National Park present in and around the Project Area. However, following are the major sanctuaries of the Atyrau region:

- Akzhayik State Nature Reserve
- Novinsky State Nature Reserve
- State. Protected area in the northern part of the Caspian Sea

According to the Atyrau Regional Territorial Inspectorate of Forestry and Wildlife, the project area is not a habitat for rare or endangered species of flora and fauna.

The alignment predominantly passes through urban settlements and areas subject to significant anthropogenic disturbance. Based on field surveys, secondary data, and stakeholder consultations, the area is classified as a *Modified Habitat*. No critical or natural habitats are present, and no conservation-significant species have been reported within the project influence area.

5.5 Socio-Economic Profile

Socio-Economic Information at a glance

Economy and Industries: The region is the oil capital of Kazakhstan, which determines its economic prosperity. The basis of the economy is the oil and gas industry.

I**nfrastructure**: The development of transport infrastructure, including roads, is of great importance for the region's economy. The President of Kazakhstan, Kassym-Jomart Tokayev, noted the unsatisfactory condition of roads in the region, which negatively affects its development.

1**. Economy and Industry**
o Atyrau Region is one of the leading oil and gas regions of Kazakhstan. The economy is primarily based on the oil and gas sector.
o In the first half of 2025, the region's industrial production volume reached approximately 6.9 trillion tenge, which is 14.2% higher than a year earlier.
o Oil and associated petroleum gas production is also increasing: oil +18.9%, gas +6.3%.
o The gross regional product (GRP) for January-June 2024 amounted to 13,062.68 million US dollars at current prices. Compared to the same period of the previous year, the real GRP was 95.4%.
2. **Standard of living, incomes, employment** (statistics of the Republic of Kazakhstan)
o The unemployment rate (registered) is about 7% of the workforce as of September 1, 2025 (according to employment authorities).
o The average nominal salary of employees (excluding small businesses) is 585,172 tenge for the second quarter of 2025.
o The average per capita monetary income of the population is about 323,307 tenge for the first quarter of 2025.
o However, real incomes are declining compared to previous periods: real wages and real monetary incomes are lower.
3. **Agriculture and Other Sectors**- Agriculture is experiencing growth: according to the results of the first five months of 2025, the gross output of agriculture, forestry, and fisheries increased by 4% year-on-year. Growth is also observed in meat livestock farming and poultry farming.- In addition to oil and gas, the processing industry, mechanical engineering, and food industry are developing.
4**. Infrastructure and Social Sphere**
o Over the years of independence, many educational, medical, cultural, and sports facilities have been built in the region.
o The population's gasification is almost 99.7%, and centralized water supply is about 99.3%.
o The implementation of the Comprehensive Socio-Economic Development Plan for 2021–2025 is also underway, with a large number of activities and significant budgetary impact.
5. **Strengths**
o Large natural resources, especially oil and gas, which provide a significant share of revenue and industrial output.
o Recent stable growth in the oil and gas sector.o Good performance in terms of infrastructure and social services: water, gas, and social and cultural facilities.

o Growth in agriculture, which helps to diversify the economy beyond just extraction.
6. **Weaknesses and Challenges**- Dependence on fluctuations in global oil and gas prices; the risk from falling prices is highly sensitive.
- Real household incomes are declining — meaning that nominal growth does not always offset inflation or price increases.
- Unemployment and migration: internal population outflow and registered unemployment are close to 7%.
- Natural and climatic conditions: desert climate, limited fertile land, shortage of fresh water — all of which complicate agriculture and population distribution.
- Uneven development between regions may exist: more developed urban areas vs. more remote rural areas, zones with less infrastructure.

5.5.1 Atyrau Region7

Demography and Migration.

The population of the Atyrau region as of August 2025 stands at 713.9 thousand people, including 391.8 thousand people (55%) - urban, and the remaining 45%- rural residents. Thus, urban population is higher relative to that of the rural population.

The natural increase in population is increasing over the years- during Jan-Jul 2025 it stands at 5,926. As against this, the natural population growth last year amounted to 10,572 people and 12,020 during 2023. This is corroborated by birth and death figures. In January-November 2024, the number of births was 13891 people (8.3% less than in January-November 2023), the number of deaths was 3319 people (5.8% more than in January-November 2023).

The migration balance during the current year is 2,835 (net outflow) with the external migration being +265 and internal migration of -3100. The same was --4373 people (in January-November 2023 - -1919 people), including 582 people (441) in external migration, -4955 people (-2360) in internal migration.

Labor and Income

The number of unemployed in the third quarter of 2024 amounted to 17971 people. The unemployment rate was 4.9% of the labor force. The number of persons registered with the employment authorities as unemployed as of January 1, 2025 amounted to 9800 people, or 2.6% of the labor force which has now increased to 25,858 or 7%. Thus, sizeable workforce is available within the region.

[7] *Stat.gov. kz/en/region/Atyrau; Atyrau - Statistics of the regions of the Republic of Kazakhstan - Agency for Strategic planning and reforms of the Republic of Kazakhstan Bureau of National statistics*.

The average monthly nominal wage accrued to employees (excluding small enterprises engaged in entrepreneurial activities) in the third quarter of 2024 amounted to 630,894 tenge, an increase of 4.7% compared to the third quarter of 2023. The real wage index in the third quarter of 2024 was 96.1%.

The average per capita nominal cash income of the population, according to estimates, in the third quarter of 2024 amounted to 336,743 tenge, which is 4.8% higher than in the third quarter of 2023, real cash incomes for the specified period decreased by 3.9%. Average monthly wage currently stands at 585,172 KZT (USD 1,250) down 1.6% YoY. The real wage index is 88.8%.

Average per capita income works out to 323,307 KZT (~$690 USD), down 0.4% YoY. The real income decline during the first quarter of 2025 is estimated at 8.9%. The volume of industrial production during Jan-Aug 2025 aggregates to 9.55 trillion KZT- mining +19.2%; Manufacturing +1%; Utilities + 26.2%; and Waste Management _30%> Industrial production January-December 2024 amounted to 10509011 million tenge at current prices, which is 3.7% less than in January-December 2023.

Agriculture --Gross output (Jan–Aug 2025): 65.5 billion KZT registering a Growth: +7.6% YoY**.** Focus has been on Livestock, fishing, limited crop farming due to arid climate

Transport & Logistics-- Cargo turnover: 45.0 billion ton-km (+47.8%) **and Passenger traffic**: 3.67 billion passenger-km (+4.6%)

Construction-- Volume of construction works: 314.8 billion KZT **Growth**: +63.8% YoY- driven by oil infrastructure, housing, and industrial expansion

Industries. Number of registered legal entities as of September 1, 2025, amounted to 14,765 units and increased by 1.2% compared to the corresponding date of the previous year, including 14,378 units with less than 100 employees. The number of operating legal entities amounted to 11,705 units, among which 11,318 units are small enterprises. The number of registered small and medium enterprises (legal entities) in the region amounted to 12,694 units and increased by 2.2 % compared to the corresponding period of the previous year.

Sum-up: Atyrau is Kazakhstan’s wealthiest region by GDP per capita. Driving forces are mining, logistics and construction. Key challenges are income inequality, migration outflow, unemployment, and real wage decline.

5.5.2 Districts of Atyrau Region

Atyrau Region in western Kazakhstan is divided into seven districts, each with its own administrative center.

Table 5-3 Districts of Atyrau Region

District	Administrative Center	Known for
Inder	Inderbor	Known for mineral resources and agriculture
Isatay	Akkystau	Coastal district near the Caspian Sea
Kurmangazy	Ganyushkino	Borders Russia; named after composer Kurmangazy
Kyzylkoga	Miyaly	Large rural area with livestock farming
Makat	Makat	Urban-type settlement with oil infrastructure
Makhambet	Makhambet	Historical district named after poet Makhambet
Zhylyoi	Kulsary	Industrial hub near the Tengiz oil field

Apart from the above districts, the city of Atyrau serves as the regional capital and is administratively separate from the districts. Each district has a particular highpoint and with a particular economic activity. Overall, it shows that the region is distinctly 'industrial'.

District wise Area Population and Density

District	Area (km²) Population* Density (persons/km²)
Zhylyoi	29,239.1 km² ~ 72,693 people ~ 2.5 people/km²
Indersky	11,041.4 km² ~ 32,267 people ~ 2.9 people/km²
Isataisky	14,772.8 km² ~ 25,554 people ~ 1.7 people/km²
Kurmangazinsky	21,204 km² ~ 57,242 people ~ 2.7 people/km²
Kyzylkoginsky (Kyzylkoga)	25,045.5 km² ~ 20,251 people ~ 0.8 people/km²
Makatsky	5,103.5 km² ~ 47,912 people ~ 9.39 people/km²
Makhambetsky	9,744.5 km² ~ 5,480 people ~ 0.56 people/km²

Table 5-4 Economic Activity Matrix – Atyrau Region

District	Key Economic Activities	Highpoints	Employment
Zhylyoi	- Oil & gas extraction - Industrial services - Logistics	Tengiz oil field; pipeline infrastructure; Kulsary hub	High in Extractive Sector
Makat	- Oilfield operations - Energy infrastructure - Urban services	Technical support bases; proximity to Atyrau city	Skilled Technical labor

Isatay	- Fishing - Livestock farming - Eco-tourism potential	Caspian coastline; marine biodiversity	Seasonal and rural labor
Kurmangazy	- Cross-border trade - Agriculture - Fishing & aquaculture	Border with Russia; customs and transit corridor	Mostly rural
Kyzylkoga	- Livestock breeding - Dryland agriculture - Rural development	Arid zone; fodder crops; water access challenges	Agricultural
Makhambet	- Construction materials - Mixed farming - Cultural tourism	Historical sites; brick production; irrigation projects	Construction and Farming
Inder	- Mineral extraction (salt, borates) - Chemical inputs - Livestock	Industrial minerals; potential for chemical processing	Mining and Processing
Atyrau City	- Oil & gas HQs - Petrochemicals - Trade & services	Embamunaigas, Chevron; Refining; regional service center	Urban services

5.5.3 Atyrau-Dossor Road – Enroute Settlements and Entities

The beginning of the section of km 294/598 of the highway begins from the junction with the Azattyk passage in the village of Novokirpichnoye, at the border of the transition of a four-lane road into a two-lane one. Further at km 300+500/592+500, the highway crosses a traffic interchange of the "Pipe" type, which is being built according to the detailed design "Construction of the Northern Bypass Road of the city of Atyrau", then crosses the Aktobe River, the Sokolok River. To ensure unhindered passage of vehicles during the reconstruction of the road section km 301 + 200 / 591 + 800 – km 377/516, when the route passes in the existing direction, the project provides for separate tracing of the roadbed for opposite directions of traffic. The existing road will be used for the passage of public transport for the period of construction of a new road structure (roadbed, pavement, culverts, etc.) with the parameters of a highway of I-b technical category for one direction of traffic. On the right side of the road in the direction of the village of Dossor there are industrial enterprises, such as the GATE Inshaat Company, the North Caspian Operating Company N.V., ASPAR Kashagan LLP, and the Karabatan Petrochemical Complex. At km 321+700/571+300, the road crosses the railway tracks at the Karabatan thermal power plant. At km 349-544, the road crosses the burial place of Onay Ata. Many people make pilgrimages to his tomb in the hope of finding peace of mind and physical health. At km 379/514 at the entrance to the village of Dossor, it is planned to build a traffic interchange at different levels of the "Pipe" type with the allocation of a priority direction for the Atyrau-Aktobe highway. Further, the road bypasses the village of Dossor from the north along free lands and adjoins

the existing A-27 highway "Aktobe-Atyrau-gr. RF (to Astrakhan)." The end of the section corresponds to km 381/512

Key landmarks and settlements along the Atyrau → Dossor route

Name Type / Description Notes / Location

1.Atyrau Regional capital, city. Starting point of the route. 2.Akzhar Village ~15 km from Atyrau, left bank. Possible connection to the route. 3.Karabatan Microdistrict / development / industrial zone. A very significant point: the section of the Atyrau-Dossor route to Karabatan is often mentioned during reconstruction. 4. Residential blocks / facilities along the route. Industrial / service companies. For example, West Dala LLP, a waste management company, is located approximately at kilometer 38 of the Atyrau-Dossor route in the Makat district. 5.SAMAL WORKERS' CAMP Residential/Temporary Camp This camp is classified as a "workers' camp" and is located near the Atyrau-Dossor highway: approximately 55 km from Dossor, approximately 38 km from Atyrau, and close to the Karabatan siding (~3.5 km). 6.Dossor is an urban-type settlement; the final destination of the Atyrau-Dossor route. It is the administrative center of the Dossor village administration, Makat district

Organizations and key facilities along the highway

• Embamunay and Dossormunay are oil production facilities located in Dossor. • The National Industrial Petrochemical Technology Park Special Economic Zone (NIPTP SEZ) is preparing to locate a facility along the highway, near Karabatan. • West Dala is a waste management company operating on the Atyrau-Dossor highway, near Karabatan/Makat district.

5.5.4 Project Affected Persons/ Entities

As the road is expanded from two to four lanes and providing for ROW, it does require lands on either side of the road. Apart from the acquisitions, there could be restrictions on access and usage temporarily and on a permanent basis. These aspects are discussed in detail in the chapter on impacts and risks. For the baseline information, it is to suffice to say: in all the project is expected to affect 63 persons/ households/ entities. This is rather tentative as the design and alignment will be finalized after the recruitment of the contractor. Out of 63 PAPs enumerated, 43 or 68% are either private sector/corporate entities or public sector companies. The remaining seem to be individual persons or households. There are 32 cases of land leased, of these, lease period for 16 has ended, and the other 16 are still active. Lease rents have been paid for all those which are active. In this context, socio-economic profile has three different dimensions – one, for the resident individuals losing lands which affects the family as a whole; two, for small businesses, income and livelihoods loss; and for large entities, incremental costs of access and/ or connectivity. These shall be taken due

note of while preparing the Land Acquisition and Resettlement Plan (LARP) and baseline profile developed accordingly.

6 Stakeholder Engagement and Disclosure

6.1 Objectives

The Government of Kazakhstan (ROK) recognizes that there are many stakeholders, both institutional and individual, as related to the road sector, in general, and this project, in particular. Stakeholders are quite heterogenous and their expectations and orientation as well as capacity to interface with the project vary. Such a diversified group of stakeholders necessitates systematic efforts to develop a Plan - Stakeholder Engagement Plan (SEP) - to identify all the different stakeholder groups/ sub-groups, design an approach for reaching each of them, hold consultations, and ensure public disclosure of the deliberations. Specific purposes are as follows:

a. To establish a systematic approach for identification of stakeholders and to build and maintain a constructive relationship with them, in particular project-affected parties thus ensuring gain their trust and legitimacy which paves the way for sustainability
b. To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be considered in project design and environmental and social performance
c. To reduce risks in implementation as it helps in identifying land disputes (if any), cultural sensitivities, labor concerns, and environmental risks—before they assume huge proportions
d. To promote and provide means of effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them. Provides a platform for the poor and vulnerable sections, including women, to participate in the project
e. To ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format
f. To provide project-affected parties with accessible and inclusive means to raise issues and grievance and allow the project to respond to and address such grievances.

6.2 Stakeholders Identification, Segmentation and Analysis

Key stakeholders who are to be informed and consulted about the Project are generally categorized into:

- Affected or likely to be affected by the project (Affected parties)- called project-affected parties (PAP); and
- Those who may have an interest in the project (Other interested parties).

These are broad categories normally resorted to by development financial institutions. However, there are two other approaches for identification/ segmentation- one, based on the Impact Zone (individuals and/ or areas / spots subject to be impacted), and the other Level of Influence (the

extend of socio-economic endowment) and their Interest in Outcomes. The same is presented in the Tables below. The segmentation helps in designing the outreach strategies. Stakeholders Based on Impact Zone.

Table 6-1 Stakeholders Categorized on the Nature and Type of Impacts

Impact Zone	Stakeholder Group	Interests	Engagement Strategy
Settlement(s)	Local residents, informal settlers, elders	Land acquisition, noise, access, compensation	Household surveys, public meetings, grievance desks
	Local government (Atyrau, Dossor)	Service continuity, urban planning	Coordination meetings, formal notifications
Industries	KPI, SEZ operators, logistics firms Private Manufacturing Businesses	Access roads, supply chain disruption, labor standards	Joint planning sessions, compliance briefings
	Workers and contractors	Working conditions, transport, safety	Toolbox talks, labor audits, anonymous feedback channels
Environmental Areas	Environmental NGOs, ecologists	Biodiversity, water runoff, pollution	Technical consultations, EIA disclosure
	Ministry of Ecology and Natural Resources	Regulatory compliance	Permit reviews, site inspections
Transport Nodes	Freight operators, railway authorities	Traffic flow, junction safety, downtime	Traffic impact assessments, coordination workshops
	Road maintenance agencies	Long-term upkeep, design input	Technical review sessions
Labor & Workforce	Camp managers, labor unions	Worker welfare, housing, grievance mechanisms	Monitoring visits, labor rights training
Community Safety	Nearby communities	Social tensions, service strain	Community liaison officers, joint forums
Community Interface Zones	School staff, clinic managers, religious leaders	Safety, access, disruption to services	Targeted outreach, alternate access planning
Social Safety	Vulnerable groups (disabled, elderly)	Mobility, information access, targeted assistance	Inclusive consultations, translated materials

Table 6-2 Stakeholders based on the nature and extent of impacts

Quadrant	Description	Engagement Strategy	Examples

High Influence / High Interest	Key decision-makers and affected parties	Intensive consultation, co-design, regular updates	Local government, landowners, businesses, QAZAvtoZhol
High Influence / Low Interest	Powerful but disengaged actors	Strategic briefings, targeted outreach	National ministries, Other DFIs
Low Influence / High Interest	Socially and Economically Disadvantaged	Inclusive consultation, grievance access, empowerment	Local residents, informal workers, NGOs, women and vulnerable.
Low Influence / Low Interest	Other interested stakeholders	Monitoring emerging concerns	Distant communities, general public, NGOs, media and political interest groups.

Given these –and overlaying one above the other- impact zones (or in common parlance, hot spots) and the interests as well as influence, in respect of each stakeholder, segmentation is made to understand and ascertain expectations, issues and concerns in respect of each stakeholder. However, their interest/ endowment (socio-economic standing) varies substantially across the groups. Hence, the project has to consider both these – influence and interest and as related to an impact zone- in designing a strategy to engage with each one of them. Stakeholder Analysis is carried out combining the second and third categorization into the first and generally followed approach. Issues and concerns specific to a particular group and sub-groups form the basis for deciding upon communication and engagement method*s.* Following this, a Stakeholder Engagement Plan (SEP) has been developed, details are available in a separate stand-alone report which forms an integral part of this ESIA.

6.3 Disadvantaged/ Vulnerable

Disadvantaged or vulnerable refers to those who may be more likely to be adversely affected by the project impacts and/or more limited than others in their ability to take advantage of a project's benefits. Such an individual/group is also more likely to be excluded from/unable to participate fully in the mainstream consultation process and as such may require specific measures and/or assistance to do so. This will take into account considerations relating to age, including the elderly and minors, and including in circumstances where they may be separated from their family, the community or other individuals upon which they depend.

In the context of SEP, the following groups are generally found to be at risk or considered as disadvantaged and vulnerable: women, especially women engaged in seasonal work, female-headed households and women farmers who by virtue of the prevailing, limiting social norms and social networks may find it harder to obtain information about the benefits of the project and to voice any concerns or issues they may want to raise; poor households; households involving persons with disability or ethnic and linguistic minority groups; as well as people without formal title to the lands occupied or using.

For this project, the following categories have been identified as 'Vulnerable' within the project area:

a) Families and individuals living below the poverty line (but not recognized or having not requested any type of social allowances)
b) Families and individuals who receive Targeted Social Aid (TSA)[8] allowance or other types of allowances such as for disability
c) People with disability and individuals with chronic illnesses;
d) Illegal households or individuals with no legal rights to their land or non-land assets
e) Women headed households
f) Large families with four or more children under the age of 18
g) Seasonal and migrant workers
h) Individuals with low levels of literacy
i) Ethnic minorities (e.g., Oralman communities)

Based on past experiences, it is highly probable that the project would exacerbate the vulnerability of those who were already vulnerable. However, if the project is to acquire land from the vulnerable, special efforts should be made to ensure effective consultations and appropriate mitigatory assistance. One of the measures could be arranging transport for the vulnerable to participate in the consultation meetings. If need be, interpreter assistance can also be arranged. Focus groups dedicated specifically to vulnerable groups may also be envisaged as appropriate. As appropriate, ethnic and linguistic minorities could be reached out in a language they feel at home. Towards ensuring gender balance, the project will undertake separate consultations with women and consider their feedback, questions, and concerns. Community liaison officers will identify, map, and ensure tailored outreach to women, disabled, socially or spatially isolated communities to ensure that they are aware and able to participate in project- related activities

6.4 Information Disclosure: Design and Pre-Construction Stage

The project's key proponents, the Committee for Roads, will review and arrange for the disclosure/ dissemination of the project's environment and social related documents. The target groups for this have been drawn earlier in section. The method of dissemination shall depend upon the 'influence & interest' and the same is discussed earlier. The disclosures will be made in English and one of the local languages- Kazak or Russian. Key documents, among others, shall include the following:

1. Draft and Final ESIA Report – Separate and stand-alone Non-Technical Summary (targeted at general public at large) and the Main Report.
2. Draft and Main Concise Environmental and Social Management Plan (ESMP).
3. Draft and Final Reports of Stakeholder Engagement including Grievance Mechanism.

[8] *Kazakh citizens, Kandas[1], refugees, foreigners, and stateless persons who reside in the country and whose average per capita income does not exceed the poverty line are eligible to receive Targeted Social Assistance. The poverty line itself is correlated with the minimum subsistence level (MSL) and is approximately 70% of it. But its size is specified quarterly in each region and published in the media. In the country's budget for 2024, the subsistence minimum is 43,407 tenge (USD90), and the poverty line is set depending on the economic capacity of the state.*

4.Draft and Final Labor Management Procedures and Occupational Health and Safety Plan (as and when available);
5. Draft and Final Resettlement Policy Framework and Resettlement Plan; and
6. Environmental and Social Action Plan.

All these will be available for 30 days on the QAJ website in accordance with the national disclosure procedure. During the Disclosure Period, complete copies of a Draft ESIA and other Project Documents, as referred above, will be available in all three languages in Committee for Roads, Central and Regional offices of QAJAutoJol and the offices of the regional and district Akimat.

7 Environmental and Social Impacts and Risks

7.1 GENERAL

This chapter identifies the beneficial as well as the potentially significant adverse E&S impacts during design/pre-construction, construction and operation phases of the proposed project on the physical, ecological and socio-economic domains of the environment. The appropriate mitigation and remedial measures are proposed in this chapter. A brief qualitative description of each E&S aspect and the affected environment in AOI is presented below.

7.2 Significance of Impacts

The significance of an environmental and social effect is typically a function of the "value" or "sensitivity" of the receptor and the "magnitude" or "scale" of the impact.

7.2.1 Receptor Sensitivity

The sensitivity of a receptor refers to its importance i.e. its environmental value / attributes. The sensitivity is generally site specific and is a function of receptor's capacity to accommodate change. It reflects its ability to recover if it is affected, and is defined by adaptability, tolerance and recoverability.

Table 7-1 Criteria and Descriptors for Assigning Receptor Sensitivity

Receptor sensitivity / value	Description
Very high	Receptor has very limited or no capacity to accommodate changes (impacts) – very high importance and rarity, international scale and very limited potential for substitution/ replacement.
High	Receptor has a limited capacity to accommodate changes (impacts) – high importance and rarity, national scale and limited potential for substitution/replacement.
Medium	Receptor has a limited capacity to accommodate changes (impacts) – high or medium importance and rarity, regional scale, limited potential for substitution/ replacement.
Low	Receptor has a moderate capacity to accommodate changes (impacts) – low or medium importance and rarity, local scale and potentially can be substituted / replaced.
Very low	Receptor is generally tolerant of and can accommodate changes or influences – very low importance and rarity, local scale and are not designated, and are easily substituted / replaced.

7.2.2 Impact Magnitude or Scale

The magnitude of an effect is typically defined by number of factors including, but not limited to:

- Spatial extent – the area over which an effect occurs.
- Duration – the time for which the effect occurs.
- Likelihood – probability of occurrence.
- Reversibility – ability to return to the original state.
- Intensity – the degree of change relative to existing environmental conditions.

A typical impact appraisal matrix for different elements of the environment is prepared to guide the impact assessment exercise for the Project and presented in Table below.

Table 7-2 – Typical Impact Appraisal Matrix

Impact magnitude factor	Description	
Spatial Extent (Area of influence)	Limited (on road location / route)	Area on, and around the construction and operational location / route of the road
	Local	In the range of municipality / neighbouring municipalities
	Regional	Kazakhstan and neighbouring countries
	Global	Continent and wider
Duration	Very short	Few minutes to few hours
	Short	Few hours to few weeks
	Average duration	Few weeks to few months
	Long	Few months to few years
	Very long	Decades / centuries
Probability of occurrence (Likelihood)	No probability	Should not occur during normal operation and conditions
	Low probability	Possible, but unlikely
	Average probability	May happen sometimes
	High probability	Likely to occur during the life cycle of the project
	Reliable probability	Will certainly appear
Reversibility	Reversible (impact)	Reversible impact on the resource / receptor, i.e. impact upon which the environment will be able to return to the original state
	Irreversible (impact)	Irreversible impact on the resource / receptor, i.e. impact upon which the environment will not be able to return to its original state
Intensity	A (very low / negligible)	No change or negligible weak impact without damaging the resource / receptor
	B (low to medium)	Measurable impact, but with proper planning does not cause damage to the resource / receptor
	C (medium to high)	Significant impact, but can be controlled by implementing the appropriate measures
	D (very high)	Impact that would be harmful to the resource / receptor
	E (compensation)	Impact that requires compensatory measures

Typical criteria descriptors for defining impact magnitude for the purpose of the present assessment are given in Table below. While this table provides guidelines of a generic nature, it should be noted that specific guidelines in relation to impact magnitude may be required for the particular topics, where considered necessary.

Table 7-3 – Criteria and Descriptors for Determining Impact Magnitude / Scale

Impact magnitude	Description
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse)
	Large scale or major improvement of resource; extensive restoration or enhancement, major improvement of attribute quality (Beneficial)
Medium	Loss of resource, but not affecting integrity, partial loss of/damage to key characteristics, features or elements (Adverse)
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial)
Low	Some measurable change in attributes, quality or vulnerability, minor loss of or alteration to one (possibly more) key characteristics, features or elements (Adverse)
	Minor benefit to, or addition of, one (possibly more) key characteristics, features or elements, some beneficial impact on attribute or a reduced risk of a negative impact occurring (Beneficial)
Very low	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse)
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial)
None / no change	No loss or alteration of characteristics, features or elements, no observable impact in either direction

7.2.3 Impact Significance

The significance (or the level) of a potential effect is a function of its predicted magnitude and the sensitivity / value of the resource / receptor being affected. The greater the receptor sensitivity and the greater the impact magnitude, the impact is more significant. The impact significance has to be set in a context and could be relativistic and to a certain degree – subjective. In general, an impact could be categorized into following significance categories (Table below):

- Negligible (or neutral): no detectable change to the environment;
- Minor: a detectable but non-material change to the environment;
- Moderate: a material but non-fundamental change to the environment;
- Major: a fundamental change to the environment.

Table 7-4 – Typical impact significance matrix

Receptor sensitivity	Impact magnitude				
	High	Medium	Low	Very low	None
Very high	Major	Major	Moderate	Moderate	Negligible
High	Major	Moderate	Moderate	Minor	Negligible
Medium	Moderate	Moderate	Minor	Minor	Negligible
Low	Minor	Minor	Minor	Negligible	Negligible
Very low	Minor	Negligible	Negligible	Negligible	Negligible

Assigning impact significance relies on reasoned argument, professional judgment and consideration of the views and guidance of competent organizations. Assigning each impact to

one of four significance categories enables different topic issues to be placed within the same scale to allow a direct comparison. Impacts determined to be minor or negligible (neutral) are not deemed to be significant, and as such are not reported in detail in this ESIA Report and will not require specific mitigation.

7.3 Positive Impacts of the Proposed Project

The key beneficial impacts due to the implementation of the proposed Project are described in **Table 7-5** below.

Table 7-5: Potential Key Beneficial Impacts of Project

Sr. No.	Potential Positive Impact	Significance	Justification
1	Reducing Road Accident	Moderate	Increasing volume of traffic on the exiting road has seen significant increase in traffic congestion and accidents. The proposed reconstruction of A-27 will facilitate smooth transportation of people and goods resulting reduction in the percentage of road accidents
2	Enhancement of economic growth due to improved road connectivity	Moderate	The proposed reconstruction of A-27 will ease movement of human and goods and thus generate movement of more cargo by road and correspondingly increase economic growth
3	Creation of jobs and employment opportunities	Moderate	The proposed Project will provide direct and indirect employment opportunities to skilled and unskilled manpower both during construction and operational phases. A lot of employment opportunities will arise from investment and economic opportunities attributable to improved road connectivity.
4	Enhancement of productivity, Reduction of travel time and decrease in stress to road users.	Major	Some of the employment opportunities will arise from improvement in commerce and trade, new jobs in the transport industry, better market access for products. Travel time to destinations will be greatly reduced.
5	Reduction in transport costs	Moderate	Truck drivers and other motorists will take a much shorter time to reach their destinations. This will result in less fuel consumption which will not only be a saving to the transporters and other motorists but also a saving to the country on foreign exchange since major part of fuel has to be imported into the country.
6	Addition of economic and social value addition to the Project area of influence	Moderate	There exists a close relationship between transport infrastructure and primary production. Without good access transportation of production is not feasible. Availability of good transport infrastructure attracts not only traders and transporters, but agriculturalist and other producers as well.

Sr. No.	Potential Positive Impact	Significance	Justification
7	Appreciation of property value	Moderate	Proposed reconstruction of A-27 will help in creating influx of investors resulting in high demand for property within the Project area.
8	Improvement of living standards of communities	Moderate	There will be a general improvement on the living standards of the communities living along and near to the road alignment.
9	Improvement of response to emergencies	Major	The proposed reconstruction of A-27 is expected to aid in rapid response to emergencies which will in turn save human lives and livestock.
10	Improvement in roadside modern infrastructure of services	Moderate	There will be a roadside modern infrastructure of services, there will be an increase in employment, an increase in the level of incomes of the population, and the comfort of the transport highway and related settlements will increase.
11	Increase access to cheap raw materials and equipment	Moderate	Local producers will have access to cheap raw materials and equipment, will develop international and interregional ties, the agricultural sector will develop and its access to markets.

7.4 POTENTIAL Adverse ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

There are some potential significant adverse impacts on the local environment. The proposed Project is divided into three (03) phases i.e. Pre-construction / Planning and Design Phase, Construction Phase and Operation and Maintenance (O&M) Phase. The Pre-Construction Phase includes all stages before the Construction Phase (i.e. site investigation work i.e. topographical, geotechnical studies etc.); Construction Phase includes all stages from mobilization of Contractor to the completion of Project; and Operation Phase starts after the Construction Phase which includes the inspection and repair works.

Adverse impacts envisaged at these three (03) phases of the proposed Project along with their proposed remedial or mitigation measures are detailed below:

7.4.1 Potential Impacts during Pre-Construction / Design Phase

Following is the brief description of impacts envisaged and the recommended mitigation measures during Pre-construction / Design phase.

7.4.1.1 Water Quality

The proposed road will not cross any major river or other surface water bodies, however, there are few drains/nullahs. There might be change in water flow pattern and disturbance to water flow which will cause adverse impacts on these water bodies. Planning and designing of proposed road need careful consideration to the presence of existing water bodies and movement of surface waters. Water may be detrimental due to its presence in soil and above surface thereby damaging

property and life when unable to find natural drainage and dissipate in a short duration of time effectively. Moreover, when flood flows encounter a restriction in the natural stream, adjustments take place in the vicinity of the restrictions. This impact is moderate in nature.

Mitigation Measures

- For the crossing of the nullahs and other similar structures bridges will be constructed and widened. While culverts and other possible arrangement will be accomplished in design for the crossing of nullahs/ drains. Bridges on water channels shall be properly designed to accommodate design flows considering design discharge for flood occurrence of 100 years;
- Sand mining from river/nullah beds will not be allowed for construction works as it will have irreversible impact on the river/nullah morphology;
- Provision of culverts to control flood damages and provision of safety of embankments will be considered during the design of these arrangements;
- Adequate vent height, free boards of hydraulic structures in accordance to the design discharge for flood occurrence of 100 years are considered in the detailed design stage to avoid any flooding and overtopping of the roads;
- Planning of location of construction camps will be at an appropriate distance from the surface water bodies; and
- Septic tanks and soakage pits will be designed to cater the wastewater from the construction camps.

Residual Impacts

- The residual impacts will be Minor negative to insignificant in nature after the implementation of mitigation measures.

7.4.1.2 Public Utilities

Due to the proposed Project, public utilities such as transmission lines, storm water pipes, gas pipelines, etc. will be affected creating disruption of public services and inconvenience to the local residents and road users. This impact is temporary and may be considered as moderately negative in nature.

Mitigation Measures

- The provision in the design and budget for the relocation of the existing utility infrastructures wherever required shall be finalized in consultation with the concerned department. Utilities relocation cost included in the LARP Document;
- Timely public notification of unexpected disruption of services; and
- All public utilities (e.g. electric lines, pipes, power/ telephone lines etc.) likely to be affected by the proposed Project will be relocated well ahead of time before the actual commencement of the construction works.

Residual Impacts

- The residual impacts will be Minor negative to insignificant in nature after the implementation of mitigation measures.

7.4.1.3 Construction Material Extraction/Use related E&S Impacts

Resources involved in the construction of proposed Project would include water, fuel and construction materials. Excessive water consumption by the construction staff may stress water resources in the Project Area and in certain cases may disturb the existing water supplies in the Project Area. Construction material to be used for construction includes coarse aggregates, fine aggregates, asphalt, cement, lining material, earthworks, reinforced and structural steel etc. Almost all the materials to be used in the construction of proposed Project are non-renewable and therefore their efficient use is necessary to make it available for future use.

Fuel will be used to operate construction machinery. Efficient use of energy resources is important to reduce air emissions. For conservation of energy, efficiency of the engines and burning processes is important. The impact is moderate negative in nature.

Mitigation Measures

- Use potable water bowsers for construction works and mineral water bottles for drinking purpose;
- Plan for the provision/purchase of adequate insulation to reduce heat loss through batching plants;
- Reduction of wastage of water through training of workers involved in water use;
- Reuse of construction waste materials may be adopted wherever possible;
- Diesel and fuels with low sulphur content will be used to operate construction machinery and equipment;
- Efficient and well-maintained equipment and machinery will be used;
- The equipment and machinery will be turned off when not in use;
- Ensure adequate insulation to reduce heat loss through batching plants;
- Regularly monitor CO and CO_2 content of the flue gases to verify that combustion systems are using practical excess air volumes;
- Use of solar panels at construction camps may be considered and plan for use of solar panels at operational phase may also be considered; and
- A good camp design and an efficient worksite management plan can help the contractor to reduce the water demand, wastewater and solid waste volumes to the lowest levels.

Residual Impacts

- The residual impacts will be Minor negative to insignificant in nature after the implementation of mitigation measures.

7.4.1.4 Drainage

Improper design of storm water drainage and flood water discharge of the proposed Project may result in stagnant water on the road during operation due to which following impacts are expected to arise:

- Deterioration of road surface and reduction of its bearing capacity;
- Inconvenience for commuters/pedestrians;
- Stagnant water may provide the breeding ground for disease vector; and
- Foul odour may be generated.

This impact is moderate negative in nature.

Mitigation Measures

Mitigation measures include the provision of appropriate drainage structures with appropriate design capacity to avoid urban flooding especially during the rains. Proper slopes shall be incorporated in design to avoid the stagnant water on At-grade road surface.

Residual Impacts

- The residual impacts will be insignificant in nature after the implementation of mitigation measures.

7.4.1.5 Flora

During the pre-construction phase, activities such as installation of construction camps, construction of temporary roads and mobility of construction staff may damage the local vegetation/trees, shrubs and herbs, etc. As the heavy machinery and camps will be moved and installed, which require significant space due to which available vegetation is expected to be removed. This impact is moderately significant and needs to be encountered prior to the start of construction phase.

Mitigation Measures

- The camps, mobility of machinery and construction of temporary road will be properly planned and well designed to avoid any loss to local green cover;
- It is recommended to establish the construction camps where minimum or no vegetation exists;
- Similarly, the alternate routes for roads and points for camps are recommended where no loss of vegetation is expected; and
- The location of construction camp(s) will be selected so, as to have limited environmental effect during construction phase and to reduce the cost and land requirement.

Residual Impact

- The impact of flora will be Minor adverse in nature after taking the above-mentioned mitigations.

7.4.1.6 Fauna

As movement and installations of noisy machinery and vehicles during the pre-construction and mobilization phase will take place so noise and habitat loss is expected. The routes of fauna/habitats may be affected due to camps set-up and machinery movements and installations. This impact will be Minor significant.

Mitigation Measures

- The standard measures must be studied prior to construction phase to minimize noise due to machinery movements and installations;
- Wildlife movements and routes must be considered (those areas having not tree/green cover) prior to construction phase;
- The alternate routes and points are recommended to avoid any damage to locally available fauna;
- Sand mining from river/nullah beds will not be allowed for construction works as it will have irreversible impact on the river/nullah morphology leading to impact on aquatic life;
- The construction camp management plan during the planning stage must consider fencing and gating to check the entry of animals in search of eatable goods; and
- Similarly, waste management plan of the camps must be considered at the planning stage to prevent wild animals and birds.

Residual Impact

- The impact of fauna will be Minor in nature after taking the above-mentioned mitigations.

7.4.2 Potential Impacts during Construction Phase

7.4.2.1 Soil Erosion and Contamination

The excavation site and excavated material dumped may result in soil erosion by both water and wind. The impact is expected to be higher during the construction phase.

Soil erosion and contamination may occur on roadside, at contractors' camps due cutting/filling operations, clearing of vegetation and land levelling activities can destabilize the surrounding land surface, particularly if the excavated area is left unfilled for long, which may lead to rainfall induced soil erosion. The unspent materials and debris produced from consumed up materials, if left as such and allowed to mix with soil underneath, can degrade the quality of receiving soils and may

render them unfit for plantation later stages. Unplanned disposal may create adverse environmental impacts such as an increase in dust pollution, a decrease in aesthetic value, erosion etc. The possible contamination of soil by oils and chemicals at camp sites, workshop area and equipment washing-yards may limit the future use of land for agricultural purposes. The surface soil has the potential to be contaminated by construction material, vehicle movement and various construction activities. Spillage of fuel, lubricants, and chemicals has the potential to result in contamination of soil. The spillage can occur:

- During transfer of fuel from one container to another or during refueling;
- Maintenance of equipment and vehicles;
- Due to leakage from equipment and containers;
- Dropping of material near the asphalt plant; and
- Accidental spill

The route of the road passes through dominantly flat topography, with slightly hillocky features, characterized with Minor sensitivity to an erosion hazard. Therefore, no significant effect on soil erosion and sediment production is expected, except on the cuts and incisions. However, the construction activities may also cause soil erosion in the following ways:

- Heavy vehicles used during construction activities compact soil, resulting in the reduction of their infiltration capacities, thus facilitating surface flow and possible gully formation; and
- Clearing of vegetation along the roadside during construction will cause a reduction of the vegetation cover within the ROW. This will expose soil to erosion.

Provided that the Project design includes modern construction methods and good construction practice are used, these geotechnical risks are expected to be minimal.

This impact can be categorized as Moderate negative in nature.

Mitigation Measures

- Good engineering practices (as elaborated in below points) will help to control or minimize the soil erosion both at the construction sites and in peripheral areas;
- All the disturbed areas need to be protected against soil erosion by stripping and stockpiling of all the available topsoil for later re-vegetation;
- Special slope protection measures will be adopted in the sensitive areas and along the shoulders of roads and excavations shall be kept confined to the specified foundation spots as per the approved engineering drawings;
- Unnecessary excavations will be avoided and Left over construction materials, excavated soil and waste material produced as a result of construction/ rehabilitation works, many be properly disposed-off in designated areas to avoid soil contamination.
- Use of stone pitching or riprap will also be provided in the design at appropriate places especially around flyovers, bridges, culverts;

- Provision for rip-rap in discharge zones from drainage structures will be made in the design to reduce erosion;
- Down drains/chutes will be lined with rip-rap/masonry or concrete to prevent erosion;
- Side slopes will be adjusted to a gradient necessary to reduce erosion potential or, if steeper, stabilized, covered with riprap or other material to prevent soil erosion;
- Roads and access routes will include suitable road engineering techniques such as road edge buffer re–planting;
- Soil erosion can be minimized by regular reconstruction of areas not in use for Project activities. Reconstruction will include immediate re–vegetation of slopes using fast growing indigenous species and different functional groups of plants i.e. shrubs and grasses for keeping soil in place;
- Waste oils will be collected in drums and sold to the recycling contractors.
- Domestic solid waste from the construction camp and sites will be disposed in a manner that does not cause soil contamination.
- Site restoration plan for the Project will be strictly followed; and
- To minimize the potential for soil erosion, upon completion of all disturbed areas would be contoured and re-vegetated.

Residual Impacts

- The residual impacts will be Minor adverse to insignificant in nature after the implementation of mitigation measures.

7.4.2.2 Climate Change

At ESIA level, identification of climate change risks and their assessment have been carried out. Considering the scope and available data on the existing climate change parameters. Based on the assessment, river flood, urban flood, water scarcity, extreme heat and wildfire are identified as high-risk impacts. The detail of these impacts along with their assessment and respective measures are provided in Annex-3

Apart from the above, the climate change due to global warming, may result in following impacts over a period of time:

- Extended summer season and reduction in snow falls;
- Higher temperatures may result in more precipitation falling as rain rather than snow, hence earlier and greater runoffs, increased runoff may pose greater challenges for water management;
- Increased natural hazards such as landslides and debris flows, extreme/unpredictable rainfall events, wind storms, droughts and wildfire;
- Due to shift in temperatures and precipitation patterns runoff, stream/lake temperatures, suitable habitats may move upland, thereby declining in size, ecosystems become

fragmented, number and composition of species will change with particular threats to sensitive species;
- Increased damages to transportation infrastructure from extreme events, causing difficulties for access and emergency evacuation, and involves higher maintenance costs; and
- Rising temperatures may worsen working conditions for project workers, especially during the summer, due to heat waves

As Project interventions are spread over a wide area there is no change predicted in the macroclimatic setting. The microclimate is likely to be temporarily modified by vegetation and tree removal, levelling of land, cutting and filling, and working of machinery, however, the impact will be localized and limited to the active construction zone. Particulate matter will create a negative impact on the microclimate but this will be short term and can be easily mitigated using appropriate control measures. These negative impacts will mainly be restricted to areas adjacent to the highway, excavated areas, dumping sites, labour camp areas and machinery parking areas.

The deterioration in the microclimate during the construction phase will be temporary in nature and will disappear with the completion of the project. Therefore, overall impact can be considered as a negligible with low magnitude and Minor sensitivity.

Mitigation Measures

- Regular motioning of the vehicles for engine efficiency;
- Avoid idling of construction vehicles;
- Alternative energy resources shall be considered where possible; and
- Order of the Minister of Health of the Republic of Kazakhstan (Hygienic Standards for Physical Factors Affecting Humans), WHO, IFC guidelines/standards whichever stringent one applicable to gaseous emissions generated by construction vehicles, equipment and machinery shall be enforced during construction works.
- Plantation development as per the tree plantation/reforestation plan is highly recommended for the sequestration of CO_2 and vehicle maintenance protocol will be adopted.
- Bridges on water channels and road shall be properly designed to accommodate design flows considering design discharge for flood occurrence of 100 years and recent highest flood.

Residual Impacts

- The residual impacts will be temporary and insignificant in nature after the implementation of mitigation measures.

7.4.2.3 Green House Gas Emission

The main sources of greenhouse gases (CO_2, CH_4, NO_x etc.) during the construction activities of the proposed Project will include both mobile and stationary sources. The mobile sources will be the construction and transportation vehicles while the stationary source will be the batching and asphalt plants. Emission of greenhouse gases cause global warming and other climatic changes

on regional and global scale. GHG emissions due to construction activities of the Project account for a small proportion of the total GHG emissions produced throughout a road projects life cycle. Nevertheless, the GHG emissions due to construction activities of the Project have been scoped-in to the present assessment to present the indicative magnitude and significance of this impact. Based on the above estimation, the total Lifecycle GHG emissions are 174,000 tons CO_2e. The construction phase GHG emissions are 36,105 tons CO_2e/annum (detailed are provided in Annex-4). Based on this assessment, overall impact can be considered as a negligible with low magnitude and Minor sensitivity.

Mitigation Measures

In principle, it is recommended that the principle of sustainable material sourcing and construction practices is utilised during the upcoming advanced design and construction of the Project, considering the following mitigation strategies:

- Optimization of the detailed design and construction methods to reflect the carbon reduction hierarchy (design-based mitigation):
    - Efficient use of materials (i.e. 'right-sizing') and reduce the requirement for construction materials
    - Use robust materials that require less maintenance, repair, and refurbishment
    - Use of low carbon, recycled materials and materials with more efficient manufacturing processes
    - Choose materials that can be reused or recycled instead of landfilled at the end of lifetime of the infrastructure
    - Substitute construction materials for lower-carbon alternatives (e.g. low temperature asphalt / with a lower bitumen content)
    - Minimise the vegetation loss
    - Optimise the construction transport - minimizing transportation impacts through use of local materials and by optimising the sourcing.
- As much as possible, incorporate material resource efficiency and waste minimization best practice into the detailed design (design-based mitigation).
- Select and engage with material suppliers and construction Contractor(s) taking into account their policies and commitments to reduction of GHG emissions, including embodied emission in materials.
- Contractor(s) must ensure:
    - Closed loop re-use on-site for both excavated materials and topsoil should be maximised. Reusing excavated materials reduces the need to transport of these materials to disposal sites as well as the need for new raw materials. Consequently, scope 3 material transport emissions are lower (transport of new material, transport of unused material to disposal sites) and wastage is avoided, i.e. only required materials are used and overproduction and associated emissions are avoided.
    - Prepare and implement waste management procedures, incorporated into a Waste Management Plan.
    - Prepare and implement a Traffic Management Plan, including measures to mitigate traffic and congestion during construction activities, as well as optimisation of the material transport routing.

- Minimise energy consumption, including fuel usage (e.g. by minimising plant use, idling and specifying efficient plant (or hybrid or electric plant)).
- Maximise the local sourcing of materials and the use of local waste management facilities.

Residual Impacts

- The residual impacts will be temporary and insignificant in nature after the implementation of mitigation measures.

7.4.2.4 Ambient Air Quality

Air quality will be affected by fugitive dust emissions from construction machinery; dust from the unpaved surface and construction vehicles. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. The operation of an asphalt plant causes the emission of many different pollutants. The most common pollutants emitted from hot mix asphalt plants are particulate matter (PM_{10}), sulfur dioxide (SO_2), nitrogen oxides (NOx), volatile organic compounds (VOCs), and carbon monoxides (CO).

Potential impacts on the air quality during the construction stage will be due to the fugitive dust and the exhaust gases generated in and around the construction site. Dust is a major component of air pollution during road construction. Emissions are generated mainly from the following construction activities:

- Site clearance and use of heavy vehicles and machinery/equipment etc. at construction site;
- Procurement and transport of construction materials such as sand, cement, etc. to the construction site;
- Other gaseous emissions during construction result from operating of construction vehicles, plant and equipment;
- During construction, the continuous operation of machinery and movement of heavy trucks/vehicles including futuristic growth of traffic volume during the construction period on the road and traffic jams may generate increased gaseous emissions and dust (PM_{10} and $PM_{2.5}$) which are already exceeded and will severely affect the health of locals including residents, students, road users and business owners and can lead to a range of respiratory issues. Children, the elderly, and individuals with pre-existing health conditions are more vulnerable to the health effects of PM pollution. Elevated levels of PM_{10} and $PM_{2.5}$ reduce air quality, leading to decreased visibility and hazy conditions. The construction activities as well as futuristic growth of traffic volume during construction period may also result in increased air pollution in the area. Increase in air pollution levels without Project and with Project during construction period (for mobile & stationary sources) is predicted from construction machinery, equipment, which reveals that there shall not be significant contribution towards pollution due to the construction activity of the Project if mitigation plan will be implemented and monitored in proper sense; and

- Asphalt heating.

The majority of the dust emissions are likely to occur during the working hours of construction activity, i.e. the implementation of these activities. Small portion of dust might me related to uncontrolled open areas, storage areas as well, considered as open sources of fugitive emissions or unmanaged waste quantities. However, bearing in mind the type of the activities, these are not expected to be dust intensive. The main sources of fugitive air pollution at the construction site are Bitumen boiler, Diesel Power Plant, mobile compressors, motor transport and road equipment, welding station, warehouses of inert materials, painting stations, and gas welding. During the construction and installation work, 13 sources of air pollution will be involved, of which 2 are organized and 1 is unorganized, which emit 15 types of pollutants. At the time of construction, pollutant emissions are 288.067 tons. The list of pollutants emitted from emission sources and emitted into the atmosphere during the construction period is presented in Table 7-6.

Table 7-6 List of Pollutants Emitted into the Atmosphere during Construction Phase

Code	Pollutant	MACS Maximum-The mg/m3	MACS average Accurate mg/m3	Class dangerous In this case, the SV	Release of matter Taking into account purification, g/s	Release of matter Taking into account Cleaning, t/year (M)
1	2	4	5	7	8	9
0123	Iron(II, III) oxides (iron trioxide, iron		0.04	3	0.057047	0.219879
	oxide) /in terms of iron/ (274)					
0143	Manganese and its compounds /in terms of	0.01	0.001	2	0.001064	0.005121
	manganese(IV) oxide/(327)					
0301	Nitrogen (IV) Dioxide (Nitrogen Dioxide) (4)	0.2	0.04	2	0.026138	0.083082
0304	Nitrogen(II) Oxide (Nitrogen Oxide) (6)	0.4	0.06	3	0.00157	0.003908
0328	Carbon (Soot, Black Carbon) (583)	0.15	0.05	3	0.00089	0.00253
0330	Sulphur dioxide (Sulphur anhydride, Sulphur dioxide,	0.5	0.05	3	0.00557	0.00674
	Sulfur(IV) oxide) (516)					
0337	Carbon Oxide (Carbon Monoxide, Carbon Monoxide) (584)	5	3	4	0.035985	0.0968921
0616	Dimethylbenzene (mixture of o-, m-, p-	0.2		3	0.1105	0.4725
	Isomers) (203)					
0703	Benz/a/Pyrene (3,4-Benzpyrene) (54)		0.000001	1	0.00000001	0.000000044
0827	Chloroethylene (vinyl chloride, ethylene chloride)		0.01	1	0.00000816	0.0000247
1325	Formaldehyde (Methanal) (609)	0.05	0.01	2	0.0002	0.00048
2752	White spirit (1294*)				0.1105	0.4725
2754	Alkanes C12-19 /in terms of C/(Hydrocarbons	1		4	1.2107	5.939
	limit C12-C19 (in terms of C); Solvent					
	RPK-265P) (10)					
2902	Particulate matter (116)	0.5	0.15	3	0.314	76.1023
2908	Inorganic dust, containing silicon dioxide in the	0.3	0.1	3	2.27417	204.66241
	%: 70-20 (fireclay, cement, cement dust					
	- clay, shale, blast furnace slag, sand,					
	Clinker, ash, silica, ash					
	of Coal of Kazakh Deposits) (494)					
	V S E G O :				**4.14834217**	**288.067366844**
Notes: 1. In column (9): "M" is the emission of IO, t/year; in the absence of ENCs, the MPCs.s. is used. or (in the absence of MPCs.s.) MPCm.r. or (in the absence of MPCm.r.) OBUV						
2. Sorting method: in ascending order of the SG code (column 1)						

The construction activities will also result in increased air pollution in the area. The overall impact on the quality of air during the construction phase will be moderate negative due to temporary, site based and reversible nature and limited to the Project's implementation phase only.

Mitigation Measures

- All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions;
- Open burning of solid waste from the Contractor's camps and at construction site will be strictly banned;
- Preventive measures against dust will be adopted for on-site mixing and unloading operations;
- Construction materials (sand, gravel, and rocks) and spoil materials will be transported in trucks covered with tarpaulins and all vehicles (e.g., trucks, equipment, and other vehicles that support construction works) and Impose speed limits on all vehicle movement;
- Regular water sprinkling of the site or use of chemical dust suppressants will be carried out to suppress excessive dust emission(s) which will mitigate health effects on locals including children, the elderly, and individuals with pre-existing health conditions. Improved air quality, leading to improve visibility conditions will reduce the probability of accidents;
- Emissions from power generators and construction machinery are important point sources at the construction sites. Proper maintenance and repair are needed to minimize the hazardous emissions;
- Emissions from batching / asphalt plants can be controlled efficiently by the installation of cyclone / scrubbers. Diesel operated equipment will be equipped with well-maintained fuel filter and may be replaced timely (if required). In addition to that, regular maintenance activities comprising changing of lubricating oil, changing the air and fuel filter, cleaning the fuel system, draining the water separators and proper tuning may also help in reducing the emissions from diesel generators;
- Construction equipment is generally left idling while the operators are on break or waiting for the completion of another task. Emissions from idling equipment tend to be high. Existing idling control technologies, which automatically shut the engine off after a pre-set time can reduce emissions, without intervention of the operators;
- Ensure compliance with Order of the Minister of Health of the Republic of Kazakhstan (Hygienic Standards for Physical Factors Affecting Humans), WHO/IFC guidelines/standards whichever stringent Environmental Code of Practices (Annex-9) and GRM;
- Service roads (used for earthmoving equipment and general transport) will be regularly sprayed with water during dry weather;
- All excavation work will be sprinkled with water;
- Construction workers will be provided with masks for protection against the inhalation of dust;
- Vehicles used for construction will be tuned properly and regularly to control emission of exhaust gases; and
- Ensure precautions to reduce the level of dust emissions from hot mix plants, crushers and batching plants e.g. providing them as applicable, with protection canvasses and dust

extraction units. Mixing equipment will be well sealed and equipped as per existing standards. Moreover, ensure that the batching and asphalt plants are equipped with emission control devices like scrubbers, electrostatic precipitators or bag filters.

Residual Impacts

- The residual impacts will be Minor significant after the implementation of mitigation measures.

7.4.2.5 Noise and Vibration

A. Noise

No blasting is required during the construction of the proposed Project. The noise will be produced due to the operation of construction machinery and equipment. Sources of noise and vibration during construction are heavy machinery such as bulldozers, excavators, stabilizers, concrete mixing plant, pneumatic drills, stone crushers, asphalt plants and other equipment's. Noise and vibration are perceived as one of the most undesirable consequences of construction activities. The above machinery is expected to generate noise levels that would be severe in the Project area.

The cumulative effects from several machines can be significant and may cause significant nuisance. However, these increased noise levels will prevail only for a short duration during the pre-construction and construction phase. The noise produced by construction equipment is presented in **Table 7.7** as reference.

Table 7-7: Noise Produced by Construction Equipment / Machinery

Construction Equipment / Machinery	Typical noise level approximately 15 m from source [dB(A)]
Digger	111
Excavator	108
Roller truck	112
Vibrating roller truck	116
Driller	118
Dozer	113
Other machineries	103
Truck on gravel road	64
Truck on asphalt road	61

Source: Quagliata, A., Ahearn, M., Boeker, E., Roof, C., Meister, L., & Singleton, H. (2018). Transit Noise and Vibration Impact Assessment Manual (No. FTA Report No. 0123).

The likely impacts due to noise on social sensitive receptors as identified in this ESIA report and construction workers, are:

- Psychological effects of distraction of attention, irritation and short temperedness in the exposed persons due to persistently higher noise levels; and

- Noisy settings and higher background noise levels can cause temporary threshold shift and the consequent habit of speaking loudly, which may cause damage to vocal cords in the persons exposed.

The significance of construction noise effect is dependent on the impact magnitude (noise level) which is a function of the nature of the construction works and the proximity of sensitive receptors as well as of other factors – the timing of the works (day/night) and duration of the impact. Heavy machinery and transport vehicles, including heavy goods vehicles, is expected to be required for the construction of the Project, that will result in the introduction of a significant noise source that will materially increase the existing background noise levels.

Though the construction method that has not been determined yet, however it is believed that the adopted method of construction shall produce less noise and vibration if the suggested mitigation measures will be adopted.

Mitigation Measures

According to the Hygienic Standards for Physical Factors Affecting Humans, Order of the Minister of Health of the Republic of Kazakhstan dated February 16, 2022 No KR DSM-15, the maximum Permissible noise level is 70 dBA. The maximum permissible noise level is adopted for the territories directly adjacent to residential buildings, recreation areas of microdistricts and groups of residential buildings, playgrounds of preschool institutions, school sites, taking into account the following amendments:

- Noise generated by vehicles – 10 dBA
- For existing residential development – 5 dBA
- during the day from 7 to 23 hours - 10 dBA

There are a variety of ways by which construction equipment and worksite noise can be controlled. The following is a list of ways to control noise levels at the worksite of the proposed Project:

Quieter Equipment

A cost-effective way to reduce noise at a construction worksite is to buy quiet equipment. In addition, equipment in use will be the most suitable for the job. Avoid using equipment that is over-powered and, conversely, avoid using under powered equipment. Whenever possible the quietest equipment alternative will be used. In general, electronic powered equipment is quieter than diesel powered equipment and hydraulically powered equipment is quieter than pneumatic power.

Modifying Existing Old Equipment

The most common way to reduce the noise levels of common construction equipment is through worksite modifications. Some common worksite modifications consist of retro-fitting existing equipment with damping materials and mufflers.

Barrier Protection

An effective way of reducing noise is to locate noisy equipment behind purpose-built barriers. The barriers can be constructed on the work site from common construction building material (plywood, block, stacks or spoils) or the barriers can be constructed from commercial panels which are lined with sound absorbing material to achieve the maximum shielding effect possible. To be effective, the length of the barrier will be greater than its height. The noise source will not be visible and barrier will be located as close as possible to either the noise source or the receiver.

Work Activity Scheduling

Work activity scheduling are administrative means to control noise exposure. Planning how noise sources are sited and organized on a work site can reduce noise hazards. Jobs can be rotated so that exposure time is limited. Transferring workers from a high exposure task to a lower exposure task could make the employee's daily noise exposure acceptable. Administrative controls include activity planning, for example, scheduling pavement breaking operations so as to reduce the number of work site workers exposed. In addition, noisy equipment will not be run for periods longer than necessary and will be switched off when not in use.

Maintenance

Increased attention to maintenance of tools and equipment will reduce worksite noise levels. Maintaining plant and equipment in good order not only increases its life, but makes it safer to use and quieter. Loose and worn parts will be fixed as soon as possible. Ideally, the worksite will have a system in place for checking and servicing the various machines and power tools.

Noise Perimeter Zones

Noise Perimeter Zones (NPZ) are another administrative control to limit exposure to noisy processes or equipment to as few workers as possible. NPZ are areas where noise levels of 90 dB (A) or more are roped off and marked to keep out all workers who don't have to be there. NPZ can be set up using a sound level meter to find the safe distance from the source (90 dB (A)) and the NPZ can be set up at that distance. Noise does not radiate from the source at the same level in all directions. Noise from machinery can be higher in one direction than another because the noise can also be either absorbed or reflected from surfaces it contacts, such as the ground or a wall. Therefore, measurements will be taken at several points in an area where people might be working. Once noise levels that are 90 dB (A) or more are determined, rope off this area as the

Noise Perimeter Zone. Exclude all workers who do not need to be in that zone. All workers who need to work within the zone must wear hearing protection.

There must also be a clear distinction between occupational noise exposure and ambient noise exposure. It is expected that all construction activities will be required to undergo occupational health and safety risk assessments that would serve to identify where construction activities could pose a risk of noise induced hearing problem / loss to construction workers.

Ensure Environmental Code of Practices (Annex-9) and GRM.

Residual Impacts

- The residual impacts will be moderate significant after the implementation of mitigation measures.

B. Vibration

Vibration generated by construction activity has the potential to damage structures. This damage could be structural damage, such as cracking of floor slabs, foundations, columns, beams, or wells, or cosmetic architectural damage, such as cracked plaster, stucco, or tile. The predicted ground vibrations at various distances are shown in **Table 7.8** for typical equipment that may be used during proposed road construction. The typical vibration from heavy trucks is generally low, and usually imperceptible in nearby buildings.

Table 7-8: Typical vibration levels at distances (Peak mm/s)

Plant Item	Peak Vibration (mm/s), Distance from Source			
	10m	***20m***	***50m***	***100m***
15t roller	7.0 to 8.0	3.8	1.5	0.8
7t compactor	5.0 to 7.0	3.0	1.2	0.6
Dozer	2.5 to 4.0	1.6	0.7	0.3
Backhoe	1.0	0.5	0.2	0.1

Source: Environmental Noise Management Manual-Roads & Traffic Authority, NSW, Australia, 2001

Based on the predicted peak vibration levels described in **Table 7.8**, it is expected that vibration would be barely perceptible at sensitive receiver locations within 50m for most construction activities involving rolling and compacting.

According to *British Standards of Noise and Vibration*, humans are particularly sensitive to vibration with the threshold of perception typically being in the range of 0.14 to 0.3 mm/sec[9] Peak Particle Velocity (PPV) and levels above this may cause annoyance. However, significantly higher levels than this can be tolerated for single short-term events and do not cause annoyance or disturbance to humans. The British Standard (BS 5228-2) provides guidance on vibration and its

[9] *BS 5228-2: British Standards Code of Practice for Noise and Vibration Control on Construction and Open Sites, 2014*

control and management on various site types. The standard also presents details on the human response to vibration and **Table 7.9** outlines these effects.

Table 7-9: Guidance on Effects of Vibration Levels

Vibration level	Effect
0.14 mm/sec	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/sec	Vibration might be just perceptible in residential environments.
1.0 mm/sec	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10 mm/sec	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

Source: *British Standards Code of Practice for Noise and Vibration Control on Construction and Open Sites, 2014*

Similarly, British Standard (7385-2) *'Evaluation and Measurement for Vibration in Buildings, A Guide to Damage Levels Arising from Groundborne Vibration'* provides guidance on vibration measurement, data analysis and reporting as well as building classification and guide values for building damage. This Standard states that there will be no cosmetic damage to buildings if transient vibration levels do not exceed 15mm/sec in the low frequency range and this rises to 20mm/sec at frequencies of 15Hz and to 50mm/sec at 40Hz and above. These guidelines will be reduced by up to 50% for listed structures or similar. It is also noted that the probability of damage for transient vibrations tends towards zero at 12.5mm/sec at component PPV. For continuous vibrations, the threshold is considerably less at around half this value.

Table 7.10 presents the vibration levels below which there is no risk of damage to buildings. These limits apply to vibration *frequencies* below 15Hz where the most conservative limits are required and are presented for both transient and continuous vibrations. For protected or potentially vulnerable buildings, the recommended construction vibration limit is reduced by half.

Table 7-10: Maximum Permissible Construction Phase Vibration Levels

Building Type	Vibration Limit - PPV for Transient Vibrations for Frequencies <15Hz	Vibration Limit – PPV for Continuous Vibrations for Frequencies <15Hz
Structurally sound and not protected structures	12.5 mm/s	6.25 mm/s
Protected and/or vulnerable structures	6 mm/s	3 mm/s

Source: British Standard (7385-2) 'Evaluation and Measurement for Vibration in Buildings, A Guide to Damage Levels Arising from Groundborne Vibration', 1993

Construction activities as well as construction transport can result in varying degrees of ground vibration, depending on the equipment and methods employed. Operation of construction equipment causes ground vibrations that spread through the ground and attenuate in strength

with distance. There is a possibility of vibration that may be perceptible to people at properties in close proximity to the works arising as a result of the construction activities. The response of people to vibrations on the ground is influenced by many factors. Some of those factors are physical, like amplitude, duration and frequency content of vibrations, while other factors like the type of population, age, gender and expectations are physiological. This means that people's reaction to vibrations is subjective and differs from person to person. It is generally accepted that for the majority of people, vibration levels in excess of between 0.15 and 0.3 mm/s peak particle velocity are just perceptible.

Mitigation Measures

- Vibration measurement during construction phase by the contractor near the settlements/sensitive receptors along the proposed alignment.
- Vibration monitoring of existing operations or construction activity can range from simple, single-location measurements to more complex, simultaneous, multi-instrument measurements. The simple approach consists of taking measurements at the most sensitive location along the proposed Project route or the location perceived by the complainant to have the worst level of vibration. This information can be used to identify unusual conditions that may be contributing to the high vibration condition and to identify a course of action to reduce the impact;
- Timing of the construction works to be conducted during the recommended operational hours, to reduce vibration levels to residential properties;
- Residents to be pre-warned of high vibration events (e.g. movement of heavy Machinery), and any operations being undertaken outside recommended hours;
- The vibration from rolling and compacting activities would be considered intermittent and short-term, and likely to be tolerated if prior warning is given to potentially affected residents. Residents would therefore be pre-warned of high vibration events (e.g. piling operations), and any operations being undertaken outside recommended hours. Public notification would be given a minimum of 72 hours prior to planned works. Residents would be made aware of the construction times and the duration they would likely be affected, through letter drops, personal meetings/phone calls as necessary;
- Ensure Environmental Code of Practices (Annex-9) and GRM; and
- The equipment operators to be made aware by the contractor of potential vibration issues problems and of techniques to minimize vibration effects during construction works.

Wave Barriers

The purpose of a barrier is to reflect or absorb wave energy, thereby reducing the propagation of energy between a source and a receiver. A wave barrier is typically a trench or a thin wall made of sheet piles or similar structural members. The depth and width of a wave barrier must be proportioned to the wavelength of the wave intended for screening. The wavelength of a seismic wave is a function of propagation velocity and frequency. Pile driving typically generates ground

vibration with frequencies in the range of 4–30 Hz[10]. With common wave velocities in the range of 61–610 m/s, typical wavelengths can be in the range of 3–152 m.

Vibration Reduction for Impact Pile Drivers

Impact pile driving can be the most significant source of vibration at construction sites. The principal means of reducing vibration from impact pile driving are; Jetting; Predrilling; Using cast-in-place or auger cast piles; Using non-displacement piles; Using pile cushioning; and Scheduling for specific times to minimize disturbance at nearby vibration-sensitive sites. Some of these methods may not be appropriate in specific situations, but where they are practical, they can often be used to reduce vibration to an acceptable level.

Vibration Reduction Measures for Other Construction Equipment

In most cases, vibration induced by typical construction equipment does not result in adverse effects on people or structures. Noise from the equipment typically overshadows any meaningful ground vibration effects on people. Some equipment, however, including vibratory rollers and crack-and-seat equipment, can create high vibration levels.

Because of the nature of these types of devices, the options for reducing vibration are limited. Maximizing the distance between the source and receiver might be possible, but there is usually little or no flexibility in this regard. Conducting work when most people are not in the area (e.g., at work) or when sensitive equipment is not operating can avoid or minimize adverse impacts with this type of equipment, but pavement crack-and-seat operations often must be conducted at night to avoid disrupting traffic. As such, little can be done to avoid adverse impacts on people.

Vibration Reduction for Construction Vehicle Operations

Construction Vehicles traveling on a smooth access routes are rarely, if ever, the source of perceptible ground vibration. However, discontinuities in roadway/access routes pavement often develop as the result of settling of pavement sections, cracking, and faulting. When this occurs, construction vehicles passing over the pavement discontinuities impart energy into the ground, generating vibration. In most cases, only heavy trucks, not automobiles, are the source of perceptible vibration. Trucks traveling over pavement discontinuities also often rattle and make noise, which tends to make the event more noticeable when the ground vibration generated may only be barely noticeable.

Because vibration from vehicle operations is almost always the result of pavement discontinuities, the solution is to smooth the pavement to eliminate the discontinuities. This step will eliminate perceptible vibration from construction vehicle operations in virtually all cases.

Residual Impacts

[10] Transportation and Construction Vibration Guidance Manual, California Department of Transportation, 2013

- Considering the above mitigation measures, the residual impact significance is minor adverse.

7.4.2.6 Construction Camps/Camp Sites

Due to the construction camps[11], loss of vegetation and dis-satisfaction of rehabilitation measures during and after completion of construction phase may occur. These impacts may include waste generation, soil pollution, groundwater pollution, dust emissions, etc. However, the impacts will be temporary and moderate adverse in nature. For these impacts, mitigation measures have been developed to minimize the extent or duration of their occurrence and any associated adverse effects. **Table 7.11** summarizes potential impacts and proposed mitigation measures associated with construction camps.

Table 7-11: Summary of Workers Camp Impacts & Mitigation Measures

Potential Impact	Proposed Avoidance and Mitigation Measures
Environmental ▪ Temporary habitat loss or disturbance ▪ Temporary visual intrusion ▪ Noise emissions at a single location ▪ Waste generation ▪ Discharge of sanitary effluents and rainwater run-off to nearby water bodies	***Environmental*** ▪ Reinstate any temporary facilities to pre-existing conditions in ecologically sensitive areas. ▪ Implement landscaping plan for all facilities in areas where high landscape value and visual vulnerability to the proposed activities warrants site-specific landscape restoration measures. ▪ Operate equipment in a manner sympathetic to the ambient noise environment. Do not leave equipment idling unnecessary. ▪ Provide adequate warnings of impeding works to all potential receptors within a 1 km corridor surrounding the ROW via public notices and local news.
Social ▪ Worker camp site: consultation surrounding potential construction camp sites revealed concerns regarding the location of proposed sites for Worker Camps.	***Social*** Barren or State land will be a first preference for worker camp locations, followed by land where there is a willingness of public. Employment policies which aim to maximize job opportunities for local people will help to minimize tensions caused by different socio-cultural values. Training will be provided to all staff on camp management rules and overall discipline and cultural awareness. This will include, in appropriate languages:

[11] The location of construction camps will be provided by the Contractor in coordination with the Client before mobilization.

Potential Impact	Proposed Avoidance and Mitigation Measures
	▪ A briefing on camp rules. ▪ A community relations orientation to increase awareness about the local area, cultural sensitivities and the Project Code of Conduct. ▪ Awareness-raising on health considerations, including sexually transmitted diseases (STDs). The construction contractor is required to develop a Construction Camp Management Plan to address: ▪ Discipline; ▪ Community liaison; ▪ Ethnic tensions; and ▪ Communicable diseases. A Code of Conduct and Camp Rules will be required within the Construction Camp Management Plan, which provides policies and a disciplinary framework with respect to worker behavior.
Camp Location The final location will be determined by the construction contractors and agreed with the NC QazAvtoZhol JSC and PMC	***Camp Location*** The construction contractor will be required to assess the environmental/social sensitivity of any additional or alternative sites prior to their approval for adoption.

Some additional mitigation measures will include:

- The contractor(s) will provide plan to NC QazAvtoZhol JSC and PMC for removal & rehabilitation of site upon completion;
- Photographical and botanical inventory of vegetation before clearing the site; and
- Compensatory plantation to be scheduled when construction works near end.

7.4.2.7 Wastewater Generation at Construction Camps

Construction camps are proposed to be established during construction period for the proposed Project. The locations of construction camps will be identified as per construction camp criteria laid down in ESIA report. Wastewater will be generated at the construction camps and from construction activities. If the generated wastewater is not properly treated or disposed of, this may contaminate the surface water sources such as canals, distributaries and minors apart from soil contamination. Water from dewatering activities (during rainy season) has the potential to contain suspended solids and oil and grease and if disposed of untreated may affect the soil quality. Water used for household needs in the amount of 3788.4 m^3/period is discharged into the existing sewerage networks.

The impact significance is moderate adverse.

Mitigation Measures

To dispose the liquid waste generated from the construction activities, the following steps will be taken by the Contractor:

- Domestic and chemical effluents from the construction camp will be disposed by the development of on-site sanitation systems i.e. septic tanks. The septic tanks will be constructed to provide primary treatment after which the wastewater will be discharged into existing sewerage network system with the prior approval of concerned Municipal Authorities;
- Proper monitoring to check the compliance of compliance with the environmental requirements of the legislative and regulatory acts of the Republic of Kazakhstan (Water Code, 2003; RND 1.01.03-94, 1994), internal documents/standards of the company, WHO/ IFC guidelines/standards whichever stringent one will be carried out;
- Sewage from construction camps will be disposed of after proper pre-treatment and processes such as soakage pit;
- Construction yards and material storage areas where vehicles operate or materials are stored will be established on well drained fill;
- Free-flowing points of discharge for storm water will be identified nearby the boundaries of materials storage/construction yards for gravity or pump-assisted dewatering and yard drainage;
- The good engineering practices will ensure that there will be minimum to negligible quantity of construction water will be wasted which will be utilized in other parallel activities such as sprinkling for dust suppression;
- Local drainage channels will have sufficient capacity for handling discharge flows, with clear discharge points to open drainage courses;
- Water discharged to constructed drains will contain a minimum quantity of suspended solids;
- Temporary worker quarters and erection yards will include self-contained waste treatment with removal of excess by vacuum truck or approved discharge point;
- Drainage from fuel storage tank locations, refuelling areas, and equipment service areas will be segregated from other runoff; discharge will be routed through an oil/water separator; and
- Contractors will be required to observe drainage conditions during dewatering operations and storm events to assure positive drainage. If flooding occurs along roadways or in neighbourhoods, or community complaints arise, the contractor will undertake a combination of the above mitigation measures to minimize drainage and water quality impacts.

Residual Impacts

- Considering the above mitigation measures, the residual impact significance is Minor adverse.

7.4.2.8 Solid Waste Generation at Construction Camps

The approximate volume of waste generated will be:

- 2026 - 2009.52 tons, of which hazardous - 0.07 tons, non-hazardous - 2009.45 tons.
- 2027 - 2012.81 tons, of which hazardous - 0.08 tons, non-hazardous - 2012.73 tons;
- 2028 - 2012.68 tons, of which hazardous - 0.08 tons, non-hazardous - 2012.60 tons;
- 2029 - 2008.69 tons, of which hazardous - 0.29 tons, non-hazardous - 2008.40 tons;

The major components of the labor camp waste will be garbage, putrescible waste, rubbish and small portion of ashes and residues. Other type of wastes may include inorganic construction wastes including hazardous waste as well as construction and demolition waste will be also be generated. These wastes will be generated due to the construction activities and the materials used for construction. This waste would require proper disposal to minimize land and water contamination. The impact significance is moderate adverse.

Mitigation Measures

- All the solid waste from the camps will be properly collected at source by placing containers and disposed of through proper solid waste management system. The Contractor will coordinate with local representatives and administration concerned department for the disposal of solid waste;
- The concerned department must develop a plan of action for transporting the waste to the disposal site for final disposal. It is the responsibility of the concerned department to ensure that the disposal site is properly lined to prevent the leachate from contaminating the groundwater;
- Secondly, the disposal site must be located away as far as practical from populated areas and regions that have a high density of Wildlife;
- Toxic waste will be handled, stored, transported and disposed separately;
- The waste will be properly sealed in containers with proper labels indicating the nature of the waste;
- The contractor will deposit this material at collection centre made at the site and will be transported to other developmental Projects nearby the area or disposed of accordingly with the prior approval of concerned Municipal Authorities;
- Solid waste will be segregated at source so that it can be re-used or recycled; and
- Contractors are required to prepare a Waste Management Plan (refer Annex-5) that identifies the following: material types, estimated quantities and methods for disposal; locations onsite for collection and storage; locations for disposal. A recordkeeping system for all wastes and a tracking and manifest system for hazardous and recycled materials will be included in the plan. Necessary enclosed facilities, containers and equipment will be provided in keeping with the Plan. The Plan will be updated as necessary with actual quantities, locations for disposal and additional information in accordance with the Plan.

Residual Impacts

- Considering the above mitigation measures, the residual impact significance is Minor adverse.

7.4.2.9 Waste Generation at Construction Site

The construction waste will include wastewater (which may be used irretrievably (dust suppression)), oil spillage from machinery and solid waste (damaged or spoiled materials, temporary and expendable construction materials etc.). The handling and storage of oil and other hazardous waste will be a source of environmental pollution during the excavation, foundation, levelling, carpeting and pavement activities. The solid and liquid waste from the batching plan setup in the vicinity of construction camps may also generate along with the above waste stream. The quantification of construction material waste is not available but it is anticipated that less amount of such waste will be generated along the route length.

Concrete and asphalt have limited usable life, after which they become waste. If not used within the time span, their wastage will have major financial implications. Further, their disposal will become very difficult because of the large quantities involved.

Improper disposal of construction waste can lead to nuisance and hazards towards environment and local population. The unspent materials and debris produced from consumed up materials, if left as such and allowed to mix with soil underneath, can degrade the quality of receiving soils and render them unfit for plantation. Leakages of oils, lubricants, chemicals, and other similar substances from their storage sites can spoil the receiving soils and may undermine ability of the spoiled soils to support growth of vegetation and plants. The impact significance is moderate adverse.

Mitigation Measures

- Waste Management Plan (Refer Annex-5) will be developed to implement an efficient and responsive solid waste management system during construction phase. Recyclable wastes e.g. steel bars will be sold to waste vendors;
- The contractor will develop specific environmental and social management plans for asphalt plants and concrete batching plants. These plans will incorporate the general measures as applicable to the entire Project, but will also have focused mitigations for solid waste from these plants;
- Reusable material will be used as a filling material during ground levelling;
- Solid waste generated during construction will be safely transferred to the designated waste disposal sites of nearby urban areas/population centres after getting the prior approval from the relevant authorities and the approved contractor will provide a proper waste management plan for safe transfer as well as disposal of this waste; and
- The site will be restored back to its original conditions after construction completion.

Residual Impacts

- Considering the above mitigation measures, the residual impact significance is Minor adverse.

7.4.2.10 Quarry and Borrow Areas / Pits

Quarry and Borrow area / pits and associated excavation activities from the existing sources for material may result in land disputes, soil erosion, loss of potential cropland, loss of vegetation, landscape degradation, and damage to road embankments. Borrow/ Open pits may also become potential sources of mosquito breeding and may prove hazardous to humans, livestock and wildlife. This will also degrade hygienic condition of the Project Area. The existing sources of construction material has been identified (refer Chapter 3) however the final selection will be done by contractor(s). However, it is recommended that contractor(s) must use the existing quarry and borrow areas/pit for the construction material. This impact is moderate negative in nature.

Mitigation Measures

- As recommended above, no new quarry area and borrow area will be selected. However, necessary permits will be obtained for collection of material from any existing quarry and borrow area / pits from the competent authorities;
- In quarry area / borrow pits, the depth of the pits will be regulated so that the sides of the excavation will have a slope not steeper than 1:4;
- Soil erosion along the quarry area / borrow pit will be regularly checked to prevent/ mitigate impacts on adjacent lands;
- In case quarry area / borrow pits are filled with water, measures have to be taken to prevent the creation of mosquito-breeding sites;
- Borrow pits / quarry area will be used for construction waste, but during the excavation, top 20 cm soil cover will be preserved for vegetation after the filling of the pits/areas. This is the best way to restore the flora of that area;
- The Borrow / quarry areas will be fenced properly and banned for the movement of the residents;
- Further, contractors who are supplying and purchasing construction materials will ensure availability of appropriate environmental permits from the competent authority. Contractor(s) will also conduct an E&S due diligence before sourcing the material from the available borrow area / quarries.
- Ensure Environmental Code of Practices (Annex-9) and GRM, World Bank Groups EHS Guidelines for Construction Materials Extraction.

Residual Impacts

- The residual impacts will be temporary and Minor adverse to insignificant in nature after the implementation of mitigation measures.

7.4.2.11 Traffic Related Impacts

Due to the proposed construction activities, proper traffic management may pose a challenge in the Project area, particularly, where the construction of proposed Project will pass near the towns and settlements. This may result in traffic jams and cause inconvenience to the people living and passing through the area due to road construction and movement of vehicles carrying construction materials. Also, the movement of vehicles along the haulage routes may cause soil compaction and alteration of percolation, vegetation pattern and damage to properties and utilities. This impact is temporary and moderate negative in nature.

Mitigation Measures

- Movement of vehicles carrying construction materials and equipment/machinery will be restricted during the daytime to reduce traffic load and inconvenience to the local population;
- Construction vehicles, machinery and equipment will be parked at designated areas (at construction camps site) to avoid un-necessary congestions along the major roads;
- The speed of the vehicles will be controlled (at 30 to 40 km/hr) to reduce the probability of severe accidents, soil erosion, debris flows due to vibrations and dust emission;
- Proper sign boards will be provided for smooth flow of traffic;
- Period of construction and area / location of construction site shall be informed to public in general and specifically to local residents;
- Any closure of the roads (especially main roads) and deviations / diversions proposed will be informed to the riders through standard signs and displays; and
- Traffic Management Plan – TMP (refer Annex-6) has been proposed. However, the contractor may take guidance from this TMP and will prepare site specific TMP which will be implemented to avoid traffic accidents, jams/public inconvenience in the Project Area.

Residual Impacts

- The residual impacts will be insignificant in nature after the implementation of mitigation measures.

7.4.2.12 Notified Physical Cultural Resources

There are no notified physical cultural resources as listed in UNESCO World Heritage list of archeological sites coming in the ROW. However, during excavation, there is a chance of finding artifacts. In case of finding any artifact, the contractor shall immediately report through Supervision Consultant to concerned department (depending upon the location) to take further suitable action to preserve those antiques or sensitive remains. Chance finds procedure shall be adopted in case of any accidental discover of cultural heritage.

At km 349-544, the road crosses the burial place of Onay Ata. Many people make pilgrimages to his tomb in the hope of finding peace of mind and physical health. The mausoleum on the burial site of the saint was built in 1999 on the initiative of Fariza Ongarsynova. The project's technical

design will ensure the preservation of the cultural site by implementing measures to avoid any direct impacts during all phases of the project. This includes ensuring that the site will be physically avoided and that appropriate buffer zones are established. Protective measures will be implemented in accordance with national heritage protection regulations and international best practices, such as those outlined in IFC Performance Standard 8, to safeguard the cultural value of the site throughout the project's life cycle.

7.4.2.13 Natural and Man-Made Disasters

Natural disasters (earthquakes) and accidents such as fire, falls, slips and trips may result in injuries, financial losses and may even lead to deaths. The workers shall be trained and facilitated to cope with such disasters.

Mitigation Measures

- An Emergency Response Plan – ERP (refer Annex-7) for earthquakes and manmade disasters will be developed by the Contractor in coordination with PMC & NCQazAvtoZhol JSC and will implement in close consultation with the RESCUE Services and other concerned departments;
- Training of the Contractor, PMC and NCQazAvtoZhol JSC staff and employees regarding the emergency procedures and plans will be regularly conducted;
- Emergency numbers will be clearly posted at all disposal stations;
- Minor incidents and near misses will be reported, and preventive measures will be formulated accordingly by the PMC and NCQazAvtoZhol JSC Management;

7.4.2.14 Biodiversity

The principle potential impacts on the biodiversity receptors during the construction phase of the Project include:

Loss of terrestrial habitats

There are no rare and endangered plants in the zone of influence. There are no natural food and medicinal plants. According to the cadastres of accounting documents, there is no agricultural land in the area under consideration. There are no permanent habitats of birds and animals, relict plantations, historical monuments and cultural monuments. The fauna of the area under consideration is represented mainly by small rodents, reptiles and birds. The territory of the planned activity is not the habitat of bird species listed in the Red Book of the Republic of Kazakhstan. The proposed land is not related to forestry, and (or) withdrawal of lands of the state forest fund for state needs is not required. Thus, the activity of the object does not have a significant impact on the flora and fauna. Changes in the vegetation cover (species composition, condition, productivity of communities, assessment of genotype adaptability, economic and functional significance, pollution, pest infestation) in the area of the facility are not expected, and therefore there are no consequences for the life and health of the floral and faunal population.

However, due to site clearance for construction of the Project, destruction and alteration of terrestrial habitats as a result of land take requirements along the existing road and other auxiliary elements is expected. Due to its irreversibility, this is considered in principle as the key impact on the biodiversity. The significance of this impact along the Project as a whole is assessed as minor due the minor sensitivity of the habitats (dominantly rural areas and semi-natural habitats) and low impact magnitude - small affected area for the Project footprint over a limited area in vicinity of the Project. That would not imply material change to the wider region. Additionally, it is expected that the alteration of the habitats affected by the works associated with auxiliary elements for the purposes of construction of the Project, (whose footprint would be expected to be of limited scope since the existing road will provide access to the key construction sites along the road), construction compounds, etc. will be reversible providing that rehabilitation and reinstatement methods (e.g. construction methods to preserve the vegetation cover and return it back into its original form) are used on the these temporarily affected areas.

Impact on aquatic habitats

The impact on watercourses crossed by the Project is expected to be of minor significance since no massive construction works is expected within riverbeds or in their immediate proximity – works of short-term nature and reversible, which may cause temporary disruption during construction of bridge foundations due to excavation and dewatering as well as concrete pouring (depending on the bridge design and the site-specific conditions). Therefore, provided that good construction practice and management actions during construction of the Project are implemented, these potential impacts on the water environment will be of localised and short-term nature that would likely cause a detectable but non-material and reversible change of minor significance on aquatic habitats. Pollution impact on aquatic habitats due to accidental event (e.g. spill, or unsanitary spoil and waste disposal) is of low probability but may cause material adverse effect to the water quality and aquatic habitats. Provided that good international practice is implemented, and preventive measures are in place this impact is considered as of minor significance.

Habitat disturbance due to construction transport and operation of machinery

The disturbance of surrounding habitats by construction machinery and transport is considered as potential impact of temporary and short-term nature. The impact magnitude is expected to be very low, and the impact is considered as of negligible significance.

Direct impacts on species (collection of plants, hunting of animals, mortality due to collisions).

No significant impacts are expected from plants collection by the workers or animal mortality from collisions with vehicles or hunting, provided that appropriate Code of Conduct for the workers during construction is established and enforced, as well as training of workers on this matter is provided as part of the mitigation strategy. Contractor’s workers may damage the vegetation and trees (for use as firewood to fulfill the camp requirements). Dust deposition during construction

has the potential to lead to changes to plant communities Due to Minor sensitivity of the habitats and plant communities along the existing road, this impact is assessed as of minor significance.

Disturbance of animal species (breeding, foraging, roosting) due to construction works

Animals will be disturbed due to the presence of workers and machinery during the whole construction phase. The construction noise and vibrations generated during the site clearance and construction works would likely disturb and displace some species – reptiles, birds and mammals in general. Most species would use a number of different resting sites and bats would use a number of different roost sites throughout the year.

The disturbance effect is of temporary and short-term nature as well as reversible. The animals will leave their natural habitats and places where they live, but upon construction activities completion, it is expected that they would return back. Therefore, this impact is assessed as of low magnitude and minor significance.

Alien species

The risk of introduction of alien species during the construction phase of the Project is considered to be minor as the transport vehicles and machinery for construction are expected to be supplied locally, soil is not expected to be enriched with phosphorous and nitrogen and the climatic conditions are too harsh for such species to establish.

This impact is substantial significant due to its permanent and irreversible nature .

Mitigation Measures

- A tree plantation program shall be formulated with the recommendations of ten (10) trees in place of felling of one tree i.e. 1:10 in consideration of mortality (if applicable);
- Open fires will be banned in the area to avoid hazards of fire in the area;
- Clearing of vegetation cannot be avoided at the areas specified for Project structures, but damages to the natural vegetation may be minimized by establishing camp sites, workshops and batching plants on waste/barren land rather than on forested or agriculturally productive land;
- However, if such type of land is not available, it shall be ensured that minimum clearing of the vegetation is carried out and minimum damage is caused to trees and undergrowth;
- Construction vehicles, machinery and equipment will remain confined within their designated areas of movement;
- The Contractor's staff and labor shall be strictly directed not to damage any vegetation such as trees or bushes. They shall use the paths and roads for movement and shall not be allowed to trespass through farmlands or forested areas;
- Contractor shall provide gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel shall not be allowed.

- Care shall be taken during construction activities for avoiding purposely or chance killing of animals;
- If found any wild species and habitat during construction, that must have dealt carefully and local wildlife department officials will be called;
- Hunting, poaching and harassing of wild animals shall be strictly prohibited, and Contractor shall be required to instruct and supervise its labor force accordingly and clear orders will be given in this regard;
- The Contractor must be held responsible for instructing his work force accordingly and for enforcing this restriction. In addition, this shall have to be controlled by the Wildlife Department;
- Provision of culvert/tunnel for the movement of different faunal species across the propose road present in the Project Area;
- Special measures shall be adopted to minimize impacts on the wild birds, such as avoiding noise generating activities during the critical periods of breeding;
- The contractor will be instructed to avoid the wastewater and the chemical spills into the fresh water;

Residual Impact

- The impact of biodiversity will be Minor adverse in nature after taking the above-mentioned mitigations.

7.4.2.15 Health and Safety

a) Occupational Health and Safety

Health risks and worker's safety problems may result at the workplace if the working conditions provide unsafe and/or unfavorable working environment due to storage, handling and transport of hazardous construction material. Workers will be provided with safe and healthy working environment taking into account risks inherent to the particular sector and specific classes of hazards in project area. Guidelines for Construction Health and Safety Management Plan/ Checklist is attached in **Annex-8.** The high risk activities include construction material transportation, material loading and unloading, concrete pouring, bitumen laying, lifting activities (if any), electrical works and work at height (if any). Extreme heat and cold in the area increase the risk of workers becoming ill. Too high a temperature leads to a number of heat-related illnesses, such as heat rashes, heat cramps, heat exhaustion, or heat stroke; As people are more likely to be indoors, viruses can be more easily transmitted from one person to another, and cold, dry air can weaken the body's resistance. The impact is categorized major adverse.

Mitigation Measures

- Ensure compliance with Order No. 1019 "Occupational Health and Safety Training Procedure and Timelines" and Labour Code of the Republic of Kazakhstan (No. 414-V, 23 November 2015, as amended) and World Bank Group General EHS guidelines;

- Obligatory insurance against accidents for labourers/workers;
- Providing basic medical training to specified work staff and basic medical service and supplies to workers;
- Layout plan for camp site, indicating safety measures taken by the contractor, e.g. firefighting equipment, safe storage of hazardous material, first aid, security, fencing, and contingency measures in case of accidents;
- Work safety measures and good workmanship practices are to be followed by the contractor to ensure no health risks for labourers;
- Protection devices (ear muffs) will be provided to the workers doing job in the vicinity of high noise generating machines;
- Provision of adequate sanitation, washing, cooking and dormitory facilities including light up to satisfaction;
- Proper maintenance of facilities for workers will be monitored;
- Provision of protective clothing for labourers handling hazardous materials, e.g., helmet, adequate footwear for bituminous pavement works, protective goggles, gloves etc.;
- Ensure strict use of wearing these protective clothing during work activities;
- Elaboration of a contingency planning in case of major accidents;
- Instruct foremen to strictly enforce the keeping out of non-working persons, particularly children, off work sites;
- Adequate signage, lightning devices, barriers, yellow tape and persons with flags during construction to manage traffic at construction sites, haulage and access roads.
- The Contractors/Sub-Contractor need to be evaluated by Executing and Implementing Agencies (EAs and IAs) on H&S aspects during the bidding stage. This may include:
    - An appropriate health and safety management system (policies, procedures and practices) is in place (such as the one conforming to ISO 45001).
    - Availability of necessary resources to implement the HSE management system on site
    - A good record of occupational health and safety performance in work of similar nature
    - A qualified and experience staff on HSE with proven professional record
- A strong top management commitment and importance on the HSE aspects is quite important. The HSE aspects/ progress shall be discussed in routine Project progress meetings by involving all the concerned HSE staff
- Hiring of experienced and qualified HSE staff at QazAvtoZhol, Construction Supervision Consultant (CSC) and Contractor
- Establish health and safety committees including Project Director, Resident Engineer, and Environment staff of the EA, CSC and Contractor responsible for H&S arrangement and monitoring implementation.
- QazAvtoZhol needs to ensure strict enforcement of safety rules and regulations.
- QazAvtoZhol, CSC and contractors need to provide guaranteed provision of a safety budget and the introduction of safety incentives on penalties to construction workers.
- Adequate provision of safety training and resources by the CSC and contractors.
- Regularly inspect the workplace for health and safety issues

- Establish Standard Operating Procedure (SOP's) for health and safety incidents
- Inform AIIB (including the safeguards staff) of any incidents or fatalities within 48 hours. The report will mainly provide details on proper investigation of the incident, compensation given to the deceased / injured family and corrective action to be taken to avoid future incidents.
- Contractors must ensure that workers are adequately protected in extreme heat and cold. Medical personnel should be ready to provide emergency care in emergency cases and ensure that patients are transported to the nearest hospitals;
- Contractor(s) will include a health and safety champion program to encourage workers adhere with H&S requirements.

Residual Impacts

- Considering the above mitigation measures, the residual impact significance is moderate adverse.

7.4.2.16 Community Health and Safety

Community health and safety issues during the construction of proposed Project may include dust, noise, and vibration from construction vehicle transit, and communicable disease associated with the influx of temporary construction labor. Significant community health and safety issues associated with road Projects may also include:

- Pedestrian safety
- Traffic safety
- Emergency preparedness

The construction activities and vehicular movement at construction sites may result in roadside accidents particularly inflicting local communities who are not familiar with presence of heavy equipment. Quality of groundwater and surface water resources available in the nearby local communities may be affected due to the construction activities, oil spillage and leakage, roadside accidents, etc. The proposed Project will also have potential of air (dust pollution), noise and vibration impacts on nearby community. The labor works with different transmittable diseases (HIV/AIDS etc.) may cause spread out of those diseases in the local residents of above mentioned settlements along the proposed Project. The construction areas located near the residential/settlements may cause accident for the people moving near to these areas. The impact significance is moderate adverse.

Mitigation Measures

- Ensure compliance national laws and World Bank Group General EHS guidelines;
- Provision of safe corridors along the proposed Project and construction areas, and safe crossings for pedestrians and bicyclists during the construction phase. Crossing locations will consider community preferences, including those related to convenience or personal safety;

- Installation and maintenance of speed control and traffic calming devices at pedestrian crossing areas especially near the settlements;
- Installation and maintenance of all signs, signals, markings, and other devices used to regulate traffic, specifically those related to pedestrian facilities or bikeways;
- Setting of speed limits appropriate to the road and traffic conditions;
- Instruct foremen to strictly enforce the keeping out of non-working persons, particularly children, off work sites;
- Timely public notification on planned construction works;
- Close consultation with local communities to identify optimal solutions for diversions to maintain community integrity and social links;
- Reducing the impacts of vector borne diseases on long-term health effect of workers will be accomplished through implementation of diverse interventions aimed at eliminating the factors that lead to disease, which includes: Prevention of larval and adult propagation of vectors through sanitary improvements and elimination of breeding habitat close to residential areas and by eliminating any unusable impounding of water;
- Traffic Management Plan (Refer Annex-6) and appropriate road safety measures will be implemented to avoid traffic accidents, jams/public inconvenience.
- The communicable disease of most concern during construction phase, like Sexually-Transmitted Disease (STDs) such as HIV/AIDS will be prevented by successful initiative typically involving health awareness; education initiatives; training heath workers in disease treatment; immunization program and providing health service; and
- Contractor will take due care of the local community and observe sanctity of local customs and traditions by his staff. Contractor will warn the staff strictly not to involve in any un-ethical activities and to obey the local norms and cultural restrictions.

Residual Impacts

- Considering the above mitigation measures, the residual impact significance is minor adverse.

7.4.3 Potential Impacts during Operational Phase

The anticipated E&S impacts related to the proposed Project have been studied for the operational phase of the Project as discussed hereunder.

7.4.3.1 Soil Erosion and Degradation

In the operational phase of the Project, impacts on soil in a form of disruption due to soil erosion may occur, as well as degradation of soils and aquifers by direct and indirect pollution through vertical infiltration of fuel, oil or chemicals due to the water runoff from the road. This impact is moderate in nature.

Mitigation Measures

The following mitigation must be implemented to control erosion risk during operations of the highway:

- Monitor and maintain slopes along the highway alignment (embankments).
- Storm water drains and oil traps must be regularly serviced and maintained to ensure that they remain effective and do not become saturated and or blocked over time.
- Emergency response provision must be made for effective countermeasures in the event of a spill on the roadway and the containment and removal of the same. Such provision should include not only spillage from a crashed motor vehicle as well as the recovery of a large-scale spill in the event that a vehicle transporting hazardous materials is somehow damaged and loses containment.

Residual Impacts

The residual impacts will be Minor in nature after the implementation of mitigation measures.

7.4.3.2 Air Quality

In principle, the upgrade of existing road with higher travel speed, will have a direct impact on the travel time. The expected reduction of travel time usually results to increase of road trips, not made otherwise, i.e. in case that the highway was not constructed.

Based on the above, the Project is expected to have significant impact on travel time and will result to additional road trips. Therefore, the area along the road is expected to experience increases in traffic flow and this may cause a reduction in air quality, but not likely to concentrations above the national air quality objectives. The main reason for this is that the air quality is already good in the immediate area around the road corridor and because further improvements in air quality is to be expected due to expected reductions in emissions from vehicles because use of cleaner (low-emission) vehicles is expected to grow.

The operational impacts on air quality are difficult to avoid, but it is considered that the adverse impacts on air quality from the Project are of minor to moderate significance as they are focused in a small geographic area rather than spread across the extent of the wider region.

In addition, the Project will have minor to moderate beneficial impact in wider context, since it would reduce the air pollution by reducing the congestions and their consequential air quality effects at particular sections along the existing road network in the Project region.

Mitigation Measures

Direct operational mitigation measures within the responsibilities of the authority responsible for the regular maintenance of the road:

- Greenery and vegetation - planting trees and shrubs along roads can help absorb pollutants and improve air quality.

- Regular maintenance of the highway – ensure good and sustainable maintenance of the roads that will contribute to reducing the dust emissions, by:
    - Develop and implement long-term maintenance plans,
    - Budget allocation,
    - Ensure that maintenance teams are well-trained and equipped with the necessary skills and knowledge.
- Air Quality Monitoring – establish air quality monitoring systems along the highway to identify pollution hotspots and take corrective actions.

Depending on the results for the concentrations of air pollutants obtained from the air emissions dispersion modelling, particular site-specific mitigation measures may need to be proposed during the further Project design and the accompanied detailed environmental and social appraisal.

Residual Impacts

The residual impacts will be negligible in nature after the implementation of mitigation measures.

7.4.3.3 Green House Gas Emission

In the case of the operation of road project, the GHG emissions can be determined as follows:

- Scope 1: Emissions due to maintenance activities, i.e. emissions from road resurfacing, repaving, and ongoing maintenance work that requires fuel-powered equipment.
- Scope 2: Emissions from electricity used for road lighting or other electronic infrastructure (e.g., traffic lights, toll stations).
- Scope 3: Emissions from vehicles using the road over its lifetime

The operation phase GHG emissions are 1,479 tons CO_2e/annum (4.06 tons CO_2e/day) without considering the traffic based emission (refer Annex-4). However, GHG emissions, resulting from the vehicles of the road users, are the most significant ones. Based on the available data and above assumption, total GHG emission for 2029 and 2048 are estimated which are 287.79 tons CO_2e/day and 1,778.18 tons CO_2e/day for the entire section 87 km. Hence, total operation phase GHG emissions are 291.85 tons CO_2e/day for 2029 and 1,782.24 tons CO_2e/day for 2048 considering the lighting, maintenance activities and traffic based emission. Based on this assessment, overall impact can be considered as a Moderate significant.

Mitigation Measures

During the operational phase of the Project, design and best operational practice should be considered:

- Optimize the lighting (energy-efficient lighting) by specifying requirements into the detailed design stage (design-based mitigation).
- Operate, maintain and refurbish the Project using best-practice efficient approaches and equipment.

- In addition, at national level, the use of low emission fuels and low emission vehicles should be promoted.

Residual Impacts

The residual impacts will be moderate significant in nature after the implementation of mitigation measures.

7.4.3.4 Drainage

During the operational phase, poor maintenance of the road drainage system, particularly during the monsoon season can cause nuisance to the travelers and public due to flooding in the existing drainage structure In case of chocking of road drainage, the increased surface runoff due to heavy rains will accumulate at the surface and can cause traffic jams. The impact may consider to be moderate adverse in nature.

Mitigation Measures

- The impact can be controlled/reduced by timely and continuous maintenance/ cleaning of the drainage system; and
- Placement of sign boards instructing not to dispose of solid waste to avoid chocking of drain along the road alignment.

Residual Impacts

The residual impacts will be negligible in nature after the implementation of mitigation measures.

7.4.3.5 Surface Water Bodies

The release of pollutants during the operational phase into surface water might result from discharge of storm water, possible leakage of fuel and/or oil from the vehicles using the road. During the regular maintenance of the highway, there may be a need to use construction and maintenance machinery, with an associated possible impact to surface water. The significance of this impact is of minor significance.

Mitigation Measures

The following mitigation must be implemented to control surface water impacts during operations of the highway:

- Storm water drains and oil traps must be regularly serviced and maintained to ensure that they remain effective and do not become saturated and or blocked over time;
- Emergency response provision must be made for effective countermeasures in the event of a spill on the roadway and the containment and removal of the same. Such provision should include not only spillage from a crashed motor vehicle as well as the

recovery of a large-scale spill in the event that a vehicle transporting hazardous materials is somehow damaged and loses containment.

Residual Impacts

The residual impacts will be negligible in nature after the implementation of mitigation measures.

7.4.3.6 Noise and Vibration

Operation of the highway will cause a permanent material change in the current noise profile along the entire length of the existing road corridor as a result of traffic which is expected to be of increased magnitude in comparison to the present traffic level. The movement of vehicles and usage of horns will create noise which will be a hazard for the nearby residents/built-up areas. As such the receptor sensitivity is considered to be high. Given that the noise levels are predicted to exceed the defined limits the impact magnitude is considered to be high for houses/facilities in the most affected locations (within the zone of 200 meters from the Project).

Noise will primarily arise from vehicular traffic movement, roadside operations, and associated maintenance activities. The principal noise sources include:

- Continuous traffic noise from light and heavy vehicles, especially at higher speeds;
- Intermittent noise from loading/unloading of goods, vehicle braking, and acceleration at junctions;
- Operation of maintenance equipment such as road sweepers, asphalt rollers, or mowing machinery; and
- Interaction with existing and planned railway operations, which will contributing to cumulative noise levels within the shared corridor.

Based on the similar highway environments, daytime average equivalent noise levels (Leq) are expected to range between 65–75 dB(A) at 15 m from the carriageway edge, reducing to below 55 dB(A) at 100 m distance. However, this impact will be further classified based on the latest traffic count data and other road design parameters, before the operation stage of the proposed project.

Unlike the construction noise which will only occur during the day, noise from traffic will become a permanent feature of the environment and will occur throughout the night too, although at a lower level of intensity. The impact significance is accordingly considered to be permanent and moderate adverse in nature.

Mitigation Measures

- Noise modeling shall be carried out before completion of construction to provide the effective measures before start of O&M phase, which includes, but is not limited to, the following:

- Installation of vegetated berms or noise walls along populated sections and near sensitive receptors to reduce the noise transmission.
- Enforcement of speed limits, especially near settlements and at-grade crossings.
- Limiting high-noise activities such as road maintenance and equipment operations to daytime hours, wherever feasible, to reduce nighttime noise.
- Designated loading-unloading activities away from the sensitive receptors.

Moreover, the following measures shall be implemented to reduce the intensity of noise along the corridor

- Use of horn should be strictly prohibited in the close proximity of the built-up areas and sensitive receptor;
- Proper signboards should be installed to ensure reduce noise levels in the Project area, particularly those that contribute to unnecessary noise, such as speeding or loud vehicle modifications;
- Enforcement and penalties against traffic rules violators; and
- Regular monitoring of noise level to maintain acceptable limits at the nearby receptors.

A Noise Management Plan (NMP) will be developed and implemented to oversee the management of noise emissions throughout the operation of the project. The guidelines for this plan are provided in **Annex-12**

Residual Impacts

The residual impacts will be Minor in nature after the implementation of mitigation measures.

7.4.3.7 Road Safety

On a broader thought, the road safety would improve with the implementation of proposed project with consideration of road safety measures. However, it is also anticipated that the improved road conditions will facilitate higher speeds which may pose an issue of traffic accidents. This impact is permanent but moderately adverse in nature, since the frequency of accidents may be lowered, but their intensity may be quite severe due to enhanced speeds at which vehicles will move. The impact considered permanent and substantial adverse in nature.

Mitigation Measures

Strict enforcement of speed limits, installation of speed guns and channelization of traffic with respect to categories (heavy vehicle traffic and light vehicle traffic), should be ensured for the smooth flow of traffic moving from major road crossings. Enforcement of penalties for the violators will reduce the significance of this impact. Regular road safety audit should be ensured to improve the road safety during O&M.

Residual Impacts

The residual impacts will be Minor in nature after the implementation of mitigation measures.

7.4.3.8 Impact on Biodiversity

The principle potential impacts on the biodiversity receptors during the O&M phase of the Project include:

Fragmentation of habitats and migratory corridors

No additional habitat fragmentation will occur since the Project aims to reconstruct and upgrade an existing road and therefore the impact of this nature is of negligible significance. In addition, the biodiversity surveys carried out in the course of the present assessment indicate that the Project area is not used by migratory species and the existing road does not result in barrier effect.

Alien species

The direct impact on flora during the operational phase of the Project is related to possible introduction or spontaneous spread of alien species as a result to the permanent modification of the habitats. Due to fact that the habitats along the existing road are already modified and of Minor sensitivity, this impact is considered as a low magnitude impact over a limited area in vicinity of the Project that may imply detectable but non-material change. Therefore, this impact is considered as of minor significance.

Road kills (collisions)

During the operational phase the road collision risk is the highest threat in particular to amphibians and reptiles as well as to particular bird and mammal species.

The amphibians and reptiles will continue to use the already established areas across the road. Furthermore, because the asphalt of the road is warming much faster than the surrounding ground, during cold days, especially in the mornings, the lizards and snakes will use the road to accumulate heat from the warmed road and could easily become victims of the traffic on the road. Birds, especially those with slow take-off and landing capabilities, are at risk of colliding with vehicles on the road, leading to fatalities. This risk is of increased magnitude due to increased traffic on the highway in comparison to the current traffic intensity.

Similarly, increased mortality of the animals due to collision with vehicles may be expected due to increased traffic on the highway in comparison to the current traffic intensity. Nonetheless, the road has sufficient number of culverts and/or underpasses to be used by smaller animals.

Mitigation / Enhancement Measures

Principal measures of good maintenance practice to mitigate operational impacts from the Project include, at a minimum:

- Once operational, establish sound waste management, including removal of food and carcasses from the highway, in order to minimize attractiveness to animals and reduce collisions. Waste arising from the operational highway is expected to be managed using the established procedures and facilities that are used across the road network.
- Afforestation with native species of plants (trees and herbs) along the alignment. The planting may also be designed to contribute to the mitigation of visual impacts and impacts on the landscape character.
- Regular maintenance of the vegetation along the highway; prevention of invasive species spread; avoid utilization of pesticides.
- It is highly recommended to use shielded and downward-facing lighting to minimize light pollution and disorientation for nocturnal birds, which can disrupt their navigation and affect their behavior (design-based measure).
- Monitoring of the road killed birds and mammals to access the vehicle collision accidents and the impact on the populations.
- The road litter should be minimized, as it can attract scavengers and predators which can pose a threat and have a huge impact on the ground nesting birds.
- Regular removal of food, carcasses and other organic residues from the road to minimize attraction of mammals.
- Monitoring and maintenance of the fence of the highway to prevent collisions of mammals with vehicles.

Residual Impacts

The residual impacts will be negligible in nature after the implementation of mitigation measures.

7.4.3.9 Occupational Health and Safety

Occupational health and safety risks during operational phase will be the same as during the construction phase. However, they will be limited to the operational and maintenance activities for the highway, which will be occasional and/or involve a limited number of workers. Influx of workers would not be an issue, as well as child and forced labour. Gender Based Violence and Harassment always represent a risk that should be carefully inspected and properly mitigated.

The risk of traffic accidents is important, even if the likelihood is average. Therefore, the risk magnitude is considered medium. Without measures to prevent this potential risk, the health and safety of the maintenance workers during the operation of the highway is considered to be an impact of moderate significance.

Mitigation Measures

Operational phase includes maintenance activities. The focus of the activities will be set to the company that will operate the road, namely QazAvtoZhol. In principle, QazAvtoZhol will hire other companies (Contractor(s)) to maintain all or different highway sections.
QazAvtoZhol in their capacity as Project Operator will need to implement its own management procedures and actions as part of the company's Environmental and Social Management System (ESMS), and require the Contractor(s) to implement their own plans, aligned with QazAvtoZhol's ESMS in the following areas, at a minimum:

- Occupational Health and Safety
- Grievance Mechanism for Workers
- Local Recruitment and Development
- Labour and Working Conditions
- Supply Chain Management

Residual Impacts

Considering the above mitigation measures, the residual impact significance is minor adverse.

7.5 Cumulative Effects

Cumulative impacts refer to the accumulation of human-induced changes on valued environmental and social components (VECs)[12] over time and across space in an additive or interactive manner. Therefore, cumulative impacts are combined changes to the environment caused by two or more projects that are close to the same location or area, and which types of construction or operational impacts have similar nature and potential for interaction. Cumulative effects occur because a series of projects of the same type are being developed[13] or from the combined effects over a given resource of a mix of different types of projects[14].

For this Project, cumulative effects may occur during both construction and operation. During operation, interaction is expected primarily with existing and planned railway infrastructure in the corridor, as well as other transport or utility schemes that could influence traffic volumes, emissions, noise, vibration, safety, and land use compatibility. This includes the potential increase in traffic volumes and emissions from road traffic and railway operations, as well as noise from both sources that could exacerbate impacts on nearby communities. Additionally, land-use conflicts may arise where transportation infrastructure intersects with urban development or agricultural land. In relation to the Project, cumulative effects may occur during its construction in a form of typical impacts associated with construction works (air pollution, nuisance due to construction noise, traffic disturbance, waste generation, workers influx, etc.) as a result of

[12] Definition of VECs according to the IFC Good Practice Handbook 'Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets' 2013: 'VECs are environmental and social attributes that are considered to be important in assessing risks.

[13] For example, when several hydroelectric projects are constructed or planned on the same river or within the same watershed, when multiple road, oil and gas projects or mines are developed in close proximity, or when a number of wind farms are constructed or planned within the same flyway or region.

[14] For example, the development of a mine site, access roads, transmission lines, and other adjacent land uses.

interaction with projects of similar type and size in its surrounding (other transportation developments (i.e. road or railway infrastructure), or projects such are gas transportation developments (i.e. gas pipeline infrastructures).

7.6 Valued Environmental Components

Based on the desktop study of Project's AoI, its resources and screening analysis, no sensitive receptors will be directly affected by Project interventions during construction. However, some Valued Environmental Components (VECs) were identified by keeping in view the Project construction and operational phase activities in context of above mentioned developments. VECs with respect to physical, biological and social perspectives are identified and listed below:

- Physical Environment
  - Landscape and Aesthetics;
  - Ambient Air Quality;
  - Water Quality;
  - Noise and Vibration.
- Biological Environment
  - Flora;
  - Fauna; and
  - Habitat connectivity and barrier effects.

- Social Environment
  - Social & Cultural Conflicts;
  - Agriculture & Livelihood;
  - Transportation and road safety;
  - Economy; and
  - Land use compatibility near transport nodes (at road–rail interfaces).

During the time this assessment was carried out, no such specific information on current or future projects in close proximity, or in the area that is to be directly affected during the construction of the Project was available. Therefore, no major cumulative effects due to interaction with other projects are likely to be expected to occur during construction. However, if such development arises, cumulative effects may occur if construction of the Project and other schemes are realized simultaneously, in parallel, in the form of typical impacts associated with construction works such as noise, air pollution, and traffic disturbance. In this case, coordinated E&S management and cooperation between contractors of various developments throughout the construction period will be essential to optimize the mitigation strategy. This will include preparation of joint management plans for the aspects relevant for the potential cumulative impacts, such as construction waste management, traffic management, construction noise, community health and safety, emissions, traffic volumes etc.

Apart from the above, the operation phase cumulative impacts of these identified VEC are discussed in Table 7.12.

Table 7.12: Cumulative Impacts and Mitigation Measures during Operational Phase

E&S Component (VEC)	Potential Cumulative Impacts	Proposed Mitigation and Management Measures
PHYSICAL ENVIRONMENT		
Landscape and Aesthetics	Visual alteration from the combined presence of proposed road and railway infrastructure, lighting, and ancillary developments (e.g., service areas). Incremental change in landscape character along the transport corridor.	- Adopt coordinated visual design standards for roadside and rail infrastructure (signage, lighting, vegetation). - Implement roadside landscaping and tree planting using native species to soften visual impacts. - Restrict unregulated roadside commercial developments through land-use control and corridor management.
Ambient Air Quality	Combined vehicular and locomotive emissions (NOx, PM, CO_2) could elevate local air pollutant concentrations, especially in areas of dense traffic or at crossings.	- Promote use of low-emission or Euro-compliant vehicles through policy coordination. - Regular maintenance of the road surface to optimize traffic flow and minimize idling emissions. - Establish joint air quality monitoring near road–rail intersections. - Encourage modal shift for freight to rail where feasible.
Water Quality	Potential contamination of nearby water bodies from combined surface runoff (oil, fuel residues, particulates) from road and railway surfaces.	- Design and maintain roadside drainage with oil/grit interceptors. - Coordinate with railway authorities for shared stormwater management plans. - Prohibit discharge of untreated runoff to natural waterways. - Regular monitoring of water quality at representative points.
Noise and Vibration	Cumulative noise levels from concurrent operation of road traffic and rail movements may exceed thresholds near sensitive receptors.	- Establish noise buffer zones or green belts in overlapping road–rail sections. - Install noise barriers near settlements, schools, and clinics based on the noise modeling as referred under section 1.4.3.6.

		- Periodic monitoring and community feedback mechanism.
BIOLOGICAL ENVIRONMENT		
Flora	Road and rail corridor expansion may cumulatively reduce natural vegetation and promote habitat fragmentation.	- Implement joint ecological offset or replantation programs along the transport corridor. - Use native and drought-tolerant species for landscaping. - Prevent encroachment into natural vegetation zones.
Fauna	Increased traffic and train movement may raise risks of wildlife collisions and disturbance.	- Maintain existing wildlife crossings (underpasses/culverts) with suitable capacity at identified locations along the existing road. - Use wildlife warning signage and speed control zones in sensitive habitats. - Restrict night-time construction/maintenance in critical areas.
Habitat Connectivity and Barrier Effects	Combined linear infrastructure may create cumulative barrier effects to animal movement and gene flow.	- Develop/maintain an integrated corridor for wildlife with designated crossing points. - Preserve green corridors connecting habitats. - Monitor the effectiveness of fauna passage structures.
SOCIAL ENVIRONMENT		
Social & Cultural Conflicts	Increased access and mixed land use may lead to social change or cultural conflicts near transport hubs.	- Conduct community engagement and awareness programs. - Promote inclusive local development planning. - Preserve culturally significant sites during road–rail interface works.
Transportation and Road Safety	The interaction of road and rail traffic may increase accident risk at level crossings and junctions.	- Upgrade crossings with proper signaling, barriers, and lighting. - Implement speed limits and awareness signage near crossings. - Coordinate traffic safety campaigns with local authorities.

		- Promote data sharing for integrated traffic management.
Economy	Enhanced connectivity may induce commercial development and population growth, exerting pressure on infrastructure and services.	- Integrate corridor development with regional spatial planning. - Support local small and medium-sized enterprises through regulated roadside markets. - Monitor economic activities to avoid unplanned sprawl.
Land Use Compatibility (Road–Rail Interfaces)	Uncoordinated land use near transport nodes may lead to congestion, safety risks, and land-use conflicts.	- Prepare joint land-use zoning and corridor development plan. - Enforce buffer zones and right-of-way management. - Periodic review of land-use plans with local governments.

Keeping in view the above impact assessment, it can be concluded that there will be no adverse significant impacts on physical, ecological and socioeconomic environment due to proposed Project along with the nearby developments during construction and operation phases. The significance of cumulative impacts during the operational phase are assessed as moderate, with the potential for effective mitigation through coordination between implementing agencies (such road, railway) and municipal authorities, monitoring, and adaptive management requirements. It is recommended that the implementation of the E&S plan across regional development and mitigation measures for other physical, ecological and socio-economic domains mentioned in ESMP along with regular monitoring and audit as provided in the Environmental Assessment reports will further reduce the significance of the impacts.

7.7 POTENTIAL ADVERSE SOCIAL IMPACT ASSEESSMENTS & MITIGATORY MEASURES

The project's social impacts and risks thereof too are assessed as substantial due to potential impacts likely to be associated with land acquisition and restrictions on land use during construction, labor management as well as community health and safety associated with potential labor influx. The project recognizes ‘gender equity’ as an important aspect requiring attention, specially, from the point of view of women empowerment. Separate stand alone reports on Labor Management Procedures (LMP) and Land Acquisition and Resettlement Framework (LARF) have been prepared, a gist of the same following hereunder.

7.8.1 Land Acquisition and Restrictions

AIIB's Environmental and Social Standard (ESS) 2 addresses impacts of Project-related land acquisition, including restrictions on land use and access to assets and natural resources, which may cause physical displacement (relocation, loss of land or shelter), and/or economic displacement (loss of land or assets, or restrictions on land use, assets and natural resources leading to loss of income sources or other means of livelihood), all of these constitute Involuntary Resettlement. Involuntary resettlement refers to the impacts of both physical and economic displacement and the processes to mitigate and compensate them. Resettlement is considered involuntary when the Project-affected people do not have the right to refuse land acquisition or restrictions on land use that result in physical and/ or economic displacement. This occurs in cases of: (a) lawful expropriation or temporary or permanent restrictions on land use; and (b) negotiated settlements in which the buyer can resort to expropriation or impose legal restrictions on land use if negotiations with the seller fail.

AIIB's ESS 2 objectives are: (a) To avoid Involuntary Resettlement (IR) wherever feasible; (b) to minimize Involuntary Resettlement by exploring Project alternatives; (c) where avoidance is not feasible, to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-project levels and to provide resettlement assistance; (d) understand and address gender-related risks and differential impacts; (e) to improve the overall socioeconomic status of the displaced poor and other vulnerable groups; and (f) to conceive and implement resettlement activities as a development program, and enable the persons displaced by the Project to share in Project benefits. The instrument used to address the IR isIR the Land Acquisition Plan (LAP) or Resettlement Plan (RP) (together, LARP/LAP/RP). This document uses LARP.

However, the LARP does not apply to state land that is transferred from one RoK authority to another, or that is used temporarily by the Contractors during construction works, unless third parties are adversely affected by the transfer or use. Future arrangement for temporary land use by contractors will be made through mutually agreed negotiated transactions (i.e., leaseholds) with the landowners and/or land administrators (in case of state land). Such negotiations may include, among financial consideration, all efforts to restore the original 'greenness' of the land used.

Where associated facilities are required, the same principles as for ESFs will apply. Presence of such facilities will be determined once the detailed designs have been finalized during Project implementation.

The project estimates that the re-construction would require 1,193 Ha of land as per the Land Commission on the Submission of a Land Plot for the Reconstruction of the Atyrau-Dossor Highway, km 598-512 with a total area of 1193 hectares dated July 3, 2024, No6. Letter of the State Institution "Department of Land Relations, Architecture and Urban Planning of the Makat District" dated July 4, 2024, 06-08-05-02-35 No507.

Apart from widening of the roadbed and the smoothing of the existing slopes, Kazakhstan Law on Roads, the project has to provide for the permanent right-of-way for the road with a width of 70 mts. Further, arrangements are to be made for rest areas, stops, power transmission towers,

intersections and junctions, transport interchanges, exits. Along the entire length of the highway (within the administrative boundaries of the districts), There are no structures, buildings, businesses, trees, crops, or other assets and livelihoods in the project's right-of-way that may be affected. The project does not anticipate major physical displacement and / or livelihoods disruption impacts associated with land acquisition. In all, it is estimated that about 2,200 Ha of lands will have to be acquired permanently, and 334 Ha temporarily. In all, 63 persons/ entities are likely to be affected due to the acquisition. Out of 63 PAPs enumerated, 43 or 68% are either private sector/corporate entities or public sector companies. The remaining seem to be individual persons or households. There are 32 cases of land leased, of these, lease period for 16 has ended, and the other 16 are still active. Lease rents have been paid for all those which are active.

Thus, one can see some efforts at identifying the acquisition spots and people likely to be affected have been made. However, lot more needs to be done towards preparing a LARP, as discussed below.

The preparation of a LARP demands fuller information to begin with on the finalized alignment of the road and detailed technical design, and impacts likely to occur – how much and where the lands need to be acquired for the construction, number of persons / households/ enterprises likely to be adversely affected, nature and extent of effects, asset measurements and the valuations as well as compensations and other assistances to be extended (so as to prepare and seek budget). No property valuation has been conducted for any of the project's acquisitions.

Construction of some sections will require new survey to determine needs for land acquisition and relocation, repositioning/protecting of utility/gas lines, consulting with local officials and stakeholders to gain support, and planning and managing the logistics of getting labor, machinery and materials to many remote locations.

Temporary use of lands is required for burrow pits/quarries; temporary construction stockyards located along the right of way for short-term storage of construction materials, parking of construction equipment, as well as for construction camps (including dormitories for engineers and workers, sites for asphalt or concrete plants, sites for maintenance of construction equipment, parking areas). It is quite possible; the impacts may occur not only on either side of the road (corridor of construction) within Makat district, but outside the district/ region (for want of quarries).

Additional area may be required for construction of new elements such as viaducts, flyovers, relocation of utilities and turnoffs. So, all land acquisitions can be firmed up only after finalization of the detailed design and construction plans by the nominated Contractor (during the implementation stage). Once the design is finalized and approved, the Land Use Plan[1] will need to develop and finalized by Regional State Scientific and Production Center for Land Management (NPTsZem) to define the impacts and the need for land acquisition and resettlement. Based on which, a LARP can be prepared.

All these are not available at present and will surface as and when the implementation progresses. So, at this juncture, it is not possible to prepare a full-fledged plan. Given this situation, Land

Acquisition and Resettlement Framework (LARF) is prepared. But, this also serves as a preliminary Plan as it has much more information than that for a Framework.

The objectives of this LARF are to:

1. Set out key principles and procedures to address potential physical and economic displacement where such impacts are caused by the project
2. Lay out the process by which potential land acquisition and resettlement impacts will be identified, quantified, and compensated
3. Identify gaps between national legal and regulatory requirements related to land acquisition and AIIB's ESS2.
4. Establish project land acquisition and resettlement framework bridging such gaps between national legal framework and the Bank's ESS2.
5. Identify measures to be implemented to minimize, mitigate and compensate such resettlement related impacts with well-defined eligibility criteria and entitlements.
6. Enable prepare a LARP to address the involuntary land acquisition/ restrictions resultant physical and/ or economic displacement.
7. Document and assess the institutional and implementation arrangements.

Further details are available in the stand alone LARF document which forms an integral part of this ESIA and disclosed on QAJ's website.

7.8.2 Labor and Working Conditions

Road construction is expected to bring a substantial number of workforces from different parts of the country and abroad. The estimated number is expected to be about--- How they will be sourced will only be known following contract awards and submission of workplans by winning contractors. The majority of the project's workers will consist of construction workers hired by contractors, including their sub-contractors, and workers hired by supervision engineers and design/ implementation consultants. Direct workers include government secondees and consultants hired as project staff. OHS and risks around working conditions are most pertinent to construction workers. Hence, it requires the preparation of Labor Management Procedures (LMP) for guiding the management of 'labor'. As a policy the project shall not employ any child or forced labor and accordingly employment contracts will be audited. The LMP includes a grievance mechanism for workers. LMP has been prepared, disclosed, and consulted prior to the project's appraisal.

7.8.3 Other Risks

Other social risks are expected to be residual, due to inappropriate construction practices resulting in restrictions on land uses, property damages, pollution, road safety risks and other disruptions. These are to be addressed as early as possible, else; it impacts adversely livelihoods, public safety and public health. Further, given the shortages of skilled local labor forces locally, inflows of labor from other regions and countries are anticipated. Hence, there could be labor influx risks that could affect the local communities and available services and resources due to

sudden presence of workers with their operating facilities. Sexual Exploitation & Abuse and Sexual Harassment (SEA/AH) (constituent of Gender Balanced Violence) risks are expected to be low. However, project will have to put in planned efforts to ensure gender equity.

7.8.4 Gender Equality and Women Empowerment.

Kazakhstan has achieved significant efforts and progress in respect of gender equity in the past two decades. Kazakhstan stands classified as having "very high human development" according to the Gender Development Index (GDI). It is one of only 21 countries worldwide, and the only in Central Asia, in which the female Human Development Index (HDI) score is equal to or greater than the male HDI score.[15] With a higher life expectancy and greater educational attainment, Among the countries of Central Asia, Kazakhstan is a leader in progress on gender equality, ranking 76th out of 146 countries in the Global Gender Gap Index 2024,[16] a report designed to measure gender equality. Kazakhstan's Gender Inequality Index (GII)I has also improved significantly since 2008 thanks to fewer maternal deaths, a reduced adolescent birth rate, more women in parliament, and a higher share of women with at least some secondary education. Despite a higher female HDI, Gender Inequality Index (GII) results show that women in Kazakhstan are still not reaching their full human development potential due to gender inequalities across three dimensions: i) reproductive health, ii) empowerment (measured by educational attainment and political participation), and iii) labor market participation. Given this situation, the ESIA identifies such areas/ issues specific to the project and addresses the same, a Gender Acton Plan has been prepared. A brief note on Women's Empowerment and Gender Equality in the context of the project is provided in Annex 13.

[15] https://files.acquia.undp.org/public/migration/kz/9d96eb2ba9b703996f92a3c2b0e737ba1d4ba71cf14dea3338e9cd440da25974.pdf

[16] Global Gender Gap Report 2024 | World Economic Forum

8 Environmental and Social Management Plan

This chapter presents the Environmental and Social Management Plan (ESMP) which details the mitigating measures that will be implemented to avoid or minimize/reduce them to acceptable level, mitigate, compensate for or offset them the potential adverse impacts of the project and the monitoring plan to monitor and evaluate the effectiveness of the actual implementation of the mitigating measures. This chapter summarizes the mitigation, monitoring requirements, institutional arrangement monitoring and measures to be taken during the implementation and implementation budget.

8.1 Contractors' Qualification

It is recommended that all contractors procured under the Project be compliant with ISO 9001 Quality Management, ISO 14001 Environmental Management and ISO 45001 Occupational Health and Safety Management or equivalent. These will be done by QazAvtoZhol imposing the requirements of ISO certifications during prequalification or technical evaluation of contractors. In addition, all subcontractors under the major contractors will also be subject to ISO 14001 and ISO45001 audit provisions by the main Contractor during the course of the project.

8.2 Various Mitigation and Control Measures

The ESMP includes different types of mitigation and control measures and sub plans for significant impacts and risks: (i) general and non-site-specific measures in the form of Environmental and Social Codes of Practices (ECPs) presented in **Annex-9** to address general construction and operation matters identified as moderate and minor in significance prior to mitigation and prevention; (ii) project specific and to the extent possible, site-specific mitigation measures for major impacts and risks; (iii) C-ESMP with site-specific and contract-specific management plans to be prepared by the Contractor; (iv) OCHS Management System Processes and Standard Operating Procedures to be prepared by the Contractors; and (v) proposed plans in this ESMP to address significant and cumulative impacts.

8.3 Environmental and Social Code of Practices for Construction

The environmental and social codes of practice (ECPs) are generic, non-site-specific guidelines for the construction phase. The ECPs consist of environmental and social management guidelines and OHS practices to be followed by the contractors for sustainable management of all environmental, social, health and safety issues. The ECPs are listed below and details are presented in **Annex-9**

- ECP 1: Waste Management
- ECP 2: Fuels and Hazardous Goods Management
- ECP 3: Water Resources Management
- ECP 4: Drainage Management
- ECP 5: Soil Quality Management
- ECP 6: Erosion and Sediment Control
- ECP 7: Topsoil Management

- ECP 8: Topography and Landscaping
- ECP 9: Borrow Areas Development & Operation
- ECP 10: Air Quality Management
- ECP 11: Noise and Vibration Management
- ECP 12: Protection of Flora
- ECP 13: Protection of Fauna
- ECP 14: Road Transport and Road Traffic Management
- ECP 15: Construction Camp Management
- ECP 16: Cultural and Religious Issues
- ECP 17: Construction and Operation Phase Security

8.4 Contractor's Environmental and Social Management Plan

The Contractor will prepare a 'Contractor's Environment and Social Management Plan' (C-ESMP) demonstrating the manner in which they will comply with the requirements of Site-Specific Management Plans, ECPs and the mitigation measures proposed in this ESIA Report and Environmental and Social Exclusion List provided in the AIIB ESF. The Bank will not knowingly finance Projects involving activities under the Environmental and Social Exclusion Checklist. The C-ESMP will be submitted before the start of any construction activities (maximum of 30 days) of Contractor's mobilization and be approved by the Engineer. The Contractor will develop this C-ESMP with the support/consent of E&S staff of PMC and the guidelines provided in the ESMP. The Contractor will also be responsible for training of its dedicated E & S staff on regular basis for effective implementation of E & S aspects. The C-ESMP will form the part of the contract documents and will be used as monitoring tool for compliance. Violation of the compliance requirements will be treated as non-compliance leading to the corrections or otherwise imposing penalty on the contractor. The C-ESMP shall be approved by the Construction Supervision Consultant (CSC) and PIU. The guidelines for the development of C-ESMP have been provided as Annex-10.

8.5 Inclusion of ESMP in Contract Documents

The ESMP of the Project along with the ECPs and occupational hazards and risks will be included in the contractors' bid documents.

The ESMP shall form part of the Bidding Documents and subsequently be included in the Construction Civil Works Contract and be part of the Contractors' obligation. Compliance shall be ensured by QAJ/PIU with the assistance of PMC and CSC. An environmental and social risk and impact assessment has been carried out based on existing information and field verification site inspection. Information to be obtained in the Feasibility Study and Detailed Engineering Design shall be used to update the ESMP before project tendering. The current ESMP has been devised to ensure proper response with the identified project impacts, which may arise during the construction and operation phase of the project road.

Prior to the construction, the QAJ with the assistance of the CSC will do the following for the Project Road:

- Establish baseline information on the existing environmental conditions and parameters for the specific road project;
- Develop an environmental auditing protocol for the construction period as well as a detailed monitoring and management plan;
- Provide guidance and formulate a report outline that will be used by the Contractor as a guide in the preparation of monthly environmental and social progress reports; and
- Undertake regular and periodic monitoring of Contractor's implementation of the mitigation measures during the construction stage, consistent with the monitoring program, and submit monthly monitoring reports to QAJ.

The current ESIA/ESMP will be included in the design, build, and maintenance contracts. Based on the final detailed designs, the ESIA/ESMP will be updated by the QAJ. The technical specifications of the bid documents will clearly state that contractor will need to comply with the mitigation and control measures provided in the ESMP and other specific requirements as per Ministry of Ecology and Natural Resources (MENR).

8.6 Institutional Arrangements

8.6.1 Institutional Arrangements for Implementation of E&S Instruments during Construction Phase

A dedicated Project Implementation Unit (PIU) will be established for the implementation of the proposed project. The key players involved during construction phase of the proposed Project are the Committee of Roads (CoR), QAJAvtoZhol as employer / proponent, the Project Management Consultants (PMC), Construction Supervision Consultant, Third Party Validation Consultant and the Contractor(s). The roles and responsibilities of these organizations are outlined below.

The QazAvtoZhol will make Contractors bound through contract documents to implement the E&S instruments and other terms and conditions of the relevant Permits including NOCs from MENR and concerned agencies. The E&S instruments will be included as a clause of the contract documents. The following Table 8-1 presents the key institutions along with their roles and responsibilities.

Table 8-1 Institutional Arrangements Organizational Setup for the Implementation of E&S Instruments during ConstructionProject

Sr. No.	Responsible Agencies	Functions of project participant	Responsibilities of the project participant
1	Committee of Roads (CoR)	Coordination of activities on creation and development of a network of public highways of regional and district significance. Realization of investment and social policy in the road sector.	Exercises general control over the project implementation according to the concluded contracts for reconstruction, consulting services, as well as compliance with the deadlines of strategic documents envisaging the project implementation. Control over the effective utilization of project assets.
2	JSC "NC 'QAJAvtoZhol' (National Operator of highways of republican and international importance)	The authorities of the National Operator include the implementation of budget investment projects for the development of a network of public roads of international and republican importance on the basis of the state assignment.	General management of the project, including technical, legal financial aspects. Control over design, construction, reconstruction, repair, maintenance of highways of international and republican importance, development of roadside service facilities along the highways, etc. To implement the project, the staff will include specialists in environmental and social development, responsible for environmental and social risk management, supervising the preparation of ESF tools together with external consultants. Monitoring and reporting will be carried out. **Details are provided in Section i QazAvtoZhol / PIU.**
	QAJ Atyrau Regional Office	Pivotal role in ensuring that infrastructure projects in the Atyrau Region of Kazakhstan meet rigorous standards for safety, compliance, and performance.	Key role and responsibilities include: (i) quality assurance oversight; (ii) quality control implementation; (iii) documentation and reporting, including preparation of compliance and quality performance reports, and reporting incidents (if any) with root cause analysis; (iv) stakeholder coordination and resolving issues at local levels; (v) capacity building and training; and (vi) support to strategic corridors – corridor diagnostics and settlement level assessments
3	Project Implementation Unit (PIU)	Improvement of project implementation efficiency, support Committee of Roads activities in the management of large construction projects.	Overall project management, including technical, legal, E&S and Financial aspects. Overall responsibility for the implementation of the LMP, including coordination with the civil work contractors and CSCs. **Details are provided in Section i QazAvtoZhol / PIU.**

Sr. No.	Responsible Agencies	Functions of project participant	Responsibilities of the project participant
4	Construction Supervision Consultant (CSCs)	Evaluation and control of quality of work, materials used, coordination of engineering solutions, including adjustment of design solutions, if necessary, or if required to improve the performance contract.	Quality control of technical decisions made, E&S including aspects related to LAR, labor and working conditions, OHS, as required under the LMP. **Details are provided in Section iii Construction Supervision Consultant (CSC)**
5	General Contractor – contracting construction organization Construction organization that will perform construction works. To be determined on the basis of competitive tender for the procurement of goods and services	Implementation of construction works	Performance of quality works/services as per their respective contracts, including ensuring safe working practices, zero accidents and fatality requirements, management of labor and working conditions as required under the LMP including Labor GRM. **Details are provided in Section iii Contractor.**
6	Project Management Consultants (PMC)	Stationed at the project /site level and support QAJ's central and regional offices.	All aspects related to project management including Environmental and Social as well as LAR and Labor. **Details are provided in Section i QazAvtoZhol / PIU.**

Sr. No.	Responsible Agencies	Functions of project participant	Responsibilities of the project participant
6	Committee of Labor and Social Protection of the Ministry of Labor and Social Protection of the Population of the Republic of Kazakhstan (external to the project)	Formation and realization of state policy, implementation of inter-sectoral coordination and state management in the field of labor, including occupational safety and health; employment; Social security, including pensions and compulsory social insurance; social protection of persons employed in jobs with harmful working conditions.	Ensuring compliance with legislation, norms, and standards of the Republic of Kazakhstan. Periodic labor inspection and compliance assessment with regards to the Labor Code. Supervises project execution, enforces quality and warranty as well as statutory and safeguard compliance
7	Migration Service Committee of the Ministry of Internal Affairs of the Republic of Kazakhstan (external to the project)	Issuing and (or) extending permits for employers to hire foreign labor, as well as intra-corporate transfers	Compliance with legislation, norms, and standards of the Republic of Kazakhstan
8	Local executive authorities - Local Akimat (Atyrau Oblast, Makat and Dossor districts)[17]	Exercise of State authority in the regions.	Permits, document processing, etc. Facilitates land acquisition, community consultation, and grievance handling
	Ministry of Ecology and Natural Resources (MENR)	Central executive body responsible for state policy and management in environmental protection, green economy development, waste management (excluding municipal, medical, and radioactive waste), sustainable use of natural resources, geology, water resources, sanitation, forestry, biodiversity, and specially protected areas.	Compliance with MENR approvals and permits, monitor activities, and report regularly. Issues licenses and permits for plant operations and material sources, with strict oversight from regional and local offices.

[17] *Grievance Mechanisms: Local Akimats are frontline actors, but CoR sets the tone for responsiveness and transparency*

i. QaJAvtoZhol / PIU

QazAvtoZhol will establish a dedicated PIU for the implementation of the proposed project. QazAvtoZhol with the support of Project Management Consultant (PMC) will perform the following activities: (i) Establish communication and coordination with the Ministry of Environment and Natural Resources (MENR); (ii) Review, quality control, approval and submission of E&S instruments prepared for the Project, including ESMP as well as C-ESMP (iii) Ensure proper implementation of the ESMP requirements, LARP during the project implementation; (iv) Establish a GRM and track grievances/beneficiary feedback (in line with the SEP) during project implementation to use as a monitoring tool for implementation of project activities and environmental and social mitigation measures; (v) Supervise environmental protection and mitigation measures stipulated in the ESMPs; (vi) Monitor environmental and social impacts as part of the overall monitoring of ESMP, LARP, LMP, SEP implementation; and (vii) Promptly notify the Bank within 48 hours of any incident or accident related or having an impact on the Project which has, or is likely to have, a significant adverse effect on environment, affected communities, the public, or workers; (viii) Submit regularly monitoring reports on the environmental, social, health, and safety (ESHS) performance and analyze the efficiency of applied mitigation measures to minimize adverse E&S implications. Together with Project implementers and beneficiaries, the Committee for Roads with its QazAvtoZhol are responsible for implementation of the above activities.

With regard to ESMP implementation, the PMC (E&S Staff i.e. one environment specialist and one social specialist) will provide capacity building training to QazAvtoZhol on E&S aspects covered in this ESIA for the effective implementation of E&S requirements.

During implementation, the PMC will conduct regular monitoring using an E&S checklist based on the ESMP, which will be used by field monitor. Contractors, through dedicated ESHS staff, will implement mitigation measures and comply with national regulations. The PMC will ensure that all selected contractors, subcontractors (if any), and vendors understand and incorporate environmental and social mitigation measures relevant to them as standard operating procedures for civil works. The PMC will train contractors on environmental and social mitigation measures and ensure cascading training to subcontractors and vendors. QazAvtoZhol will ensure operation and maintenance entities are trained on relevant measures.

Upon completion of project activities, the PMC will review progress and confirm implementation of all E&S mitigation measures. For civil works, this includes monitoring site restoration and landscaping to ensure areas are returned to their pre-project condition and acceptable standards before contract closure. Any outstanding issues must be resolved before a project is considered complete. The PMC will then submit a completion report to AIIB describing final compliance with ESMP and related plans.

ii. Construction Supervision Consultant (CSC)

CSC will engage E&S team which include but not limited to the environment, social (also act as focal point for gender/ community engagement), OHS expert. CSC will be responsible for the following tasks:

- To oversee the performance of the Contractor to make sure that the Contractor are complying with the E&S instrument's requirements and all design parameters including quality requirements.
- Supervise civil works, ensuring compliance with C-ESMP, OCHS Management Plan (OCHSMP) and LMP.
- Ensure Contractors include an EHS section in all Method Statements by addressing relevant EHS issues for each construction task.
- Provide input, advice and approve method statements relating to ESHS issues.
- Ensuring that the day-to-day construction activities are carried out in an environmentally and socially sound and sustainable manner.
- Strong coordination with the Contractor and E&S staff- PMC.
- To supervise and monitor E & S activities being performed at site.
- To organize periodic E & S training programs and workshops for the relevant E & S staff including PMC and contractor.
- Ensure periodic reporting (monthly/quarterly) of ESMP to PMC and QazAvtoZhol.
- Suggest any additional mitigation measures (if required)

iii. Contractor

Contractor will be required to comply with the Project's E&S risk management documents and procedures including the EISA, LMP and local legislation. This provision will be specified in the contractor's agreements. Contractors will be expected to disseminate and create awareness within their workforce of environmental and social E&S risk management compliance for their effective implementation. Contractors will be responsible for the following:

- Comply with the Project's environmental and social mitigation and management measures as specified in ESMPs and contract documents, as well as national and local legislation.
- Take all necessary measures to protect the health and safety of workers and community members, and avoid, minimize, or mitigate any environmental harm resulting from project activities.
- Preparation of C-ESMP with site specific mitigation plans for approval of CSC before mobilization.
- Preparation of Occupational and Community Health and Safety Management Plan based on construction methods, site specific hazards.
- Implementation of C-ESMP and OCHSMP as well as mitigation, monitoring, and control measures proposed in the ESIA/ESMP.
- Prepare separate monthly reports for addressing environmental and social impacts and OCHS issues.

The following personnel are required in the contractor's environmental and social team:

- Environmental Specialist

- Social Specialist
- OHS Specialist
- Community Liaison/Communication Officer

The Contractor shall be responsible for ensuring that the environment, health and Safety Management is adhered to the approved C-ESMP and OCHSMP.

iv. Third-party Validation (TPV) Consultant

The TPV will be carried out through independent E&S Specialists / Consultants. They will monitor the environmental and social parameters and conduct field surveys at the construction sites to evaluate compliance level on intermittent basis. They will be engaged to conduct the external and independent monitoring of the implementation of the E&S instruments. This external monitoring agency is to evaluate the overall effectiveness of the E&S Instruments implementation and recommend changes if and when necessary to the ESHS Section.

Roles and responsibilities of TPV Consultant will be the following:

- Carry out independent monitoring at critical locations during construction phase and monitoring the implementation of E&S instrument at project area;
- Monitor GRM and resolution of complaints;
- Inform PMC, QazAvtoZhol and AIIB of any significant impacts arising during implementation; and
- Observe and amend/prepare (if required) corrective action plans.

The TPV Consultant will carry out external monitoring on implementation of C-ESMP, LMP, and OCHSMP.

8.7 Environmental and Social Management

8.7.1 Construction Stage Site Specific Management Plans

Contractor will be required to prepare site specific management plans and include in the C-ESMP, prior to his mobilization and commencement of construction works, for approval of CSC. The following, but not limited to site-specific E&S Management Plans shall be prepared, consulted on and implemented throughout the project cycle, based on the guidelines provided in this ESMP:

- Air Quality Management and Dust Suppression Plan
- Noise and Vibration Management Plan
- Construction Material and Transportation and Waste Management Plan
- Borrow Pit Management Plan
- Site Drainage Plan
- Occupational Health and Safety Plan (OHS)
- Community Health and Safety Plan
- Soil Management Plan
- Spill Prevention Plan

- Emergency Preparedness and Response Plan (refer to Annex- 7)
- Road Safety and Traffic Management Plan
- Labor Camp Management Plan
- Facility Layout Plans and Plants Operation Plan
- Chance Finds Procedures (refer to Annex-11.)
- Site Restoration/reinstatement Plan (incl., all disturbed lands)
- Other management plans, as relevant.

8.7.2 Mitigation Plan

The mitigation, safety inspections, and audit plans are the key element of ESMP to be prepared on the basis of impact and risk assessment. The Plan describes the potentially negative impacts and risk during construction and operation, lists mitigation and prevention measures to address the negative impacts and risks, and assigns responsibilities for implementation, prevention and monitoring and inspecting of these measures. The Mitigation and prevention Plan is given in **Table 8-2**. Contractor will make sure they present the implementation status of mitigation and preventive measures identified in this Table in every monthly report, with quantifiable information.

Table 8-2: Environemntal and Scoial Management and Monitoing Plan

Sr. No.	E&S Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
		Preconstruction / Design Phase			
1	**Water Quality** The proposed road will not cross any major river or other surface water bodies, however, there are few drains/nullahs. There might be change in water flow pattern and disturbance to water flow occurred.	• For the crossing of the nullahs and other similar structures bridges will be constructed and widened. • While culverts and other possible arrangement will be accomplished in design for the crossing of nullahs/ drains. • Bridges on water channels shall be properly designed to accommodate design flows considering design discharge for flood occurrence of 100 years;	• Confirmation of design incorporation. • Audits and Checks	CC, Design Consultant	Proponent / PIU/ PMC
2	**Public Utilities** Due to the proposed Project, public utilities such as transmission lines, storm water pipes, gas pipelines, etc. will be affected creating disruption of public services and inconvenience to the local residents and road users.	• The provision in the design and budget for the relocation of the existing utility infrastructures wherever required shall be finalized in consultation with the concerned department. Utilities relocation cost have been included in the LARP Document; and • All public utilities (e.g. electric lines, pipes, power/ telephone lines etc.) likely to be affected by the proposed Project will be relocated well ahead of time before the actual commencement of the construction works. • Timely public notification of unexpected disruption of services	• Compensation and Utilities relocation records	Concerned Agency	Proponent / PIU/PMC
5	**Construction Material Extraction/Use related E&S Impacts** Resources involved in the construction of proposed Project would include water, fuel and construction materials. Excessive water consumption by the construction staff may stress water resources. Construction materials and fuel for energy to be used in the construction of proposed Project are non-renewable and therefore their inefficient use will cause wastage of resources.	• Use potable water and mineral water bottles for drinking purpose; • Reduction of wastage of water through training of workers involved in water use; • Reuse of construction waste materials may be adopted wherever possible; • Diesel and fuels with low sulphur content will be used to operate construction machinery and equipment; • Efficient and well-maintained equipment and machinery will be used; • The equipment and machinery will be turned off when not in use; • Ensure adequate insulation to reduce heat loss through batching plants; • A good camp design and an efficient worksite management plan can help the contractor to reduce the water demand, wastewater and solid waste volumes to the lowest levels.	• Confirmation of design incorporation. • Audits and Checks	CC, Design Consultant	Proponent / PIU/ PMC
7	**Drainage** Improper design of storm water drainage and flood water discharge of the proposed Project may result in stagnant water on the road during operation due to which following impacts are expected to arise • Deterioration of road surface and reduction of its bearing capacity; • Inconvenience for commuters/pedestrians; • Stagnant water may provide the breeding ground for disease vector; and • Foul odour may be generated..	• Mitigation measures include the provision of appropriate drainage structures with appropriate design capacity to avoid urban flooding especially during the rains. • Proper slopes shall be incorporated in design to avoid the stagnant water on At-grade road surface.	• Confirmation of design incorporation	CC, Design Consultant	Proponent / PIU/PMC
9	**Flora** Activities such as installation of construction camps, construction of temporary roads and mobility of construction staff may damage the local vegetation/trees, shrubs and herbs, etc. As the heavy machinery and camps will be moved and installed, which require significant space due to which available vegetation is expected to be removed.	• The camps, mobility of machinery and construction of temporary road will be properly planned and well designed to avoid any loss to local green cover; • It is recommended to establish the construction camps where minimum or no vegetation exists; • Similarly, the alternate routes for roads and points for camps are recommended where no loss of vegetation is expected; and • The location of construction camp(s) will be selected so, as to have limited environmental effect during construction phase and to reduce the cost and land requirement.	• Conformation of design incorporation • Checks and audits of suitable place • Tree compensation record	CC, Design Consultant	Proponent / PIU/ PMC
10	**Fauna** As movement and installations of noisy machinery and vehicles during the pre-construction and mobilization phase will take place so noise and habitat loss is expected. The routes of fauna/habitats may be affected due to camps set-up and machinery movements and installations.	• The standard measures must be studied prior to construction phase to minimize noise due to machinery movements and installations; • Wildlife movements and routes must be considered (those areas having not tree/green cover) prior to construction phase; • The alternate routes and points are recommended to avoid any damage to locally available fauna; • Sand mining from river/nullah beds will not be allowed for construction works as it will have irreversible impact on the river/nullah morphology leading to impact on aquatic life;	• Conformation of design incorporation • Checks and audits of suitable place	CC, Design Consultant	Proponent / PIU/ PMC

Sr. No.	E&S Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
		• The construction camp management plan during the planning stage must consider fencing and gating to check the entry of animals in search of eatable goods; and • Similarly, waste management plan of the camps must be considered at the planning stage to prevent wild animals and birds.			
		Construction Phase			
1	**Soil Erosion and Contamination** Soil erosion may also occur in the workshop areas as a result of improper drainage system of equipment washing-yards and improper management of construction activities. Land may be contaminated due to the spillage of chemicals, fuels, solvents, oils, paints, concrete, solid waste generated at campsites etc.	• Good engineering practices will help to control or minimize the soil erosion both at the construction sites and in peripheral areas. • All the disturbed areas need to be protected against soil erosion by stripping and stockpiling of all the available topsoil for later re-vegetation. • Site restoration plan for the project will be strictly followed. • The Contractors will be required to instruct and train their workforce in the storage handling and management of materials and chemicals that can potentially cause soil contamination; • Material Safety Data Sheets (MSDS) will be strictly followed during handling and storage of chemicals; • Soil contamination due to concrete transportation and solid waste will be minimized by placing all containers in casings.	• Visual observation and photographic record • Site restoration and rehabilitation plan implementation	CC	Proponent / PIU/ PMC, CSC
3	**Climate Change** Based on the assessment, river flood, urban flood, water scarcity, extreme heat and wildfire are identified as high risk impacts. Apart from the above, the climate change due to global warming, may result • Extended summer season and reduction in snow falls; • Increased natural hazards such as, extreme/unpredictable rainfall events, wind storms, droughts and wildfire; • Increased damages to transportation infrastructure; and • Rising temperatures may worsen working conditions for project workers, especially during the summer, due to heat waves	• Regular motioning of the vehicles for engine efficiency; • Avoid idling of construction vehicles; • Alternative energy resources shall be considered where possible; and • Order of the Minister of Health of the Republic of Kazakhstan (Hygienic Standards for Physical Factors Affecting Humans), WHO, IFC guidelines/standards whichever stringent one applicable to gaseous emissions generated by construction vehicles, equipment and machinery shall be enforced during construction works. • Bridges on water channels and road shall be properly designed to accommodate design flows considering design discharge for flood occurrence of 100 years and recent highest flood.	• Visual observation, checks and audits • Deign Incorporation •	CC	Proponent / PIU/PMC, CSC
3	**Green House Gas Emission** The main sources of greenhouse gases (CO_2, CH_4, NO_x etc.) during the construction activities of the proposed Project will include both mobile and stationary sources. Based on the estimation, the total Lifecycle GHG emissions are 174,000 tons CO_2e. The construction phase GHG emissions are 36,105 tons CO_2e/annum.	• Optimization of the detailed design and construction methods to reflect the carbon reduction hierarchy (design-based mitigation) • As much as possible, incorporate material resource efficiency and waste minimization best practice into the detailed design (design-based mitigation). • Select and engage with material suppliers and construction Contractor(s) taking into account their policies and commitments to reduction of GHG emissions, including embodied emission in materials. • Contractor(s) must ensure sustainable practices to reduce GHG emissions	• Visual observation, checks and audits, • Regular environmental monitoring, sampling and testing reports • Vehicle inspection record • Landscaping Record	CC	Proponent / PIU/ PMC, CSC
4	**Ambient Air Quality** Air quality will be affected by fugitive dust emissions from construction machinery; dust from the unpaved surface and construction vehicles. Emissions may be carried over longer distances depending upon the wind speed, direction, temperature of surrounding air and atmospheric stability. The operation of an asphalt plant causes the emission of many different pollutants. The most common pollutants emitted from hot mix asphalt plants are particulate matter (PM_{10}), sulfur dioxide (SO_2), nitrogen oxides (NOx), volatile organic compounds (VOCs), and carbon monoxides (CO).	• All vehicles, machinery, equipment and generators used during construction activities will be kept in good working condition and be properly tuned and maintained in order to minimize the exhaust emissions; • Open burning of solid waste from the Contractor's camps and at construction site will be strictly banned; • Regular water sprinkling of the site or use of chemical dust suppressants will be carried out to suppress excessive dust emission(s); • Regular monitoring of air quality in accordance with Order of the Minister of Health of the Republic of Kazakhstan (Hygienic Standards for Physical Factors Affecting Humans), WHO, IFC guidelines/standards whichever stringent one will be ensured.	• Visual observation • Regular environmental monitoring, sampling and testing reports • Vehicle maintenance records • Water sprinkling records.	CC	Proponent / PIU/ PMC, CSC
5	**Noise and Vibration** Noise and vibration generated by the construction machinery during the construction stage is likely to affect the settlements in AOI particularly the sensitive receptors.	• According to the Hygienic Standards for Physical Factors Affecting Humans, Order of the Minister of Health of the Republic of Kazakhstan dated February 16, 2022 No KR DSM-15, the maximum permissible noise level is 70 dBA.	• Physical observation	CC	Proponent / PIU/ PMC, CSC

Sr. No.	E&S Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring

	The noise will be produced due to the operation of construction machinery and equipment. Sources of noise and vibration during construction are heavy machinery such as bulldozers, excavators, stabilizers, concrete mixing plant, pneumatic drills, stone crushers, asphalt plants and other equipment's..	• The following is a list of ways to control noise levels at the worksite of the proposed Project:
		  • Quieter Equipment
		  • Modifying Existing Old Equipment
		  • Barrier Protection
		  • Work Activity Scheduling
		  • Maintenance
		  • Noise Perimeter Zones
		• The following is a list of ways to control noise levels at the worksite of the proposed Project:
		  • Wave Barriers
		  • Vibration Reduction for Impact Pile Drivers
		  • Vibration Reduction Measures for Other Construction Equipment
		  • Vibration Reduction for Construction Vehicle Operations
		  • Time Management for Heavy vibration generating operations
			• Regular environmental monitoring, sampling and testing reports
			• Vehicle maintenance records		

6	**Construction Camps/Camp Sites** Due to the construction camps[18], loss of vegetation and dis-satisfaction of rehabilitation measures during and after completion of construction phase may occur. These impacts may include waste generation, soil pollution, groundwater pollution, dust emissions, etc.	• The contractor(s) will provide plan to NC QazAvtoZhol JSC and PMC for removal & rehabilitation of site upon completion; • Photographical and botanical inventory of vegetation before clearing the site; and • Compensatory plantation to be scheduled when construction works near end	•		Proponent / PIU/ PMC, CSC
7	**Wastewater Generation at Construction Camps** Wastewater will be generated at the construction camps and from construction activities. If the generated wastewater is not properly treated or disposed of, this may contaminate the surface water sources such as canals, distributaries and minors apart from soil contamination. Water from dewatering activities (during rainy season) has the potential to contain suspended solids and oil and grease and if disposed of untreated may affect the soil quality.	• To dispose the liquid waste generated from the construction activities, the following steps will be taken by the Contractor: • Domestic and chemical effluents from the construction camp will be disposed by the development of on-site sanitation systems i.e. septic tanks. • Proper monitoring to check the compliance of compliance with the environmental requirements of the legislative and regulatory acts of the Republic of Kazakhstan (Water Code, 2003; RND 1.01.03-94, 1994), internal documents/standards of the company, WHO, IFC guidelines/standards whichever stringent one will be carried out; and • Sewage from construction camps will be disposed of after proper pre-treatment and processes such as soakage pit.	• Visual observation • Regular environmental monitoring, sampling and testing reports • Waste Management plan implementation	CC	Proponent / PIU/ PMC, CSC
8	**Solid Waste Generation at Construction Camps** The approximate volume of waste generated will be: • 2026 - 2009.52 tons, of which hazardous - 0.07 tons, non-hazardous - 2009.45 tons. • 2027 - 2012.81 tons, of which hazardous - 0.08 tons, non-hazardous - 2012.73 tons; • 2028 - 2012.68 tons, of which hazardous - 0.08 tons, non-hazardous - 2012.60 tons; • 2029 - 2008.69 tons, of which hazardous - 0.29 tons, non-hazardous - 2008.40 tons; The major components of the solid waste will be garbage, putrescible waste, rubbish and small portion of ashes and residues. Other type of wastes may include inorganic construction wastes.	• All the solid waste from the camps will be properly collected at source and disposed of through proper solid waste management system; • Secondly, the disposal site must be located away as far as practical from populated areas and regions that have a high density of Wildlife; • Toxic waste will be handled, stored, transported and disposed separately; • The waste will be properly sealed in containers with proper labels indicating the nature of the waste; and • Solid waste will be segregated at source so that it can be re-used or recycled.	• Visual observation and photographic record. • Waste Management plan implementation	CC	Proponent / PIU/ PMC, CSC
9	**Waste Generation at Construction Site** The construction waste will include wastewater, oil spillage from machinery and solid waste (damaged or spoiled materials, temporary and expendable construction materials etc.). The handling and storage of oil and other hazardous waste will be a source of environmental pollution during the excavation, foundation, levelling, carpeting and pavement activities.	• Waste Management Plan will be developed to implement an efficient and responsive solid waste management system during construction phase. • Solid waste generated during construction will be safely transferred to the designated waste disposal sites of nearby urban areas/population centres after getting the prior approval from the relevant authorities and the approved contractor will provide a proper waste management plan for safe transfer as well as disposal of this waste; and	• Visual observation and photographic record. • Waste Management	CC	Proponent / PIU/ PMC, CSC

[18] The location of construction camps will be provided by the Contractor in coordination with the Client before mobilization.

Sr. No.	E&S Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
		• The site will be restored back to its original conditions after construction completion.	plan implementation		
10	**Quarry and Borrow Areas / Pits** Quarry and Borrow area / pits and associated excavation activities from the existing sources for material may result in land disputes, soil erosion, loss of potential cropland, loss of vegetation, landscape degradation, and damage to road embankments. Borrow/ Open pits may also become potential sources of mosquito breeding and may prove hazardous to humans, livestock and wildlife. This will also degrade hygienic condition of the Project Area.	• As recommended above, no new quarry area and borrow area will be selected. However, necessary permits will be obtained for collection of material from any existing quarry and borrow area / pits from the competent authorities; • In quarry area / borrow pits, the depth of the pits will be regulated so that the sides of the excavation will have a slope not steeper than 1:4; • Borrow pits / quarry area will be used for construction waste, but during the excavation, top 20 cm soil cover will be preserved for vegetation after the filling of the pits/areas. This is the best way to restore the flora of that area; and • Further, contractors who are supplying and purchasing construction materials will ensure availability of appropriate environmental permits from the competent authority. Contractor(s) will also conduct an E&S due diligence before sourcing the material from the available borrow area / quarries.	• Visual observation and photographic record • NOC record of permits • Check and audits	CC	Proponent / PIU/PMC, CSC
11	**Occupational Health and Safety** Occurrence of accidents / incidents and other natural emergencies during the construction stage is a common phenomenon and workers as well as locals will be more prone to serious accidents.	• Ensure compliance with Order No. 1019 “Occupational Health and Safety Training Procedure and Timelines” and Labour Code of the Republic of Kazakhstan (No. 414-V, 23 November 2015, as amended); • The Contractors/Sub-Contractor need to be evaluated by Executing and Implementing Agencies (EAs and IAs) on H&S aspects during the bidding stage. • Safety precautions for the construction workers, Training of workers in construction safety procedures and use of Personnel Protective Equipment (PPE) will mitigate this impact. • QazAvtoZhol needs to ensure strict enforcement of safety rules and regulations. • QazAvtoZhol, CSC and contractors need to provide guaranteed provision of a safety budget and the introduction of safety incentives on penalties to construction workers. • Establish health and safety committees including Project Director, Resident Engineer, and Environment staff of the EA, CSC and Contractor responsible for H&S arrangement and monitoring implementation. • Establish Standard Operating Procedure (SOP’s) for health and safety incidents	• Implementation of HSE Plan • Use of PPEs • Training Records • Work permits • Implementation of Emergency response plan and disaster management plan in case of natural disaster occurrence	CC	Proponent / PIU/ PMC, CSC
12	**Community Health and Safety** The construction activities and vehicular movement at construction sites may result in roadside accidents deteriorate quality of water resources, cause air/dust emissions, noise pollution, vibrational impact and spread of different transmittable diseases due to outside labor	• Proper control on construction activities, restrict entry of labor with different transmittable diseases, adopt mitigations for dust, noise & vibration impacts and create awareness about road safety will be ensured. • Timely public notification on planned construction works; • Close consultation with local communities to identify optimal solutions for diversions to maintain community integrity and social links; • Traffic Management Plan and appropriate road safety measures will be implemented to avoid traffic accidents, jams/public inconvenience	• Implementation of HSE Plan • Use of PPEs • Community concerns record • Medical reports of worker	CC	Proponent / PIU/PMC, CSC
13	**Workers’ Employment Rights** Labor rights and non-discrimination at workplaces Non-compliance with regards to the terms and conditions of employment: Risks of not complying with labor code, paying workers inadequate rates, discrimination of women, those with disabilities, foreign workers or other vulnerable persons.	• Periodic labor audits covering all workers, including those contracted by sub-contractors and foreign workers hired through intermediate agencies. • Workers’ grievance mechanisms, including peri odic consultations with the workers’ associations if applicable or workers’ representatives.	• Grievance redress record • Consultation record • Training record • Dissemination relevant material.	QAJ/ PIU/ CC	Proponent / PIU/ PMC, CSC
	Worker accommodation building specifications (camps)	Build camps to the camp specifications for production accommodation (In accordance with the Order of the Ministry of Public Health of Republic of Kazakhstan dt July 26, 2022 # КР ДСМ-67). In addition, the benchmarks of the IFC Guidance Notes on “Workers’ accommodation: processes and standards”, will be followed. In the event of new construction, the following Construction phase plans will be applied as necessary: • Minimum Health Requirements for Project Execution • Minimum health requirements for women-employees, including a female nurse in the camp • Minimum Camp Specifications for Operations Accommodation including separate sanitation/hygiene spaces for women’s	• Contractor Onboard documents. • Monitoring reports.	QAJ/ PIU/ CC/ Contractor	

Sr. No.	E&S Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
		• Contractor's Occupational Health and Safety Plan including women's health • Emergency Response Plan • Security Management Plan.			
	Camp management practices.	• Ensure that the contractor is used to managing camps, they must have a proven track record. • Implement an induction program to be attended by all residents that covers at least the following: ○ Camp rules and regulations ○ Code of conduct ○ Camp grievance mechanism ○ Camp disciplinary procedure ○ Complaints system for food, dining, housekeeping and maintenance ○ Camp committee system ○ Community relations and cultural awareness ○ Health, safety and security	Monitoring Reports	PIU/CC/ Contractor	Proponent / PIU/PMC, CSC
14	**SEA/SH** Risk of occurrence of GBV related issues occurring at the workplace, risk of occurrence SEA/SH incidences affecting the host community.	• The Contractor must arrange for trainings on SEA/SH, which may also cover prevention of violence against children campaign to be provided by competent providers in cooperation with the authorized agencies. • The cost of the campaign shall be funded by the Contractor and/or provisional sum if included in the bill-of quantity. The contractor shall ensure that at least one refresher for workers is conducted each month. • QAJ, in collaboration with contractors and other stakeholders such as local government and SEA/SH service providers, will ensure that the project grievance redress mechanism (GRM) and workers' GRMs include protocols, training, and accountability mechanisms as relevant to ensure that grievances related to SEA/SH are handled with due confidentiality, adhering to the principles of protection to the survivors and ethical standards. • Additional support could be provided by the con tractors to the service providers (i.e., NGOs, safe houses, government departments) if available resources are limited and/or if additional capacity is required to manage potential SEA/SH risks properly. • Internal GRM functions will be strengthened to ensure timely, impartial, independent and fair investigations for SEA and SH that should be safe, gender-sensitive, and appropriate to the context; and thus, maintaining neutrality and confidentiality before and during deliberations	• Grievance redress record Minutes of meetings of community/ gender consultation • Training records • Dissemination of relevant material.	QAJ/PIU CC	Proponent / PIU/PMC, CSC
15	**Community Relations/ Interface** Risk of Project related complaints and grievances unresolved: − Potential complaints from Project-Affected Persons due to construction works, including damage to property, access restrictions and usage.	• General public should be sufficiently informed prior to construction about the project including the process of GRM for their relevant concerns. Relevant actions to prevent issues with the community based on the consultations during the project preparation must be considered as a preventive measure. • Contractor will cooperate with the QAJ/ PIU and its CSC in the establishment of GRM and comply with all the requirements in resolving grievances.	• Grievance redress record • Minutes of meetings of community/ gender consultation	CC	Proponent / PIU/ PMC, CSC
16	**Influx of non-local labor** Deprivation of job opportunities to local population − Hostility with local residents, resulting in tension. – Crowding basic services, particularly access to water, electricity, and healthcare.	• Sustain community engagement on labor management and establish a communication system with the host community to alert the project if there are emerging issues. • Train the project's workers on codes of conduct, as well as provide cross-cultural awareness training and conduct with the local community. • Reduce labor influx as much as possible promoting local recruitment. • Prioritize local labor for skills that can be sourced locally.	• Minutes of meetings of community Consultation Dissemination relevant material. • Training records.	QAJ/PIU/ CC	Proponent / PIU/PMC, CSC

Sr. No.	E&S Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
			• Grievance redress record		
17	**Notified Physical Cultural Resources** No notified physical cultural resources as listed in UNESCO World Heritage list of archeological sites are coming in the RoW of the proposed project. Hence, insignificant impact on the notified archaeological site has been assessed during the construction of the proposed project. At km 349-544, the road crosses the burial place of Onay Ata. Many people make pilgrimages to his tomb in the hope of finding peace of mind and physical health. The mausoleum on the burial site of the saint was built in 1999 on the initiative of Fariza Ongarsynova.	• No notified archaeological site will be affected due to the implementation of the proposed project. However, the Contractors will be required to train the construction crews and the site supervisors in archaeological site recognition, conservation procedures and temporary site protection. • In case of a chance archaeological find during excavation, the Contractors must halt work at the site immediately and notify the concerned authority. • The project's technical design will ensure the preservation of the cultural site by implementing measures to avoid any direct impacts during all phases of the project. This includes ensuring that the site will be physically avoided and that appropriate buffer zones are established. Protective measures will be implemented in accordance with national heritage protection regulations and international best practices, such as those outlined in IFC Performance Standard 8, to safeguard the cultural value of the site throughout the project's life cycle.	• Record Register • Consultation record of Concerned Cultural and Archaeological Department	CC	Proponent / PIU/ PMC, CSC
18	**Traffic related Impacts** Due to the proposed construction activities, proper traffic management may pose a challenge in the Project area, particularly, where the construction of Project will pass through the towns and settlements; traffic problems may arise for the commuters and transporters travelling to the proposed areas. The movement of vehicles along the haulage routes will cause soil erosion, debris flow, dust emissions etc.	• Movement of vehicles carrying construction materials and equipment/machinery will be restricted during the daytime. • Traffic Management Plan will be implemented to avoid traffic accidents, jams/public inconvenience. • Measures of soil erosion and dust emission (as mentioned earlier) will be followed	• Vehicle maintenance record • Training record • Implementation of TMP • Regular visual observations	CC	Proponent / PIU/ PMC, CSC
19	**Natural and Man-Made Disasters** Natural disasters (earthquakes) and accidents such as fire, falls, slips and trips may result in injuries, financial losses and may even lead to deaths.	• An Emergency Response Plan (ERP) for earthquakes and manmade disasters will be developed by the Contractor in coordination with PMC & NC QazAvtoZhol JSC and will implement in close consultation with the RESCUE Services and other concerned departments; • Training of the Contractor, PMC and NC QazAvtoZhol JSC staff and employees regarding the emergency procedures and plans will be regularly conducted; • Emergency numbers will be clearly posted at all disposal stations; • Minor incidents and near misses will be reported, and preventive measures will be formulated accordingly by the PMC and NC QazAvtoZhol JSC Management;	• Training Record Register • Emergency Response Plan (ERP) implementation. • Minor incidents and near misses reports	CC	Proponent / PIU/PMC, CSC
20	**Biodiversity** There are no rare and endangered plants in the zone of influence. There are no natural food and medicinal plants. According to the cadastral of accounting documents, there is no agricultural land in the area under consideration. There are no permanent habitats of birds and animals, relict plantations, historical monuments and cultural monuments. The fauna of the area under consideration is represented mainly by small rodents, reptiles and birds. The territory of the planned activity is not the habitat of bird species listed in the Red Book of the Republic of Kazakhstan. The proposed land is not related to forestry, and (or) withdrawal of lands of the state forest fund for state needs is not required. Thus, the activity of the object does not have a significant impact on the flora and fauna. Changes in the vegetation cover (species composition, condition, productivity of communities, assessment of genotype adaptability, economic and functional significance, pollution, pest infestation) in the area of the facility are not expected, and therefore there are no consequences for the life and health of the floral and faunal population.	• Open fires will be banned in the area to avoid hazards of fire in the area; • Construction vehicles, machinery and equipment will remain confined within their designated areas of movement; • Contractor shall provide gas cylinders at the camps for cooking purposes and cutting of trees/bushes for fuel shall not be allowed. • Care shall be taken during construction activities for avoiding purposely or chance killing of animals; • If found any wild species and habitat during construction, that must have dealt carefully and local wildlife department officials will be called; • Hunting, poaching and harassing of wild animals shall be strictly prohibited, and Contractor shall be required to instruct and supervise its labor force accordingly and clear orders will be given in this regard; • The Contractor must be held responsible for instructing his work force accordingly and for enforcing this restriction. In addition, this shall have to be controlled by the Wildlife Department; • Provision of culvert/tunnel for the movement of different faunal species across the propose road present in the Project Area; • Special measures shall be adopted to minimize impacts on the wild birds, such as avoiding noise generating activities during the critical periods of breeding; • The contractor will be instructed to avoid the wastewater and the chemical spills into the fresh water;	• Visual observations • Regular monitoring, audit and checks	CC	Proponent / PIU/ PMC, CSC
Operation & Maintenance Phase					

Sr. No.	E&S Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
1.	**Soil Erosion and Degradation** In the operational phase of the Project, impacts on soil in a form of disruption due to soil erosion may occur, as well as degradation of soils and aquifers by direct and indirect pollution through vertical infiltration of fuel, oil or chemicals due to the water runoff from the road.	• Monitor and maintain slopes along the highway alignment (embankments). • Storm water drains and oil traps must be regularly serviced and maintained to ensure that they remain effective and do not become saturated and or blocked over time. • Emergency response provision must be made for effective countermeasures in the event of a spill on the roadway and the containment and removal of the same.	• Visual observation • Audits and Checks	Proponent	
2.	**Air Quality** Improvement in road condition will help to reduce traffic related emissions in the short term by allowing a smoother traffic flow. However, in the longer run, increased traffic levels may lead to higher values of emissions.	• Greenery and vegetation - planting trees and shrubs along roads can help absorb pollutants and improve air quality. • Regular maintenance of the highway – ensure good and sustainable maintenance of the roads that will contribute to reducing the dust emissions, by: o Develop and implement long-term maintenance plans, o Budget allocation, o Ensure that maintenance teams are well-trained and equipped with the necessary skills and knowledge. • Air Quality Monitoring – establish air quality monitoring systems along the highway to identify pollution hotspots and take corrective actions.	• Visual observation • Regular environmental monitoring, sampling and testing reports	Proponent	
3.	**Green House Gas Emission** Total GHG emission for 2029 and 2048 are estimated which are 287.79 tons CO_2e/day and 1,778.18 tons CO_2e/day for the entire section 87 km. Hence, total operation phase GHG emissions are 291.85 tons CO_2e/day for 2029 and 1,782.24 tons CO_2e/day for 2048 considering the lighting, maintenance activities and traffic based emission.	• Optimise the lighting (energy-efficient lighting) by specifying requirements into the detailed design stage (design-based mitigation). • Operate, maintain and refurbish the Project using best-practice efficient approaches and equipment. • In addition, at national level, the use of low emission fuels and low emission vehicles should be promoted.	• Visual observation • Regular environmental monitoring, sampling and testing reports	Proponent	
4.	**Drainage** During the operational phase, poor maintenance of the road drainage system, particularly during the monsoon season can cause nuisance to the travelers and public due to flooding in the existing drainage structure In case of chocking of road drainage, the increased surface runoff due to heavy rains will accumulate at the surface and can cause traffic jams.	• The impact can be controlled/reduced by timely and continuous maintenance/ cleaning of the drainage system; and • Placement of sign boards instructing not to dispose of solid waste to avoid chocking of drain along the road alignment.	• Regular monitoring, audit and checks	Proponent	
5.	**Surface Water Bodies** The release of pollutants during the operational phase into surface water might result from discharge of storm water, possible leakage of fuel and/or oil from the vehicles using the road. During the regular maintenance of the highway, there may be a need to use construction and maintenance machinery, with an associated possible impact to surface water.	• Storm water drains and oil traps must be regularly serviced and maintained to ensure that they remain effective and do not become saturated and or blocked over time; • Emergency response provision must be made for effective countermeasures in the event of a spill on the roadway and the containment and removal of the same.	• Regular monitoring, audit and checks	Proponent	
6.	**Noise and Vibration** The movement of vehicles and usage of horns will create noise which will be a hazard for the nearby residents/built-up areas. Given that the noise levels are predicted to exceed the defined limits the impact magnitude is considered to be high for houses/facilities in the most affected locations (within the zone of 200 metres from the Project). Unlike the construction noise which will only occur during the day, noise from traffic will become a permanent feature of the environment and will occur throughout the night too, although at a lower level of intensity.	• Noise modeling shall be carried out before completion of construction to provide the effective measures before start of O&M phase; • Use of horn should be strictly prohibited in the close proximity of the built-up areas and sensitive receptor; • Proper signboards should be installed to ensure reduce noise levels in the Project area; • Enforcement and penalties against traffic rules violators; and • Noise barriers may be installed/constructed near the built-up areas	• Physical observation • Regular environmental monitoring, sampling and testing reports • Vehicle maintenance records	Proponent	
7.	**Road Safety** On a broader thought, the road safety would improve with the implementation of proposed Project with consideration of road safety measures. However, it is also anticipated that the improved road conditions will facilitate higher speeds which may pose issues like traffic accidents.	• Strict enforcement of speed limits, installation of speed guns and channelization of traffic with respect to categories (heavy vehicle traffic and light vehicle traffic), should be ensured for the smooth flow of traffic moving from major road crossings. Enforcement of penalties for the violators will reduce the significance of this impact.	• Regular traffic surveillance	Traffic Police/ Relevant Department	
8.	**Impact on Biodiversity** No additional habitat fragmentation will occur since the Project aims to reconstruct and upgrade an existing road. The Project area is not used by migratory species and the existing road does not result in barrier effect	• Afforestation with native species of plants (trees and herbs) along the alignment. The planting may also be designed to contribute to the mitigation of visual impacts and impacts on the landscape character. • Monitoring of the road killed birds and mammals to access the vehicle collision accidents and the impact on the populations.	• Visual observations • Audit and Checks	Proponent	

Sr. No.	E&S Impacts	Mitigation Measure	Performance Monitoring Indicators	Responsibility	
				Implementation	Monitoring
	During the operational phase the road collision risk is the highest threat in particular to amphibians and reptiles as well as to particular mammal species.	• The road litter should be minimized, as it can attract scavengers and predators which can pose a threat and have a huge impact on the ground nesting birds. • Regular removal of food, carcasses and other organic residues from the road to minimize attraction of mammals. • Monitoring and maintenance of the fence of the highway to prevent collisions of mammals with vehicles.			

9.	**Occupational Health and Safety**
	Occupational health and safety risks during operational phase will be the same as during the construction phase. However, they will be limited to the operational and maintenance activities for the highway, which will be occasional and/or involve a limited number of workers.
		• QazAvtoZhol in their capacity as Project Operator will need to implement its own management procedures and actions as part of the company's Environmental and Social Management System (ESMS), and require the Contractor(s) to implement their own plans, aligned with QazAvtoZhol's ESMS in the following areas, at a minimum:
		  • Occupational Health and Safety
		  • Grievance Mechanism for Workers
		  • Local Recruitment and Development
		  • Labour and Working Conditions
		  • Supply Chain Management
			• Visual observation
			• Audits and Checks
				Proponent	

8.7.3 Project Induced Labor Influx Management Plan

The plan is to recruit one main Contractor for the entire project. The project expects to involve direct workers, contracted workers and primary supply workers. It is estimated that approximately 1,118 direct jobs are expected to be created during the construction phase with peak labour of 447. Most unskilled positions are likely to be sourced from the local areas and neighboring communities, thereby sharing project benefits with communities. Many of the workers are expected to be employed from the existing highway reconstruction projects, therefore, reducing new workers coming into the area.

The construction work, with the promise for more development in the project locations – particularly in selected central places/markets, may further attract diverse groups of in-migrants, namely, families/followers, traders/entrepreneur, small business/shop owners, suppliers of construction-related materials and various other service providers will move into the area to benefit from the project construction for more than two years period. This may lead to potential negative socio-cultural impacts, including a wide range of concerns such as gender-based violence, sexual exploitation and abuse of women/children, generating tensions between the local residents of the remote and isolated and rather conservative communities and the in-migrant groups.

The Contractor will prepare a labor influx management plan in line with AIIB's guidelines, covering measures or strategies to (i) raise awareness and engage all stakeholders (e.g., project management, contractors, consultants, community groups/leaders, local NGOs) in responding to the social and cultural risks to local communities; (ii) inter-cultural understanding with a view to minimize the risks; (iii) better management of construction and labor camps; (iv) development and implementation of code of conduct for locals and in-migrant workers (for instance, respect to local values and cultures; workers strictly forbidden to establish contacts and relationship with local women; workers must not leave camps without prior permission from the supervisors; and workers or local resident must report any suspicious contact or activities to the camp officers); and (v) improvement in local law and order to ensure positive environment and build a community of mutual trust and respect for project construction.

8.8 Environmental and Social Monitoring

Environmental and Social monitoring provides timely and useful information to the Project management and implementation agencies. Conceptually, "monitoring" means to check and balance, on a regular basis, the status of the Project activities and realization of various developmental targets during E&S preparation, pre-construction, construction and O&M. It helps in timely identification / analysis and removal of the bottlenecks and expedites actions. Certain environmental parameters (physical, ecological and social) are selected and quantitative analysis is carried out. The results of analysis will be compared with the guidelines; standards and pre-Project condition to investigate whether the ESIA/ESMP and its implementation are effective for the mitigation of impacts or not. The objectives of environmental and social monitoring plan during the pre-construction, construction and O&M phases will be as follows:

- Monitor the actual Project impacts on physical, ecological and socio-economic receptors;

- Recommend mitigation measures for any unforeseen impact or where the impact level exceeds the anticipated level in the ESIA/ESMP;
- Ensure compliance with legal and community obligations including safety during construction and O&M phases;
- Ensure the safe disposal of excess construction materials, solid waste, water and wastewater and gaseous emissions;
- Appraise the adequacy of the ESIA/ESMP with respect to the Project's predicted long-term impacts on the area's physical, ecological and socio-economic environment;
- Evaluate the effectiveness of the mitigation measures proposed in the ESIA/ESMP and recommend improvements in ESIA/ESMP, if required; and
- Compile periodic incidents / accidents data to support analyses that will help to minimize future risks.

QazAvtoZhol with the support of PMC will be responsible for all the monitoring activities (compliance monitoring and effect monitoring). All the findings and results in the form of monitoring report will be finally shared with MENR, respective agencies as well as AIIB as per the reporting mechanism.

Compliance Monitoring

The compliance monitoring of the proposed Project activities is principally a tool to ensure that the environmental and social control measures identified are strictly adhered to during the Project execution. The compliance monitoring will be conducted by the E&S Staff of CSC. Various aspects of the ESIA/ESMP compliance monitoring will be to:

- Systematically observe the activities undertaken by the contractor(s) or any other persons associated with the proposed Project;
- Verify that the activities are undertaken in compliance with the ESIA/ESMP;
- Document and communicate the observations to the CSC and E&S staff of PMC, so that any corrective measures, if required, can be taken in a timely manner;
- Maintain a record of all incidents of environmental and social significance and related actions and corrective measures;
- Maintain contact with the communities, solicit their views and concerns, and discuss them during the monthly meetings; and
- Prepare periodic reports of the environmental and social performance of proposed Project.

Effect Monitoring Strategy

ESIA/ESMP anticipates the impacts of the proposed Project on the basis of information available at the time of conducting the assessment and the natural processes that link various environmental and social parameters. Based on assessment, mitigation measures are introduced such that the predicted residual effects do not exceed acceptable levels. Consequently, it is possible that even if the mitigation measures are implemented fully, the negative impacts of the Project could exceed predicted levels or acceptable limits. In order to address the above concerns, effects monitoring will be undertaken during the Project activities,

with the overall objective of proper management of environmental and social risks and uncertainties. Broadly, effects monitoring has the following objectives:

- To verify that the impacts of the proposed Project are within acceptable limits, thus establishing credibility (public assurance);
- To immediately warn the PMC and QazAvtoZhol of unanticipated adverse impact or sudden changes in impact trends so that corrective actions can be undertaken, which may include modifications in the proposed activities, or the inclusion of modified or additional mitigation measures;
- To provide information to plan and control the timing, location, and level of certain Project activities so that the effects are minimized; and
- To facilitate research and development by documenting the effects of the proposed Project that can be used to validate impact-prediction techniques and provide a basis for more accurate predictions of future projects.

The contractor(s) is mainly responsible for effect monitoring, which is being supervises by the CSC and monitor by PMC at each site, and for the entire Project. The effect monitoring program has been designed carefully considering the identified impacts and some additions or deletions probably in frequency may be taken up in this program after learning lessons from one-year operation of the Project through Change Record Register. **Table 8-3** provides environmental and social effect monitoring schedule for pre-construction, construction and operations stages of the proposed Project.

Table 8-3: Monitoring Plan as per ESSs

Sl.	Parameters / Receptor	Monitoring Parameters / Performance Indicator	Location[19]	Monitoring Mechanism	Monitoring and Reporting Frequency	Responsibility	
						Implementation	Monitoring
1.	Water Resources/ Water Quality	Monitoring of all parameters of effluent from construction sites as per stringent environmental quality standards.	Proposed Project routes. • Major receptor, i.e., residential areas etc. within the RoW/AoI. However, estimated sampling points will be verified at construction stage. Other proposed effluent discharge points are: • Contractors camps • Concrete preparation plants • Fuel (Petrol. Oil and Grease) products storages. • Vehicle and machines repairing and servicing yards.	Visual checks of laboratory activities Discrete grab sampling and laboratory testing of water samples by MENR approved Laboratory for monitoring.	• Once before the start of construction by activity monitors and reported; and • On quarterly basis during the construction. • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
2.	Drinking Water	Monitoring of all parameters of drinking water as per stringent environmental quality standards.	Proposed Project routes. • Major receptor i.e. construction site, camps area and nearby residential areas within the RoW/AoI. However, estimated sampling points will be verified at construction stage.	Visual checks and monitoring of laboratory activities Discrete grab sampling and laboratory testing of drinking water samples by MENR approved Laboratory for monitoring.	• Once before the start of construction by activity monitors and reported; and • On quarterly basis during the construction. • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
3.	Soil Contamination	Soil contamination, uncontrolled solid waste disposal activities at sites.	Proposed Project routes. • Sites with severe contamination. Other proposed sampling sites are: • Construction Camp. • Equipment washing yards. • Spillage points of fuel, chemicals and lubricants.	Visual observations and checks of laboratory activities Sampling and laboratory testing for soil samples.	• Once before the start of construction by activity monitors and reported; and • On quarterly basis during the construction. • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
4.	Land Resources	Land use change.	Proposed Project routes. • Sites with significant land use change.	Random visits and visual observations of land use change.	• Once before the start of construction by activity monitors and reported; and • On quarterly basis during the construction. • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
5.	Dust Emissions	Monitoring of PM_{10} $PM_{2.5}$ as per stringent environmental quality standards	Proposed Project routes. • Sensitive receptors within the RoW/AoI, construction site, camps area. Estimated sampling points will be verified during construction stage.	Visual checks and monitoring of laboratory activities Onsite Ambient Air Monitoring equipment	• Once before the start of construction by activity monitors and reported; and • On quarterly basis during the construction. • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
6.	Noise Pollution	Day and night time noise monitoring in dBA Leq. as per stringent environmental quality standards	Proposed Project routes. • Noise Sensitive receptors within the RoW/AoI. Estimated sampling points will be verified during construction stage. Other proposed sampling sites are: • Construction camps. • Equipment yards.	Visual checks and monitoring of laboratory activities Monitoring of noise level at site.	• Once before the start of construction by activity monitors and reported; and • On Monthly basis during the construction (spot measurement regular daily basis keeping in view the day to day application of different heavy noise causing equipment by the contractor).	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase

[19] Locations will be refined during and prior to start of implementation with the advice of E&S Specialists of PMC.

Sl.	Parameters / Receptor	Monitoring Parameters / Performance Indicator	Location[19]	Monitoring Mechanism	Monitoring and Reporting Frequency	Responsibility	
						Implementation	Monitoring
					• Bi annual during O&M Phase		
7.	Fumes and gases	Monitoring of CO, CO_2, SOx, NO_x, HC and $PM_{2.5}$ PM_{10} and compliance with stringent environmental quality standards Vehicular emissions as per stringent environmental quality standards.	Proposed Project routes. • Major receptors within the RoW/AoI. Estimated sampling points will be verified during construction stage. • Emissions from the silencers of heavy machinery, trucks and other vehicles.	Visual checks and monitoring of laboratory activities Onsite monitoring of ambient air quality will be preferred.	• Once before the start of construction by activity monitors and reported; and • On quarterly basis during the construction. • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
8.	Ecological Resources	Disturbance to natural habitat and fauna, uncontrolled floral cutting which can be avoidable.	Proposed Project routes along the RoW/AoI.	Visual checks to ensure that only marked trees are cut within the Project corridor. Monitoring of Wildlife / birds hunting. Inventory of existing trees, cut trees, and planted trees.	• Once before the start of construction by activity monitors and reported; and • On quarterly basis during the construction. • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
9.	Public Infrastructure	Disturbance or damage to public infrastructure	Proposed Project routes. • Public infrastructures within the RoW/AoI. These structures will be verified prior to the start of construction.	Random visits and consultations with vulnerable.	Prior to the start of construction. Reporting will be done on the basis of LARP recommendation.	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
10.	Community around the Project corridor	Use of common resources. Hindrance to mobility. CHS	• Communities within the RoW/AoI.	Community consultations.	Prior to the start of construction and during the construction stage. Reporting will be done on the basis of LARP recommendation.	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
11.	Waste Management	Inspection of waste and spoil disposal in accordance with Waste Management Plan	• Main Project area (RoW) • Construction camps and Offices. • Equipment yards. • Other Project allied facilities	Visual Observations, Monitoring and Audits	• Review the waste management stream before start of the Project; • Monitoring and reporting on monthly basis during the construction stage; • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
12.	Labor Management and Working Conditions	As per the LMP of which includes but not limited to OHS, hygiene facilities, appropriate camps area, etc.	• Main Project area (RoW) • Construction camps and Offices. • Equipment yards. • Other Project allied facilities	Visual Observations, Incident/accident register Monitoring and Audits ,	• Monitoring and reporting on monthly basis during the construction stage; • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
13.	Traffic Safety and Management	As per the TMP of ESIA / ESMP which include but not limited to the observation of traffic congestion at bottleneck areas, provision of signs and signal, vehicular inspection, driving safety protocols, etc.	• Main Project area (RoW and AoI) • Construction camps and Offices. • Equipment yards. • Other Project allied facilities	Visual Observations, Vehicle Log Books, Monitoring and Audits	• Monitoring and reporting on monthly basis during the construction stage. • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
14.	Social aspects including GBV and other Grievances	Social and cultural conflicts, SEA/SH complaints, grievances related to livelihood impacts, child abuse, etc.	• Main Project area (RoW and AoI) • Construction camps and Offices. • Equipment yards. • Other Project allied facilities	Visual Observations and consultations, Grievance Redress/Social Complaint Register, Monitoring and Audits	• Monitoring and reporting on monthly basis during the construction stage; • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase

Sl.	Parameters / Receptor	Monitoring Parameters / Performance Indicator	Location[19]	Monitoring Mechanism	Monitoring and Reporting Frequency	Responsibility	
						Implementation	Monitoring
						• QazAvtoZhol during O&M Phase	• QazAvtoZhol during O&M Phase
15.	OHS, CHS, accidents and incidents	As per Chapter 9 OCHS which include but not limited to the unsafe acts and conditions, work permits, provision and availability of mandatory PPEs, Community complaints on OCHS, incidents and injuries, illnesses, trainings, TBTs, walk-through-inspections, etc.	• Main Project area (RoW and AoI) • Construction camps and Offices. • Equipment yards. • Other Project allied facilities	Visual Observations and consultations, Grievance Redress/Social Complaint Register, Incident/accident register, Monitoring and Audits	• Monitoring and reporting on monthly basis during the construction stage • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
16.	Chemical Storage and Handling	Safety Data Sheets, Leakage and spills, Segregated handling and storage of chemicals, availability of fire extinguishers.	• Main Project area (RoW and AoI) • Construction camps • Equipment yards. • Other Project allied facilities	Visual Observations, Chemical Storage inventory, Incident/accident register, Monitoring and Audits	• Monitoring and reporting on monthly basis during the construction stage • Bi annual during O&M Phase	• Contractor during Pre-Construction and Construction Phase • QazAvtoZhol during O&M Phase	• Compliance monitoring lies with CSC and PMC during Construction Phase • QazAvtoZhol during O&M Phase
17.	Land Acquisition and Resettlement	As per Entitlement Matrix of LARP	• Within the proposed project construction limits	As per LARP	• As defined in LARP	• QazAvtoZhol through PMC	• TPV (External Monitor)

8.9 Trainings and Capacity Building

Strengthening capacity of PMC, Consultant, Contractors, Subcontractors and project workers staff is essential to ensure the successful implementation and compliance of the E&S mitigation measures. This will be achieved through series of customized trainings and awareness sessions. Training programs will be implemented throughout the project life cycle to cover both general and job-specific issues. New recruits will receive induction training, while existing staff will attend regular refresher sessions. These trainings will ensure that ESIA and ESMP requirements are well understood, roles and responsibilities are clear and personnel are aware of project impacts, risks, and the mitigation measures to be applied and monitored on it. Additionally, the trainings would lead the staffs to be well aware about the roles of PMC, QazAvtoZhol, the Engineer/CSC and the Contractor when it comes to environmental and social issues.

All organizations will provide training to their staff before project commencement and throughout implementation, covering all levels of the workforce, from management to unskilled labor. Each training report must include objectives, content, materials used, resource persons, and participant lists

Training program will consist of the following:

- General E&S awareness, including toolbox talks, induction, and community interaction.
- Discussion regarding the ESMP, E&S sensitivity of the project area and key findings of the ESIA.
- Community, Occupational, and Public Health and Safety, awareness of transmissible diseases before the start of any field activities.
- Contractor staff will be trained on ESMP implementation, including waste management, before and during construction activities.
- Drivers would be trained prior to and during the field operations regarding road safety, defensive driving, waste disposal and cultural values and social sensitivity.
- All site personnel would be educated about camp operation, waste disposal, natural resource conservation and housekeeping before field operations and continuing throughout.
- Special training will be organized for the Contractors' staff on near and over water construction.
- Contractor staffs will be trained on job-specific work prior to commence the task, proper use of personal protective equipment.
- Labor Management Procedures, Grievance Redress Mechanisms, Code of Conduct and Behavioral Standards and Occupational & Community Health and Safety, Stakeholder Engagement and Mapping and Emergency Procedures.
- Monitoring, documentation and reporting.
- Employees working under the Contractor would be trained about restoration requirements and waste disposal and the training program would commence before any restoration activities.

8.10 Reporting and Documentation

Contractor will prepare two separate monthly reports, one for Environmental and Social Management and the second one for OHS Management. The PMC with assistance from CSC and contractors will also produce quarterly reports.

Incident Report: Contractors should present all incident information in the monthly report including property and environmental damages. For fatal and high potential incidents, a flash report must be

submitted within 24 hours to the PMC and QazAvtoZhol and a detail investigation report within 7 days of the incident. All fatal incidents and high potential incidents require a root-cause analysis.

Contractor and CSC Monthly Report: Implementation schedule of the mitigation plans and safety inspections and preventive controls suggested in the ESMP should be reported in all monthly reports. The outcome of the field inspections and audits shall be reported in all monthly report. Contractors should present the implementation schedule of mitigation measures and preventive actions in all monthly report along with monitoring and auditing and CSC should confirm the status of mitigation and preventive measures claimed by the Contractor.

Quarterly Progress Reports on Environment, Health and Safety: The environmental, Social, Health and Safety monitoring reports will include (i) the overall implementation of E&S risk management instruments and measures, ESHS training conducted (ii) any environmental or social issues arising as a result of project activities, including the non-compliances and how these issues will be remedied or mitigated, corrective measures including timelines, (iii) Occupational Health and Safety performance (including incidents and accidents), (iv) community health and safety, (v) stakeholder engagement updates, in line with the SEP, (vi) public notification and communications, (vii) progress on the implementation and completion of project works, and (viii) summary of grievances/beneficiary feedback received, actions taken, and complaints closed out, in line with the SEP. The monitoring reports will be prepared by CSC and submitted quarterly during the construction period to PMC.

Project Completion Environmental, Health and Safety Monitoring Report: One year after completion of construction, the PMC will submit a Project Completion Environmental Monitoring Report which will summarize the overall environmental and social impacts and risks from the project.

Reports from the field levels will be submitted to the PMC, where they will be aggregated and submitted to the AIIB Bank on a quarterly basis.

All environmental and social safeguards reports and documents shall be disclosed on the websites of AIIB in English and of QazAvtoZhol in the local language.

8.11 Integrating E&S Measures into the Contract

Following table 8-4 depicts the actions that need to be taken to ensure that environmental and social management measures are integrated into the contracts.

Table 8-4 Actions for Integrating Environmental and Social Measures in Contracts

Stage	Actions
Before bidding	• Ensure the team skills in the terms of reference clearly include key staff qualified and experienced in managing similar projects, and demonstrated capacity to manage social and environmental issues, including issues pertaining to community health and safety, labor, and OHS in general. • If CSC is expected to be hired prior to the launch of the DBM contracts, ensure that the terms of reference clearly define the supervision engineer's responsibilities regarding oversight of, and reporting on, E&S aspects as required in the ESMP.
Preparation of bidding documents	• Review contract conditions included in bidding documents to: - Ensure that the relevant mitigation measures in the ESMP and its associated instruments, particularly the LMP and SEP and other technical recommendations and gen- eral provisions in the ESMP are reflected in the contract. - Identify relevant provisions (workers, camps, child and forced labor, safety, grievance redress, etc.) regulating the contractor's responsibility and identify any gaps, inconsistencies or areas of concern that could be addressed through additional provisions in the "particular conditions of contract" and/or technical specifications. - Include a requirement that all workers sign 'Codes of Conduct' governing behavior and identifying sanctions. - Clearly identify that training programs on SEA/SH prevention, HIV/AIDS, implementing the Codes of Conduct, etc. will be undertaken by qualified service providers, organized by the selected contractors. • Ensure the contract conditions clearly specify what type of penalty the contractor will face if the provisions of the ESHS provisions for contractors and C-ESMPs are not adhered to— including by sub-contractors. This may include direct incentives to contractors in the form of penalties for poor performance on social and environmental matters or specific Performance Securities for C-ESMP compliance. • Ensure bidding documents clarify the responsibilities of the contractor to prepare and ad- here to a C-ESMP based on the ESMP and that no civil works will commence until the C- ESMPs have been approved by the supervision engineer. The C-ESMPs will include, among others, the following mitigation plans: (a) Air Quality Management and Dust Suppression Plan (b) Noise and Vibration Management Plan (c) Construction Material and Waste Management Plan (d) Borrow Pit Management Plan (e) Site Drainage Plan (f) Occupational Health and Safety Plan (OHS) (g) Community Health and Safety Plan (h) Soil Management Plan (i) Spill Prevention Plan (j) Emergency Preparedness and Response Plan (please also refer to Annex 3) (k) Road Safety and Traffic Management Plan (l) Labor Camp Management Plan (m) Facility Layout Plans and Plants Operation Plan (n) Chance Finds Procedures (o) Site Restoration/reinstatement Plan (incl., all disturbed lands)

Stage of Contrac- tual Process	Actions by Environmental and Social Specialists and Procurement Specialists
	(p) Other relevant plans. • Ensure the bidding documents detail how the contractor and supervision engineer will be required to monitor and report on the impacts on the local community, issues related to labor influx and workers' camps. • Propose Key Performance Indicators (KPIs) for Contract Management, reflecting issues and risks specific to the contract and the monitoring plan.
Bidding evaluation	• Ensure that the procurement panel formed by the project's proponent has sufficient experience and expertise in ESHS review of the bid proposals in the similar sector. • Review and verify the recommended bidder that documents related to the ESHS requirements and other relevant obligations of the contractor required to be submitted with the bid are sufficiently detailed and cover the contractual requirements. • Clarify with bidders on technical specifications and requirements for ESHS. • Ensure that the contractor meets the project's OHS requirements for capability and experience.
After contract signing	• Prior to commencing works, the contractor submits site-specific C-ESMPs as above and potential labor data based on the labor force plan and their hiring strategy. Ensure that all contractual provisions on labor hiring by the selected contractors, including through intermediate agencies, are consistent with the requirements set forth in the ESMP and LMP. These include specific management plans for: (i occupational health and safety; (ii) non-discrimination; (iii) grievance management; (iv) minimum age; (v) terms and conditions; (vi) codes of conduct and (vii) labor and working conditions. • Supervision engineer reviews and approves the C-ESMPs – with inputs from appropriate Government agencies—before any works start. • Set up a process for contract management that plans for regular meetings of the parties to monitor the contractor's performance in all areas. • Ensure the C-ESMPs and mitigation plans are updated promptly and re-disclosed as ap- propriate to address new and emerging issues, including non-compliances and incidents and/or accidents. • Ensure that the following measures are fully documented for the World Bank's review as per the project's ESCP: • Training activities for workers on OHS, activities related to the Code of Conduct, etc. • Performance of recommended specific management plans. • FGRM reports. • KPIs (including the local community/stakeholder engagement plan, if applicable).

8.12 88.13 ESMP Implementation Costs

Detailed cost estimates for implementation of mitigation measures, preventive actions, and monitoring are presented in **Table 8-5**. Total cost of ESMP implementation is $ 1.2 million i.e 650.7 million Kazakhstani tenges. This tentative cost will be included in the overall project cost. The Contractor(s) however shall be paid against the actual execution with evidential proof of relevant E&S instruments activity.

Table 8-5: ESMP Implementation Cost

Sr. No.	Parameter	Mechanism	Frequency	Unit Rate (US $)	Qty	Cost (US $)	Remarks
1	Environmental Monitoring, Sampling and Testing Cost	Air, Noise, and Water (Surface and Ground Water)	Once for Pre-construction, Quarterly for Construction and Once for post Construction	350	6	12,600	One-time monitoring shall be carried out before the mobilization of Contractor. Quarterly monitoring cost for the one-year construction period and will be updated each year based on latest rates during construction timeline of the proposed Project. One-time monitoring shall be carried out after construction phase of Contractor.
2	Contractor's E&S Staff	E&S Personnel will monitor / conduct all environment, ecological, social and OCHS (TBTs, PPEs, housekeeping, safety signage, emergency preparedness, etc.) related activities.	Monthly	6,000		72,000	This is the tentative monthly cost for one-year period for one E&S Team leader, 01 environment specialists, 01 social specialists, one medical officer and 01 OHS specialists along with their

Sr. No.	Parameter	Mechanism	Frequency	Unit Rate (US $)	Qty	Cost (US $)	Remarks
							monthly logistics.
3	OHS Management	HSE related activities e.g. TBTs, PPEs, housekeeping, safety signage, emergency preparedness, etc.	Lump sum (3,000 per month)			36,000	Cost for PPEs, extinguishers, emergency lights, housekeeping equipment, safety signage and barricade, emergency preparedness kit, first aid kit, etc.
4	Solid and liquid Waste Management	Collection, segregation, transportation, disposal and management of domestic, commercial, construction wastes (solid and liquid)	Lump Sum (3,000 per month)			36,000	Cost for Collection, segregation, transportation, disposal and management of domestic, commercial, construction wastes (solid and liquid)
5	Dust Suppressions	Atleast once daily during the construction period at the active section	Lump sum (5,000 per month)			60,000	Cost for water bowser for watering purpose.
6	Training Cost	Literature preparation, printed material such as posters & pamphlets trainer(s), and venue, etc.	Monthly	2,000		24,000	This is the tentative cost for one-year period for one trainers along with logistics at site.
7	Third Party Environmental Consultant	Auditor's checklists & proformas	Annual	4,000		4,000	This is the tentative cost for one-year period for at least two auditors (E&S specialist) along with logistics, travels and accommodation charges.

Sr. No.	Parameter	Mechanism	Frequency	Unit Rate (US $)	Qty	Cost (US $)	Remarks
8	CSC E&S Staff	E&S Personnel will monitor / supervise all environment, social and OHS related activities	Monthly	9,000		108,000	This is the tentative monthly cost for one-year period for one E&S Team leader, one environment specialist, one social specialist, one OHS specialist along with their monthly logistics for each Section.
	Sub-Total					352,600	Tentative for one year. The cost shall be updated based on the current market prices during construction phase.
	Total					1,087,183	Tentative for 37 months Project construction period. The cost shall be updated based on the current market prices during construction phase.
	Contingency Charges		10% of Grand Total			108,718	
	Grand Total with Contingencies					1,195,902	Say 1.2 Million US $

9 Grievance Redress Mechanism

The project shall develop and make it functional an inclusive and accountable grievance redress mechanism to ensure social justice and fair play. The project acknowledges that grievance: is the prerogative of an individual or group whose livelihood, health and safety, cultural norms and heritage are adversely affected or likely to be affected by a project activity which, if not addressed effectively, and if not addressed, shall cause severe social/ environmental and / or reputational risks endangering sustainability. A grievance redress mechanism (GRM) is to safeguard project's social and environmental performance by ensuring addressal of issues and concerns aired by the PAPs with no 'costs' to them and without retribution works within existing legal and cultural frameworks, providing an additional opportunity to resolve grievances at the local project level.

The project will have two GRMs – one exclusively for laborers for airing grievances related to labor and working conditions management; and the other for all other project affected persons including issues related to land acquisitions, accesses restrictions, community safety, GBV/SEA/SH. Labor related GRM has been described in the LMP. The latter is dealt in detail in the SEP. Nevertheless, the project specific GRM is dealt with in brief hereunder.

The QAJ will inform the PAPs about the grievance process in the course of its stakeholder engagement activities and will make available a record of the responses to all the grievances. The system should be such that any/ all PAPs should be able to and can submit their grievances in any form – in person, by phone, text sms, mail, e-mail or via a website. The mechanism will also allow for anonymous grievances to be aired. Grievance management procedures including governance structure, as well as time one can expect to wait for acknowledgment, response and resolution, should be made well known as the system is established.

A Grievance may be also submitted to works contractors during the construction phase. The Grievance Leaflet and Form will be available on construction site, in Kazakh and Russian languages, in printed form, and the Leaflet will be also hung on construction site bulletin boards in order to be visible to the public and interested parties. Works contracts will forward all received grievances to the Project's contact person in the PIU.

All grievances will be recorded in a Grievance Registry and acknowledged within 7 working days. The complainant will be informed by PIU about proposed addressal measures and actions taken within 15 working days upon the acknowledgement. In the case that PIU is not able to resolve the issue, or in any cases where action is not required, PIU will provide an explanation and justification to the Complainant and will advise how to proceed further. Towards this, a multi-layer grievance system shall be in place providing for escalation and further appeals. Complainants can seek other, legal, remedies in accordance with Kazakhstan laws and regulations. The project grievance procedure is presented in **the SEP (refer annex-3).** Any grievance related to SEA/SH shall be handled in confidence and addressed through a special window.

QAZ will monitor the way in which grievances are being handled, and PIU will keep a full record of the process in the Grievance Registry or Log (refer annex 3 of SEP). The Registry will serve as the basis for completion of the Grievance Management Reports and find a place in the quarterly

monitoring report. QAZ will publish, and regularly update, all relevant documents and grievance procedures on its website, and will also make available hard copies of Grievance Forms at the local administration offices. This GM does not preclude complainants in seeking other legal remedies in accordance with the legal framework of Republic of Kazakhstan, including formal judicial appeal.

The project envisages three levels to address the grievances – (i) local/ site level; (ii) regional level at Oblast level; and (iii) Central at the National level.

For the **Atyrau–Dossor Road reconstruction**, the **Site-Level Grievance Redress Committee (GRC)**[20] plays a frontline role in managing community concerns and ensuring compliance with social safeguards. The typical composition of this committee is outlined below.

Table 9-1 Site-Level GRC Composition – Atyrau–Dossor Road

Role	Affiliation / Function
Chairperson	Local Akimat representative (e.g., Deputy Akim or designated official)
Secretary / Grievance Focal	Appointed by the Contractor or Supervision Consultant; manages records and follow-up
Contractor Representative	Site engineer or community liaison officer
PMC representative	Social or environmental specialist managing E/S aspects
Construction Supervision Consultant (CSC)	Social or environmental specialist monitoring safeguard compliance
Community Liaison Group Member	Local resident or NGO representative to ensure community voice
QAZAvtoZhol Field Engineer	Provides technical input and links to regional oversight

Key Functions of the Site-Level GRC include the following:

- Receive and register grievances from affected persons, workers, or community members.
- Conduct initial review and resolution within a defined timeframe (usually 7–10 days).
- Document proceedings using standardized forms (e.g., grievance registration, resolution minutes).
- Escalate unresolved issues to the Regional-Level GRC.
- Ensure transparency through public notice boards, consultation meetings, and feedback loops.

[20] *Microsoft Word - GRM_Guideline_eng_18Aug2014.doc GUIDELINE ON GRIEVANCE REDRESS MECHANISM ON ENVIRONMENT AND SOCIAL SAFEGUARDS FOR ROAD SECTOR PROJECTS, Committee of Roads Ministry of Investments and Development Republic of Kazakhstan, 2014.*

9.1 Central and Regional GRCs

The Committee on Roads (COR), and JSC NC QAJAutoJol central office and regional branch offices shoulder primary responsibility for ensuring that the GRM is developed and made functional as envisioned. They may seek support by Project Management Consultants and Construction Supervision Consultant (CSC), who shall be involved in managing and overseeing the construction works and other activities related to the investment program. The respective regional, district, and community Akimats, who are legally obligated to carry out tasks linked to resolving complaints, and mediators / non-governmental organizations (NGO), who are involved in supporting the negotiation of grievances, will also part of the grievance redress mechanism (GRM).

The Grievance Redress Mechanism (GRM) for road sector projects implemented by the Committee for Roads consists of two levels of grievances redressing: the Grievance Redress Committee (GRC) at the regional (oblast) and central (Astana) levels. These levels operate in accordance with the Guidelines on Grievance Redress Mechanism on Environment and Social Safeguards in Road Sector Projects, which were approved by the Committee for Roads in August 2014 (GRM Guidelines). The GRC is composed of members who are appointed from CR, akimats, QAJ, CSC, and the Contractors. At both regional and national levels, the GRC is led by senior managers who are responsible for overseeing the entire operations of the GRM and ensuring its efficient and timely execution. Meanwhile, coordinators are accountable for engaging key stakeholders and overseeing the coordination of GRC activities at both regional and central levels.

GRC at the regional level will include:

a) Representatives of QAJAutoJol's regional branch (deputy director and a safeguards specialist or lawyer)
b) Consultants' team representatives (E&S specialist and public relations specialist)
c) Representatives of regional and district akimats (one from each Akimat located in the project area)
d) Representatives of the CSC (head / deputy head and protective measures specialist/public relations specialist)
e) Representatives of the Contractors (head / deputy head and E&S specialist / community liaison specialist)

Grievance processing: Any inquiries or complaints that have received clarifications and a decision at the time of submission will be promptly closed. The GRC at the regional level reviews cases that necessitate additional steps. The Regional GRC gathers twice a month meeting and holds special meetings as needed to address specific issues. It promptly reviews and discusses grievances within a period of ten working days and provides recommendations for their resolution to the concerned parties. The regional GRC coordinator offers relevant data to GRC members, compiles meeting minutes and progress reports, and ensures that actions and decisions are accurately recorded.

Provision of feedback: Disputes lodged verbally or in writing shall be promptly acknowledged upon receipt. Complaints received via letter, e-mail, or fax and acknowledged via letter, fax, or e-mail within three working days of receipt by the GRC coordinator at the regional level. If the

grievance is unrelated to project activities or impacts resulting from project implementation and therefore cannot be addressed under this GRM Guideline, the complaining party will receive a response specifying which entity (Akimat at the community, district, or oblast level, as applicable) receives the complaint.

The results of any redress for grievances at the regional level will be communicated to the complainant. If the matter is not resolved at the regional level and is instead transferred to the central GRC, the complainant will be formally notified, with the notification specifying the date the case was transferred to the central GRC and the anticipated date of decision-making at the central level.

In the event of an anonymous complaint, a paper response will be posted at the information stand of the respective regional branch of JSC NC QAJAutoJol, along with the relevant Akimat, to ensure that the complainant has easy access to it.

Central Level

At the **central level**, the **Grievance Redress Committee (GRC)** is established to oversee and resolve complaints related to road infrastructure projects, especially those funded by international financial institutions (IFIs) like ADB, AIIB, EBRD, or the World Bank. Typically, the committee's composition shall be as outlined below.

Table 9-2 Central-Level Grievance Redress Committee (GRC) Composition

Member	Affiliation / Role
Chairperson	Senior official from the Committee of Roads (CoR), Ministry of Industry & Infrastructure
Deputy Chairperson	Representative from NC QAZAvtoZhol (national road operator)
Legal Advisor	Legal expert from CoR or Ministry ensures compliance with national and IFI standards
Social Safeguards Specialist	Often seconded from the Project Management Consultant (PMC) or CoR
Environmental Specialist	Ensure environmental aspects of grievances are properly assessed
Representative of Local Akimats	Provides regional context and links to local grievance channels
Civil Society / NGO Representative	Ensures transparency and community voice in the process
Project Contractor Representative	Participates in technical clarifications (non-voting member)
Grievance Coordinator / Secretary	Manage records, meeting minutes, and follow-up actions

Key Functions of the Central GRC include:

- **Review unresolved grievances** escalated from regional or site-level committees.
- **Ensure compliance** with stipulated E&S policies and national grievance procedures.
- **Monitor trends** in complaints to identify systemic issues.
- **Report regularly** to CoR and IFIs on grievance outcomes and corrective actions.

Thus, if the grievances are not resolved amicably at the regional level, this can be escalated to the Central level GRC.

At the Central level, the GRC (i) conducts monthly meetings, with the flexibility to schedule ad hoc meetings as required; and (ii) evaluates grievance cases and provides parties with settlement recommendations within a period of twenty working days. The central-level GRC Coordinator is responsible for disseminating pertinent information to GRC members, preparing progress reports and minutes of GRC meetings, and ensuring that actions and decisions are appropriately documented. Also, any individual can submit an electronic appeal to the state authorities on the e-otinish website https://eotinish.kz/kk

Provision of Feedback: In the event that grievance has been successfully resolved, the person who complained shall be formally notified of the resolution's outcome. The complaining party will be furnished with relevant details if the grievance remains unresolved by the GRC at the central level. This information will include the specific reasons for the case's unresolved status, along with a recommendation for further resolution through the RoK legal system.

In the event of an anonymous complaint, a paper response will be posted at the information stand of the respective regional branch of JSC NC QAJAutoJol, along with the relevant Akimat, to ensure that the complainant has easy access to it.

9.2 GRM – Monitoring and Evaluation

Grievance monitoring system has three main facets:

a. Digital Registry: a centralized database depicting all grievances with timestamps, categories, and status (number resolved within the stipulated timeline, number not resolved within the timeline, and number escalated up).
b. Assigning unique identification numbers to each case to enable effective tracking and draw generalized inferences for the impact groups/ sub-groups for future endeavors.
c. Dashboard reporting: A bird’s eye view of the summarized happenings in the form of simple table, charts etc and depicting performance based on a set of simple indicators.

Apart from concurrent monitoring, evaluations are to be carried out designed around: audits, surveys, focus group discussions and case studies. PIU, PMC and CSCs shall play an important role in undertaking these.

ANNEXES

Annex 1 - Conclusion On Determining The Scope Of The EIA

Individual Enterprise "Pshenchinova"

MINISTRY OF ECOLOGY AND NATURAL RESOURCES OF THE REPUBLIC OF KAZAKHSTAN

ENVIRONMENTAL COMMITTEE

MINISTRY/850+065-6661 AND NATURAL RESOURCES708.2024 OF THE REPUBLIC OF KAZAKHSTAN

ENVIRONMENTAL COMMITTEE

REGULATION AND CONTROL

OOOOO, Astana k., Mengilik El dangyly, 8 "Ministrlikter uyi", 14-kireberis Tel.: 8(7172)74-01-05. 8(7172)74-08-55

O10000, Astana, Mangilik El Avenue, 8 "House of Ministries", 14th entrance Tel.: 8 (7172) 74-01-05. 8(7172)74-08-55

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Conclusion on the definition of the scope of the environmental impact assessment and (or) screening of impacts of the proposed activity

Submitted for consideration: Application on the planned activity Joint Stock Company "National Company "KazAvtoZhol" Materials were submitted for consideration on 28.08.2024 KZ42R YS00752626.

General information

Information about the initiator of the planned activity: Joint-Stock Company "National Company "KazAvtoZhol", 010000, Republic of Kazakhstan, Astana, Baikonyr District, Ondiris, Ondiris, building No 72/1, 090140000306, IMANASHEV DARKHAN SERIKULY, +7 705 874 38 58, aigerim.zeinesheva@qaj.kz General description of the types of planned activities.

Projected object "Reconstruction of the highway of republican significance A-27 "Atyrau-Dossor" KM 295-381».

In accordance with Appendix 1 of Section 1 of the Environmental Code of the Republic of Kazakhstan (hereinafter referred to as the Code), the proposed type of activity is subject to a mandatory environmental impact assessment and a procedure for screening the impacts of the proposed activity.

Estimated dates for the start of the implementation of the planned activity and its completion (including construction, operation and post-disposal of the facility). The duration of the work will be 41 months. The estimated start date for the implementation of the planned activities is the second quarter (April) of 2025, the completion date is August 2028. Upon completion of construction, the facility will be put into operation. Post-recycling is not designed.

Information on the proposed place of the planned activity.

The site is located on the territory of the city of Atyrau and the Makat district of the Atyrau region.

Brief description of the proposed activity: General expected technical characteristics of the proposed activity, including capacity, productivity, facility, its estimated dimensions, product characteristics.

The beginning of the section of km 294/598 of the highway begins at the junction with the Azattyk passage in the village of Novokirpichnoye, on the border of the transition from a four-lane road to a two-lane one. Further, at km 300 + 500 / 592 + 500, the highway crosses a traffic interchange of the "Pipes" type.

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which is being built according to the detailed design "Construction of the Northern Bypass Road of the city of Atyrau" (conclusion of the state expertise No 01-0459/21 dated 08/25/2021), then crosses the Aktobe River, the Sokolok River. To ensure unhindered passage of vehicles during the reconstruction of the road section km 301 + 200 / 591 + 800 - km 377/516, when passing the route in the existing direction, the project provides for separate tracing of the roadbed for opposite directions of traffic. The existing road will be used for the passage of public transport for the period of construction of a new road structure (roadbed, pavement, culverts, etc.) with the parameters of a 1-b technical category highway for one direction of traffic. On the right side of the road in the direction of Dossor village, there are industrial enterprises such as GATE Insaat Company, North Caspian Operating Company N.V., ASPAR KASHAGAN LLP, and Karabatan Petrochemical Complex. At km 321+700/571+300, the road crosses the railway tracks at the Karabatan thermal power plant. At km 349-544, the road crosses the burial place of Onay Ata. Many people make pilgrimages to his tomb in the hope of finding peace of mind and physical health. The mausoleum on the burial site of the saint was built in 1999 on the initiative of Fariza Ongarsynova. At km 379/514 at the entrance to the village of Dossor, it is planned to arrange a traffic interchange at different levels of the "Pipe" type with the allocation of a priority direction for the Atyrau-Aktobe highway. Further, the road bypasses the village of Dossor from the north along free lands and adjoins the existing A-27 highway "Aktobe-Atyrau-gr. RF (to Astrakhan)." The end of the section corresponds to km 381/512. The total length of the section is 87 km. There are no specially protected natural areas and lands of the state forest fund in the area of construction of the facility (road) and on its territory.

Brief description of the proposed technical and technological solutions for planned activity.

The beginning of the section of km 294/598 of the highway begins from the junction with the Azattyk passage in the village of Novokirpichnoye, at the border of the transition of a four-lane road into a two-lane one. Further, at km 300 + 500 / 592 + 500, the highway crosses the traffic interchange of the "Pipes" type, which is being built according to the working project "Construction of the Northern Bypass Road of the city of Atyrau" (conclusion of the state expertise No 01-0459/21 of 08/25/2021), then crosses the Aktobe River, the Sokolok River. To ensure unhindered passage of vehicles during the reconstruction of the road section km 301 + 200 / 591 + 800 - km 377/516, when passing the route in the existing direction, the project provides for separate tracing of the roadbed for opposite directions of traffic. The plot passes through the territory of the land of the city of Atyrau, Makat district of the Atyrau region. The plan for the passage of the route was agreed by the local executive bodies of Atyrau, Makat district of the Atyrau region. The length of the bypass section is 86.654 km. The construction length of the designed section is 86.654 km. The main indicators of the route plan are: - Length of the route - 86 654.09 m; - Number of rotation angles - 56 pcs.; - Number of turning angles per 1 km - 0.64 ug/km; - Minimum radius of curvature - 1010 m; - Maximum radius of curvature - 100,000 m; - Minimum straight insert - 45.08 m; - Maximum straight insert - 4095.92 m; - The total length of the lines is 65252.29 m. - The total length of the curves is 21,401.80 m.

Brief description of the environmental components of the Land plots, their areas, purpose, estimated terms of use: Conclusion of the Land Commission on the provision of a land plot for the reconstruction of the Atyrau-Dossor highway, km 598-512 with a total area of 1193 hectares dated July 3, 2024 No6. Letter from the State Institution "Department of Land Relations, Architecture and

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Urban Planning of the Makat District" dated July 4, 2024 06-08-05- 02-35 No507. Intended purpose: reconstruction of the highway of republican significance A-27 "AtyrauDossor" km 295-381.

Description of expected emissions of pollutants into the atmosphere.

Emissions into the atmosphere for the period of work contain 23 pollutants: aluminum oxide (hazard class 2); iron oxide (hazard class 3), manganese and its compounds (hazard class 2), nitrogen dioxide (hazard class 2), nitrogen oxide (hazard class 3), soot (hazard class 3), sulfur dioxide (hazard class 3), carbon monoxide (hazard class 4), gaseous fluoride compounds (hazard class 2), fluorides (hazard class 2); dimethylbenzene (hazard class 3), methylbenzene (hazard class 3), chloroethylene (hazard class 1), butyl acetate (hazard class 4), acrolein (hazard class 2), formaldehyde (hazard class 2), acetone (hazard class 4), white spirit, hydrocarbons (hazard class 4), suspended particles (hazard class 3), inorganic dust containing silicon dioxide in %: 70-20 (hazard class 3), abrasive dust, wood dust. Gross emissions of harmful substances into the atmosphere from sources for the construction period will be approximately 2.866154274 g/s; 32.44160977 tonnes (excluding gross emissions from mobile sources).

Water supply

Water consumption during the construction of the facility will be: for household needs 3788.4 m3, for technical needs (according to estimates) - 1755654.773 m3. Water used for household needs in the amount of 3788.4 m3/period is discharged into the existing sewerage networks, water for technical needs is used irretrievably (dust suppression). Drinking water supply is from the water intake of the checkpoint "Atyrau oblysy Su Arnasy". According to the information, it is planned to receive technical water supply from the Chernaya Rechka Canal and the Ural River. In case of withdrawal and (or) use of water resources from surface and underground sources with the use of structures or technical devices, it is necessary to issue a Permit for special water use in accordance with Article 66 of the Water Code of the Republic of Kazakhstan. At km 300 + 500 / 592 + 500, the highway crosses the transport interchange of the "Pipe" type, which is being built according to the detailed design "Construction of the Northern Bypass Road of the city of Atyrau" (conclusion of the state expertise No 01-0459/21 dated 08/25/2021), then crosses the Aktobe River, the Sokolok River.

Description of pollutant discharges. Household wastewater is discharged into a bio-toilet, as it accumulates, the wastewater will be removed by special vehicles. The facility does not provide for the discharge of wastewater into surface water bodies.

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Collection and temporary storage of waste for the period of construction and installation is carried out at special sites (places). The site for placing solid waste containers has a hard waterproof coating. During the construction of the facility, the following types of waste will be generated on the site: Hazardous waste: waste from paints and varnishes containing organic solvents or other hazardous substances (paint and varnish containers) with a volume of 0.2394 tons. They are formed during painting work. As it accumulates, it is taken out for neutralization. absorbents, filter materials (including oil filters not otherwise defined), wiping cloths, protective clothing contaminated with hazardous materials (oily rags) - - volume 0.1465 tons. It is formed in the process of using rags for wiping mechanisms, parts, machines and machines. As it accumulates, it is burned or taken out for neutralization. Sludge from wastewater treatment at the place of operation, containing hazardous substances (oily sludge from treatment facilities for washing wheels of vehicles) - 0.131 tons. They are formed from the treatment facilities for washing the wheels of vehicles. As it accumulates, it is taken out for neutralization. Non-hazardous

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Waste: mixed municipal waste - 43.05 tons. Waste is generated as a result of the vital activity and non-production activities of personnel. Storage takes place in a special closed container of temporary storage, installed in an open area, fenced on 3 sides. Burial at the solid waste landfill. Mixtures of concrete, bricks, tiles and ceramics, except those mentioned in 17 01 06 (construction waste)

- 8000.0 tons. They are formed during the construction of buildings/structures. They are cement concrete. It is taken to the PTO. Welding waste (cinders of welding electrodes) - 0.1317 tons. Waste is the remnants of electrodes after they have been used in welding work in the process of repairing the main and auxiliary equipment. As they accumulate, they are removed together with ferrous scrap The approximate volume of waste generated will be: 2025 - 2009.52 tons, of which hazardous - 0.07 tons, non-hazardous - 2009.45 tons; 2026 - 2012.81 tons, of which hazardous - 0.08 tons, non-hazardous - 2012.73 tons; Year 2027

- 2012.68 tons, of which 0.08 tons were hazardous and 2012.60 tons were non-hazardous; 2028 - 2008.69 tons, of which hazardous - 0.29 tons, non-hazardous - 2008.40 tons; Responsibility for the timely removal of generated waste during the period of construction and installation work rests with the contractor. Waste generated during the period of construction and installation work will be transferred to a third-party specialized organization under a contract that has permits in the field of environmental protection.

Conclusions: According to Appendix 1 of Section 1 of the Environmental Code of the Republic of Kazakhstan, the proposed type of activity is subject to a mandatory environmental impact assessment and a procedure for screening the impacts of the proposed activity.

When developing the "Report 0 POSSIBLE influences" envisage
recommendations of state bodies, as well as Committee Environmental
egulation of the Republic of Kazakhstan:

1. In order to reduce emissions of pollutants into the atmosphere, it is necessary to provide for the following: - to exclude dusting from

temporary roads (from wheels, etc.) and to protect soil resources, to provide roads with dust suppression, or it is necessary to use special tires with low pressure on the soil (tubeless, low and ultra-low pressure). In addition, provide for dust suppression measures when performing earthworks.

2. The designed facility will be a significant source of noise. Since the planned activity is planned within the boundaries of the settlement, it is necessary, in accordance with the current legislation, to provide for measures for protection from noise and work related to noise at the time established by law.

3. In accordance with paragraph 4 of Article 72 of the Code, the draft report on possible impacts must be prepared taking into account the content of the opinion on determining the scope of the environmental impact assessment.

4. It is recommended to abandon the fencing of the highway on the site, including the refusal of the dividing fence between the lanes (if it is provided). In addition, it is recommended to further work out the issue of possible flattening of individual sections of the roadway embankment to facilitate crossings, which will help to avoid the formation of their accumulations. The speed on certain sections of crossings should be reduced to 60 km/h during the migration and lambing seasons (April-May, September, October), with a clarification

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seasonality and specific sections of the route through additional observations, as well as the possible cessation of traffic in the dark."

5. It is necessary to provide for the requirements in accordance with Article 88 of the Water Code of the Republic of Kazakhstan, prohibiting: commissioning of water intake and discharge facilities without fish protection devices; irrigation, watering and drainage systems, reservoirs, dams, canals and other hydraulic structures until the implementation of measures provided for by the projects to prevent flooding, flooding, waterlogging and salinization of lands and soil erosion,

6. Sub-clause 4 of clause 51 of the Forest Code of the Republic of Kazakhstan dated July 8, 2003 No 477 was amended dated 02.01.2023 No 184-VII.

"When transferring forest fund lands in the cases provided for by subparagraphs 3) and 4) part one of this paragraph, the persons in whose favor the plot is transferred shall carry out compensatory planting of forest crops in the amount of twice the area of the transferred plot and care for forest crops during the first three years after their planting on the land plots provided by the relevant local executive bodies as compensation to the state forest owner for transfer to the state forest fund.

7. When locating, designing and constructing railway tracks, highways, main pipelines, communication lines, wind power plants, as well as canals, dams and other hydraulic structures, measures shall be developed and implemented to ensure the preservation of migration routes

and

prevention of the death of animals in accordance with paragraph 3 of Article 245 of the Code.

8. At the intersection of gas, oil, condensate pipelines of railways and waterways, highways, ravines and other natural obstacles, at the corners of turns, at points of possible congestion of people, at the technological units of gas, oil, condensate pipelines, appropriate safety signs and inscriptions shall be displayed. For the listed places, the design must provide for additional measures that exclude or reduce the risk of emissions, drains, spills in accordance with clause 14

Article 401 of the Code

9. In accordance with Article 77 of the Code, the compiler of the report on possible impacts, the initiator shall be liable under the laws of the Republic of Kazakhstan for concealing the information received on environmental impacts and submitting false information during the environmental impact assessment.

10. In accordance with paragraph 2 of Article 222 of the Code, persons using wastewater reservoirs and (or) artificial water bodies intended for natural biological treatment of wastewater are obliged to take the necessary measures to prevent their impact on the environment, as well as to reclaim land after the termination of their operation.

11. Ensure compliance with the provisions of Article 140 of the Land Code of the Republic of Kazakhstan, namely: excavation, storage and use of the fertile soil layer when carrying out work related to land damage; restoration of disturbed lands, their fertility and other useful properties and their timely involvement in economic turnover.

12. To characterize the technological processes that result in emissions of pollutants into the atmosphere, discharges. Submit a list of pollutants and their volumes. Give a detailed description of the technological process with quantitative and qualitative characteristics at each stage.

13. According to paragraph 1 of Article 65 of the Land Code of the Republic of Kazakhstan, owners of land plots and land users are obliged to: apply production technologies that meet the

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sanitary and environmental requirements, to prevent harm to human health, deterioration of the sanitary, epidemiological and radiation situation, and environmental damage as a result of their activities; observe the procedure for the use of wildlife, forests, water and other natural resources, ensure the safety of objects of historical and cultural heritage and other objects protected by the state located on the land plot, in accordance with the legislation of the Republic of Kazakhstan; when carrying out economic and other activities on the land plot, comply with construction, environmental, sanitary and other special requirements (norms, rules, standards).

14. It is necessary to include information on: location of the designed object and sources of its impact to the nearest residential area; wind roses; selected C33 for the facility under construction and monitoring points for monitoring sources of impact. What measures are envisaged to reduce the impact on the environment and the population (in terms of sources of emissions into the atmosphere, prevention of unpleasant odors during disposal and temporary storage in the storage tank of waste and septic tank collected together of household and industrial wastewater,

15. In accordance with Article 43, paragraph 1-2 of the Land Code of the Republic of Kazakhstan, "the provision of land plots located within five hundred meters from the shoreline of a water body shall be carried out after determining the boundaries of water protection zones and strips, as well as establishing the regime of their economic use, with the exception of lands of specially protected natural areas and the state forest fund". It is necessary to provide for the requirements of Article 271 of the Code of the Republic of Kazakhstan "On Subsoil and Subsoil Use" for the implementation of water protection measures.

16. To coordinate the intake of drinking water for industrial and drinking needs with the competent authority in the field of water resources and subsoil protection.

17. In accordance with the requirements of Article 43 of the Land Code of the Republic of Kazakhstan: for the period of construction and installation works, it is necessary to issue title and identification documents for land plots for designated purposes (installation of underground LPG storage tanks

18. Also, according to Article 381 of the Code, when designing buildings, structures, structures and other facilities, during the construction (erection, creation) of which waste is supposed to be generated, it is necessary to provide places (sites) for the collection of such waste in accordance with the rules, standards and requirements in the field of waste management established by the authorized body in the field of environmental protection and the state body in the field of sanitary and epidemiological welfare Population.

Vice-chairman E. Umarov

≡ Zhanbatyr A.
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@.chanbaryn@ ccogeo.gov.kz

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Summary table of proposals and comments on the Statement on the planned activity Joint-Stock Company "National Company "KazAvtoZhol".
Summary Table Date: 27.09.2024
Place of compilation of the summary table: ERC MENR
RK Name of the authorized body in the field of environmental protection: Committee for Environmental Regulation and Control of the MENR RK
Date of notification of the collection of comments and proposals of interested state bodies: 29.08.2024
Deadline for submission of comments and suggestions of interested state bodies: 29.08-16.09.2024
Summary of comments and proposals of interested state bodies:

No	Interested state	Comments or suggestions
1	Akimat of Atyrau Area	Not presented
2	Ministry of Energy of the Republic of Kazakhstan	Has no comments or suggestions
3	Department Committee Industrial Safety of Atyrau The Department	There are no comments or suggestions
4	of Sanitary and Sanitary of Epidemiological Control o of Atyrau Region	Not presented
5	Department of Ecology of along Atyrau Area	Not presented
6	Management Natural Resources and Environmental Regulation Atyrau Area	Not presented
7	Atyrau Oblast Territorial Inspectorate Forest Economy and Animal target	There are no comments or suggestions

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	Committee reCHoro Animal Farm II target Ministry of Ecology, Geology and Natural Resources of the Republic of Kazakhstan Ministry of Emergency Situations of	
8	the Republic of Kazakhstan	Not provided
9	Committee on Water Resources resources o the Ministry of Internal Affairs of he Republic of Kazakhstan	Not presented

Vice-chairman Umarov Ermek

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Annex 2 - GAP ANALYSIS

AIIB ESF Parameter Requirement	Relevant National Laws and Regulations	Key Gaps Compared to AIIB ESF	Gaps Addressed in ESIA
Environmental Social Policy (ESP) & ESS1 Environmental and Social Assessment & Management	Environmental Code of the Republic of Kazakhstan, Labor Code, Code on public health and the healthcare system, On the Protection and Use of Objects of Historical and Cultural Heritage, Law on Specially Protected Natural Territories, Law on the Protection, Reproduction and Use of Wildlife, About Vegetation, About protected areas, etc. Law on Protection, Reproduction and Use of the Fauna, Water Code, Civil code, Law on Access to Information, Law on Public Associations, Law "On ratification of the Convention concerning on equal remuneration for men and women Workers for work of equal value". The Law "On State Guarantees of Equal Rights and equal Opportunities of Men and Women. Law on the Rights of the Child Law of the Republic of Kazakhstan "On architectural, urban planning and construction activities in the Re public of Kazakhstan" About subsoil and subsoil use.	No explicit risk-based E&S screening and categorization system (A/B/C/FI). Compared to the AIIB ESF requirements, the Project documentation does not sufficiently cover the issue of social risks such as Project-level and worker grievance redress mechanisms exist but lack consistency, inclusivity, or cultural relevance, Stakeholder engagement primarily occurs only during the EIA stage, lacking ongoing engagement throughout project stages. Lack of continuous, accessible, multi-language documentation and disclosure of stakeholder feedback and project responses throughout lifecycle. Social impact assessments lack systematization, less focus on vulnerable groups, gender-based violence, and SEA/SH risks. Kazakhstan permits light work from age 14, whereas AIIB ESF sets the minimum employment age at 15 (with 18 for hazardous work. Most of the requirements for resource efficiency, public health, biodiversity, cultural heritage, are covered. Kazakhstan's laws focus on protected areas and endangered species but do not classify habitats as critical, natural, or modified.	Relevant Environmental and Social risks and impacts associated with the project have been assessed as per the requirements of AIIB ESF and appropriate measures designed following the mitigation hierarchy. Additionally, various E&S management plans have been prepared as a part of ESIA report to mitigate the environmental and social risks. Ensure stakeholder engagement throughout the project lifecycle with timely, inclusive consultations for vulnerable groups, supported by accessible grievance mechanisms, cultural sensitivity training, and transparent documentation and disclosure. A standalone, SEP and LMP will also be prepared for this project to provide the full coverage to social side with robust monitoring mechanism throughout the project lifecycle. Adopted Kazakhstan's age for employment. Resource efficacy theme is reflected in the ESIA to optimize the use of resources and pollution management. This ESIA, has developed "Chance Find Procedure" to be followed during project implementation in case of any chance find physical culture resource.

AIIB ESF Parameter Requirement	Relevant National Laws and Regulations	Key Gaps Compared to AIIB ESF	Gaps Addressed in ESIA
			ESIA is inclusive of Third Party validation to ensure the effective implementation of mitigation measures.
ESS2 Land Acquisition and Involuntary Resettlement	Land Code of the Republic of Kazakhstan Law on State Property Law on Housing Relations	Gaps include unrecognized land users, mandatory community consultations, and livelihood restoration for affected PAPs. The Land Code explicitly states that it does not entitle encroachers or those using land informally without registered claims to compensation for the right to use the lands they occupy. The Land Code does not specifically address pre project land restrictions done in anticipation of a project. The provisions mainly deal with ongoing processes and post-decision acquisition. The Land Code does not explicitly address the needs of vulnerable groups or gender-specific considerations. No cut-off date is re quired under Legislation of Republic of Kazakhstan. No consultation is required as such with affected landowners or users. The state authority provides a written notification on the compulsory acquisition for state needs not later than 3 calendar days after the publication of the LAR decree. The notification shall be sent by mail with the mandatory notice of receipt. In case of absence of the recipient, the notification shall be re-sent (the Law on State Property Article 64.1). Lack of	Land Acquisition and Resettlement Framework (LARF) for this project has been developed considering national and AIIB's ESF requirements. However, following the detailed design a LARP shall also be developed based on the guidance provided in the LARF covering the identified gaps.

AIIB ESF Parameter Requirement	Relevant National Laws and Regulations	Key Gaps Compared to AIIB ESF	Gaps Addressed in ESIA
		independent monitoring and third-party oversight.	
ESS3 Indigenous Peoples	No formal recognition of Indigenous Peoples as distinct groups in Kazakhstan legal framework. Cultural heritage laws protect sites but do not mandate Free, Prior and Informed Consent (FPIC) or tailored Indigenous Peoples Plans.	Absence of early screening and identification of Indigenous Peoples per AIIB criteria. No culturally appropriate social assessments or engagement plans. FPIC requirements not established. Grievance mechanisms not tailored to Indigenous Peoples' cultural needs.	This ESS is not relevant to the project.

Annex 3 – Climate Change Risk and Vulnerability Assessment

Kazakhstan - At A Glance

he Republic of Kazakhstan is a landlocked country and is the ninth largest country in the world by area. Located in Central Asia, the country shares borders with the Russian Federation to the north, China to the east, and Turkmenistan, Uzbekistan and the Kyrgyz Republic to the south. The Caspian Sea forms a natural boundary to the west. Kazakhstan contains forest-steppe, steppe, semi-arid and desert climate zones and precipitation is low throughout. Kazakhstan has one of the lowest population densities in the world, with a population of 18.5 million (2019) spread over its 2.7 million square kilometer area, and 57% of this population lives in urban areas.

Current Climatology

Kazakhstan experiences an extreme continental climate, with long, hot summers and cold winters. Winter in the north of the country is long and cold – in some years the temperatures reached - 52°C (Nur-Sultan), but there are also thaws up to 5°C. The shortest season in the north is spring, which lasts 1.5 months, while summer lasts 3 months and winter extends from October to April. Snow primarily falls in November but can continue through April. Kazakhstan's seasonal climate cycle for the latest climatology, 1991–2020. Due to its great distance from the ocean, Kazakhstan has a highly continental climate and large intraday and annual fluctuations in temperature. This means that temperatures in the winter months (December to February) are extremely cold, with national averages between −9°C and −12°C, whereas summers are hot, with average temperatures of 22°C to 23°C in June, July and August. Precipitation is low throughout the year, with average monthly levels of between 14 millimeters (mm) and 30 mm, although flooding can occur during spring due to increased rain and the thawing of winter snow[21].

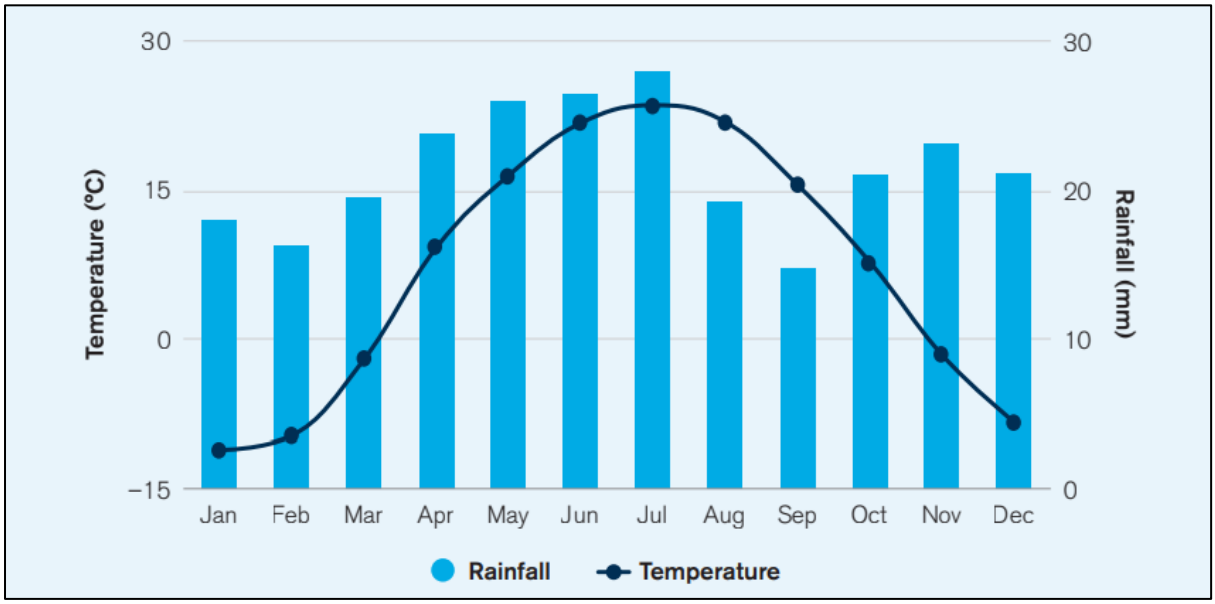


Figure 2: Monthly Climatology of Mean Temperature with Rainfall (1991-2020) (Source: World Bank)

[21] *WBG Climate Change Knowledge Portal (CCKP, 2020). Climate Data: Historical.*

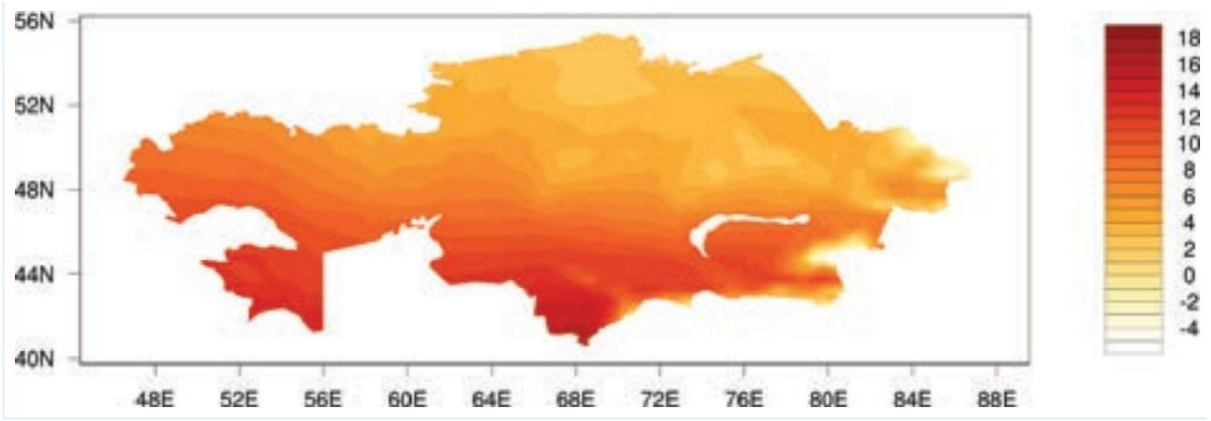


Figure 3: Observed Average Annual Mean- Temperature (°C) of Kazakhstan for 1901-2020

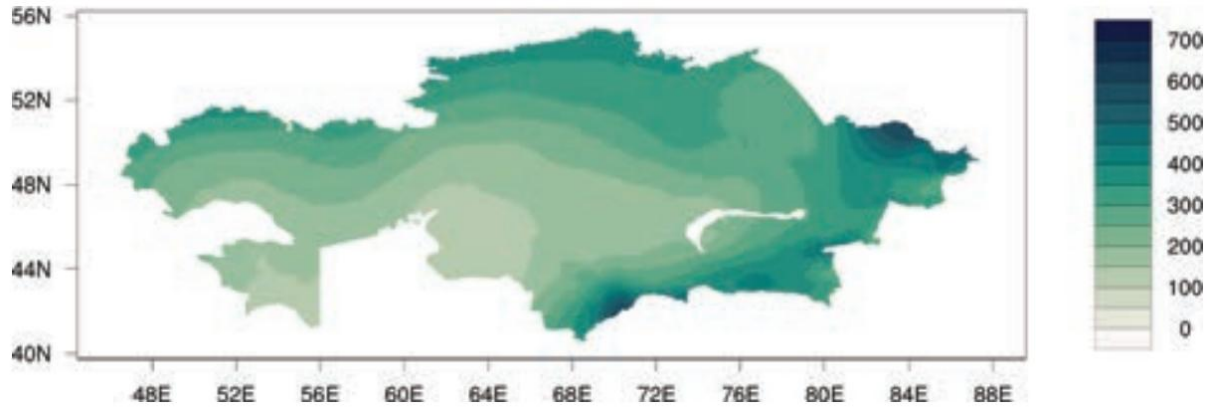


Figure 04: Observed Average Annual Rainfall (mm) of Kazakhstan for 1901-2020

Temperature

Meteorological data from Kazakhstan show a rise in average temperatures during the 20th century, particularly in the decades since the 1980s. Average annual temperatures were 0.3°C to 1.4°C warmer during the period 1997–2010 than during the baseline period of 1971–2000, and there was an average rise of 0.28°C per decade between 1941 and 2011.3 These warming trends applied to all areas[22] and were relatively more pronounced in the north, west and south of the country.3 Temperature rises were highest during the autumn and winter, with increases of 0.32°C and 0.35°C per decade, respectively, while warming was less extensive during the summer, with an increase of 0.18°C per decade.[23]

Precipitation

The trend in precipitation levels in Kazakhstan in recent decades is not as clear as for temperature. There was a slight decrease in average annual precipitation between 1941 and 2011, equivalent to a fall of 0.5 mm per annum every decade (or a 0.3% decrease in the annual total). This varied throughout the year: there was a statistically significant increase in precipitation during winter months affecting most parts of the country, whereas during the rest

[22] *World Bank. (2015). Kazakhstan: Nationwide assessment of climate-change related risks and formulation of mitigation strategy.*
[23] *Salnikov, V., Turulina, G., Polyakova, S., Petrova, Y., & Skakova, A. (2015). Climate change in Kazakhstan during the past 70 years. Quaternary International, 358, 77–82.*

of the year the marginal fall in precipitation levels was not significantly different from zero.[24] Almost all the country had a decrease in the maximum duration of rainless periods, with this effect being especially strong in the north and the southeast.13 Precipitation in Kazakhstan has a complex relationship with global climate circulation patterns and there is uncertainty regarding historical climate change influences on these phenomena. [25]

Climate Change in Kazakhstan26

The main data source for the World Bank Group's Climate Change Knowledge Portal is the Coupled Model Intercomparison Project Phase 5 (CMIP5) models, which are utilized within the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), providing estimates of future temperature and precipitation. Four Representative Concentration Pathways (i.e. RCP2.6, RCP4.5, RCP6.0, and RCP8.5) were selected and defined by their total radiative forcing (cumulative measure of GHG emissions from all sources) pathway and level by 2100. In this analysis RCP2.6 and RCP8.5, the extremes of low and high emissions pathways, are the primary focus; RCP2.6 represents a very strong mitigation scenario, whereas RCP8.5 assumes business-as-usual scenario. RCP2.6 assumes rapid and systemic global action, achieving emissions reduction throughout the 21st century enough to reach net zero global emissions by around 2080. RCP8.5 assumes annual global emissions will continue to increase throughout the 21st century.

Temperature

Average annual temperatures in Kazakhstan are expected to rise significantly by the end of the 21st century under all four emissions pathways, with the country projected to see larger temperature increases than the global average and most other Asian nations. Under the highest emissions pathway (RCP8.5), average temperatures in Kazakhstan are projected to rise by 5.8°C by the 2090s, compared with a global average rise of 3.7°C. At 5.8°C, the projected rise in the average daily maximum temperature by the 2090s in scenario RCP8.5 is higher still, as is the rise of 6.1°C in average daily minimum temperatures under the same emissions pathway and timeframe. The temperature rise by the last two decades of the 21st century projected under the most severe warming scenario (RCP8.5) is 3.7°C greater than the low emissions pathway (RCP2.6), indicating the large difference in outcome for Kazakhstan that could be achieved by controlling global emissions.

[24] Ministry of Environment and Water Resources. (2013). The Third–Sixth National Communication of the Republic of Kazakhstan to the UN Framework Convention on Climate Change
[25] Malygina, N., Papina, T., Kononova, N., & Barlyaeva, T. (2017). Influence of atmospheric circulation on precipitation in Altai Mountains. Journal of Mountain Science, 14(1), 46–59. AND Bothe, O., Fraedrich, K., & Zhu, X. (2012). Precipitation climate of Central Asia and the large-scale atmospheric circulation. Theoretical and Applied Climatology, 108(3), 345–354.
[26] Climate Risk Country Profile: Kazakhstan World Bank and ADB, 2021

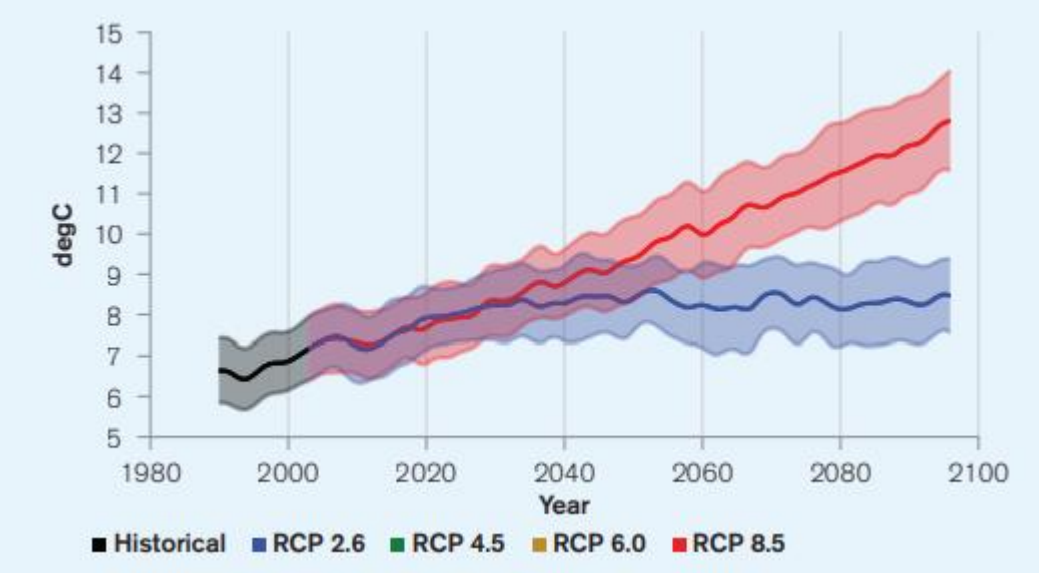


Figure 5: Historical and projected average annual temperature in Kazakhstan under RCP2.6 (blue) and RCP8.5 (red)[27]

Precipitation[28]

The intensity of sub-daily extreme rainfall events appears to be increasing with temperature – a finding supported by evidence from different regions of Asia. However, as this phenomenon is highly dependent on local geographical contexts further research is required to constrain its impact in Kazakhstan.

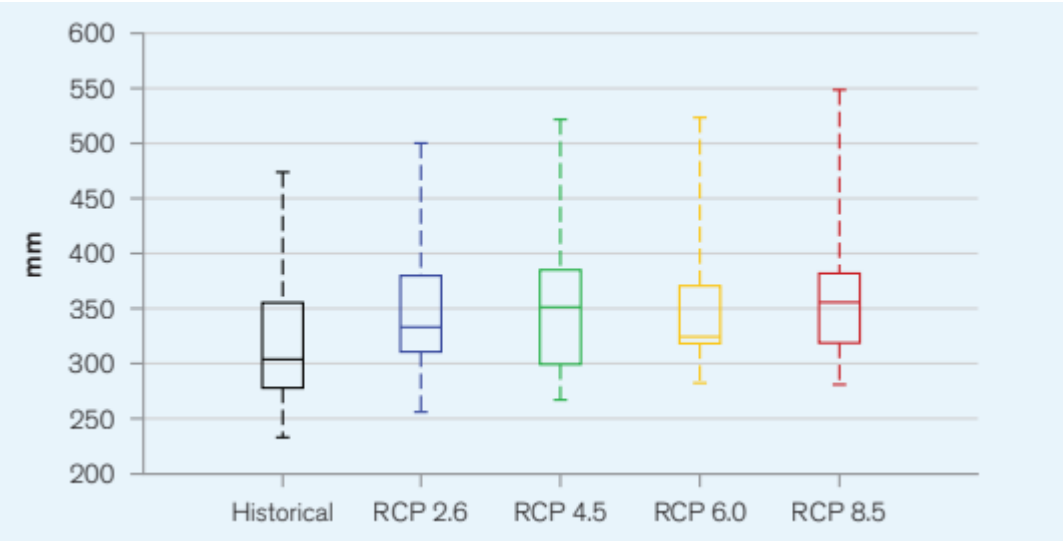


Figure 6: Projected average annual precipitation (mm) for Kazakhstan in the period 2080–2099

Climate Change Risk Identification and Preliminary Assessment

Key risks associated with climate change are:

[27] *WBG Climate Change Knowledge Portal (CCKP 2020). Kazakhstan. Climate Data. Projections*
[28] *Westra, S., Fowler, H. J., Evans, J. P., Alexander, L. V., Berg, P., Johnson, F., Kendon, E. J., Lenderink, G., Roberts, N. (2014). Future changes to the intensity and frequency of short-duration extreme rainfall. Reviews of Geophysics, 52, 522–555*

- Temperatures in Kazakhstan are projected to rise at a faster rate than the global average and faster than most other Asian nations, with potential warming of 5.3°C by the 2090s, compared with the 1986–2005 baseline under the highest emissions pathway (RCP8.5).
- Warming is projected to be even stronger for maximum and minimum temperatures and the extreme temperatures which will result are likely to threaten human lives, livelihoods, and ecosystems. Projected temperature rise in the 2090s under RCP8.5 is 3.7°C greater than the rise projected under the lowest emissions pathway (RCP2.6), indicating the large difference in outcome for Kazakhstan that could be achieved by controlling global emissions.
- Severe droughts are expected to occur more frequently under all but the lowest emissions pathway. Increased drought risk is likely to contribute to land degradation, desertification, and associated issues such as dust storms.
- Temperature rises will accelerate the melting of Kazakhstan's glaciers, which is projected to lead to an increase in river flow and flood risk through the middle of the 21st century, followed by a longer-term decline in river flow.
- Mudflows are forecast to increase in frequency by a factor of 10 and pose a threat to 156 towns and cities in Kazakhstan, among them the country's largest city, Almaty.
- More frequent droughts and reduced water security could damage agricultural productivity of crop and livestock farming. In the absence of adaptation, spring wheat yields in Kazakhstan are projected to decline by as much as 50% by the 2050s due to higher temperatures and reduced soil moisture.

At ESIA level, identification of climate change risks and their assessment has been carried out (refer Table 1) considering the scope and available data on the existing climate change parameters. Global Facility for Disaster Reduction and Recovery (GFDRR) in collaboration with the World Bank Group (WBG) developed a tool which has been utilized to consider the climate change impacts of disasters on new and existing development project. The tool identifies and robustly assess the level of river flood, urban flood, coastal flood, earthquake, landslide, cyclone, water scarcity, extreme heat, wildfire, tsunami, volcano, within the project area to facilitate the project planning and design team for the consideration of these risks along with their vulnerabilities during the design and planning phase accordingly.

The level of hazards can be described as:

- High: Potentially severe damage from this hazard for the project location. Without taking measures to mitigate the hazard and risk, high levels of damage can be expected to occur within the project
- Medium: Potentially damaging effects of this hazard for the project location. Potentially damaging events can be expected to occur within the project and measures to mitigate the hazard and risk should be considered.
- Low: Potentially damaging events are less likely to occur within the project but are still possible. Measures to mitigate the hazard and risk would be prudent at critical locations.
- Very Low: Potentially damaging effects are unlikely to occur, on average, in the project.
- No damaging effects.

Table 1: Climate Change Risks Identification and Preliminary Assessment

Sr. No.	Section	River Flood	Urban Flood	Coastal Flood	Earthquake	Landslide	Cyclone	Water Scarcity	Extreme Heat	Wildfire	Tsunami	Volcano
1.	Atyrau to Dossor Road of Atyrauskaya	High - The Ural River passes near the proposed project area and is prone to flooding during snowmelt and heavy rainfall events. Rising temperatures accelerate glacier melt in upstream regions and increase precipitation variability, leading to higher river discharge and overflow risks. In addition, the low-lying areas around Atyrau are naturally vulnerable to inundation	High - The cities of Atyrau and Dossor, along with nearby settlements, lack well-developed stormwater drainage systems. Intense rainfall events can overwhelm existing infrastructure, resulting in waterlogging. Furthermore, the prevalence of impervious surfaces such as paved roads reduces infiltration and accelerates surface runoff accumulation.	No Impact	Very Low	Very Low	No Impact	High – The project area lies within a semi-arid steppe climate characterized by limited freshwater resources. High evaporation rates caused by elevated temperatures, coupled with low precipitation and dependence on the Ural River, make the region highly water-stressed.	Medium – Western Kazakhstan regularly experiences summer heatwaves, which are projected to become more frequent and intense under future climate change scenarios. This trend poses risks to infrastructure, human health, and ecosystem resilience.	High - The surrounding steppe and semi-desert vegetation is highly flammable during dry summer periods. Rising temperatures and prolonged drought conditions further increase the likelihood of grassland and shrubland fires, creating risks for both communities and infrastructure	No Impact	No Impact

Climate Vulnerability and Risk assessment of Atyrau to Dossor Road identified the five major hazard. The identified hazards and their measures are as follow:

Table: Mitigation Measures Against the Identified Climate Change Risks

Sr. No.	Hazard	Atyrau to Dossor Road	Mitigation Measures
1	River Flood	High - The Ural River passes near the proposed project area and is prone to flooding during snowmelt and heavy rainfall events. Rising temperatures accelerate glacier melt in upstream regions and increase precipitation variability, leading to higher river discharge and overflow risks. In addition, the low-lying areas around Atyrau are naturally vulnerable to inundation	Engineering and Design Measures (Climate Resilient Design of Structures will be ensured). • Elevate road sections in flood-prone areas. • Construct culverts and bridges with adequate hydraulic capacity (at least 100 year return period flood). • Develop early warning systems and flood evacuation routes.
2	Urban Flood	High - The cities of Atyrau and Dossor, along with nearby settlements, lack well-developed stormwater drainage systems. Intense rainfall events can overwhelm existing infrastructure, resulting in waterlogging. Furthermore, the prevalence of impervious surfaces such as paved roads reduces infiltration and accelerates surface runoff accumulation.	Engineering and Design Measures (Climate Resilient Design of Structures will be ensured in Urban territory). Policy and Planning Measures (Regularly maintain and desilt drainage structures along the road. Prepare contingency traffic management plans for flood events in Urban areas)
3	Earthquake	Very Low – Fall in moderate to low fault zone.	Engineering and Design Measures (Earthquake Resilient road, bridge, culverts will be ensured)
4	Water Scarcity	High – The project area lies within a semi-arid steppe climate characterized by limited freshwater resources. High evaporation rates caused by elevated temperatures, coupled with low precipitation and dependence on the Ural River, make the region highly water-stressed.	Environmental and Nature-Based Solutions (Implement xeriscaping (low-water landscaping), Minimizing Water Use in Construction and optimize concrete mix designs to reduce water consumption at least upto 10-15%) Policy and Planning Measures (Outline of Project Level Emergency Preparedness and Response Plan will be prepared and implemented.
5	Extreme Heat	Medium – Western Kazakhstan regularly experiences summer heatwaves, which are projected to become more frequent and intense under future climate change scenarios. This trend poses risks to infrastructure, human health, and ecosystem resilience.	Engineering and Design Measures (Thermal Expansion Joints and Reflective Geometry options will be ensured) Environmental and Nature-Based Solutions (Reforestation and Vegetation Zones: Plant trees along the road for natural cooling)

Sr. No.	Hazard	Atyrau to Dossor Road	Mitigation Measures
			Policy and Planning Measures (Outline of Emergency Preparedness and Response Plan will be prepared and implemented. Adjust construction schedules (work during cooler hours) during construction and O&M phases. Install shaded rest stops and cooling shelters for construction workers during construction phase and road users during O&M phase).
6	Wildfire	High - The surrounding steppe and semi-desert vegetation is highly flammable during dry summer periods. Rising temperatures and prolonged drought conditions further increase the likelihood of grassland and shrubland fires, creating risks for both communities and infrastructure	Engineering and Design Measures (Thermal Expansion Joints and Reflective Geometry options will be ensured) Environmental and Nature-Based Solutions (fire-resistant landscaping, ensure spacing in regular interval (1-2km) to cut down the fire spread) Policy and Planning Measures (Outline of Emergency Preparedness and Response Plan will be prepared and implemented. Install water points and early detection system for construction workers during construction phase and road users during O&M phase).

Annex 4 - Greenhouse Gas Impact Assessment

The study area for this GHG impact assessment covers all GHG emissions arising from the construction of the Project and from the traffic during operation of the Project. The assessment is not restricted by geographical area, but instead includes any increase or decrease in emissions as a result of the construction and the operation of the Project, wherever that may be along the road alignment. This assessment includes:

- GHG emissions due to construction activities of the Project. Such GHG emissions account for a small proportion of the total GHG emissions produced throughout a road projects life cycle. In addition, the present assessment is of limited scope due to the absence of detailed information in the current stage of Project e.g. (relevant data for construction materials whose production imply embodied GHG emissions; relevant information for transport of construction materials (e.g. expected mass of materials with respect to time, indicative transport distances); relevant information for construction plant (e.g. types of machinery and fuels to be used, operational hours, electricity consumption); area of clearance of vegetation). Nevertheless, the GHG emissions due to construction activities of the Project have been scoped-in to the present assessment to present the indicative magnitude and significance of this impact.
- operational GHG emissions from traffic which result from the Project. The emissions from maintenance of the road (repair, replacement, refurbishment) and power consumption for the road and various structures (e.g. road lighting, lighting of interchanges, lighting of critical areas).

Construction GHG Emissions Estimation

Sources of GHG emission during road construction include emission from construction materials, fuel consumed by construction machinery as well as by material and labour transport, and removal of vegetation. The emissions are categorised as follows:

- Scope 1 – Direct emissions
  - Emissions on site from construction and laying of pavement layers, due to equipment such as excavators, vibrator rollers, air compressors, loaders, etc.
  - Emissions from onsite material production
  - Emissions from onsite transportation of material due to equipment such as transit mixers, wheel loaders, etc.
- Scope 2 – Indirect emissions
  - Emissions due to electricity production from electrical equipment.
- Scope 3 – Other indirect emissions
  - Emissions from the production purchased materials (cement, coarse aggregate, fine aggregate, filler material, etc.
  - Emissions from material transportation from production facilities to the construction site.

As per guidelines, the Scope 1 and Scope 2 emissions are a priori requested in the estimation of the emissions. As pointed out above, at the present stage of the Project development, the available data are not detailed enough to allow the detailed calculation of GHG emissions during construction. To overcome this obstacle, unit rates are used to perform a rapid

assessment of anticipated GHG emissions, based on bibliographical data and previous relevant research.

In recent study in Kazakhstan[29], for a road project of total length of 234 km, and 35 bridges are foreseen of a total length 1.182 km, i.e. a ratio 0.51%, it is assumed that the total emissions are 2,014.1 tons CO_2e/km throughout the life cycle of proposed project. Considering this, In the case of the present Project as a whole, the segments to be financed have a total length of 87 km, and 04 bridges and 03 overpasses are foreseen of a total length 518.04 m, i.e. a ratio 0.59%. This ratio is same as that of planned road in Kazakhstan. For the calculation of the construction emissions, it is assumed that the total emissions are 2,000 tons CO_2e/km.

The another relevant study[30], referring to roads in the United Kingdom, concludes that for a dual 2-lane road the total life-cycle emissions includes material production, transport, construction, lighting and maintenance during operation are distributed as follows:

- Material production 71%
- Material transport: 10%
- Construction: 2%
- Road operating (lighting): 13%
- Maintenance: 4%

By applying the above % ratio of each activity and total emission/km of planned road of Kazakhstan, the emissions throughout the life cycle are estimated as presented in the following Table 1.

Table 0-1 - Life-cycle CO_2 emissions of the Project

Component	Contribution	Total life-cycle emissions (t CO2e)	Annual emissions (t CO2e)*
Construction phase			
Material production (Scope 3)	71%	123,540	30,885
Material transport (Scope 3)	10%	17,400	4,350
Construction (Scope 1 & 2)	2%	3,480	870
Operation phase			
Road operating (lighting)	13%	22,620	1,131
Maintenance	4%	6,960	348
TOTAL	**100%**	**174,000**	

** Annual emissions for construction phase consider 4 years of construction and annual emission for operation phase consider a lifetime of 20 years*

Based on the above estimation, the total Lifecycle GHG emissions are 174,000 tons CO_2e. The construction phase GHG emissions are 36,105 tons CO_2e/annum, however, the operation phase GHG emissions are 1,479 tons CO_2e/annum without considering the traffic based emission.

Operational GHG Emissions Estimation

In the case of the operation of a typical road project, these emissions can be determined as follows:

[29] *AKTOBE REGIONAL ROADS KAZAKHSTAN: PROJECT FEASIBILITY ASSESSMENT – ESIA Report, March 2025*

[30] *Lokesh, K., Densley-Tingley, D., & Marsden, G. (2022). Measuring Road Infrastructure Carbon: A 'critical' in transport's journey to net-zero.*

- Scope 1: Emissions due to maintenance activities, i.e. emissions from road resurfacing, repaving, and ongoing maintenance work that requires fuel-powered equipment.
- Scope 2: Emissions from electricity used for road lighting or other electronic infrastructure (e.g., traffic lights, toll stations).
- Scope 3: Emissions from vehicles using the road over its lifetime

The operation phase GHG emissions are 1,479 tons CO_2e/annum (4.06 tons CO_2e/day) without considering the traffic based emission (refer Table 1). However, GHG emissions, resulting from the vehicles of the road users, are the most significant ones. These emissions are calculated for this Project. It is noted that the emissions are calculated for the entire section 87 km.

The GHG emissions are calculated based on the emission factors of the **2006 IPCC Guidelines for National Greenhouse Gas Inventories**[31], taking into consideration the fuel used for the different types of vehicles.

Table 0-2 - GHG emission factors (kg/TJ)

Fuel	CO_2	CH_4	N_2O
Diesel	74,100	3.9	3.9
Gasoline	69,300	25	8

Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories - Chapter 3: Mobile Combustion

GHG emissions are expressed in CO_2e according to the Global Warming Potential (GWP) of the gases. For the calculation, the 100-year time period GWP of the IPCC Sixth Assessment Report (AR6) are used.

Table 0-3 - GWP used for the calculation of CO_2e

GHG	GWP
CO_2	1
CH_4	29.8
N_2O	273

The forecasts of the traffic demand study of the Project are used for the estimation of the emissions for the period 2029-2048. GHG emissions are calculated for the 2029 “Start of Project” and 2048 “End of Operation Phase”. The assumptions considered in the calculations are summarised in the Table 4.

Table 0-4 - Assumptions for GHG emissions calculation

Topic	Assumptions
Scope of GHG emission estimation	▪ Section 87 km
Time horizon	▪ 20 years (2029-2048) considering 2029 as the first year of operation
Km travelled	▪ According to the traffic demand study for “without project” and “with project” scenario ▪ “Without project” scenario serves as the baseline scenario for GHG emissions.
Types of vehicles	▪ LV: All LVs are considered as medium passenger cars (7,637 in 2029 and 19,286 in 2048)

[31] *For more details, see: https://www.ipcc-nggip.iges.or.jp/public/2006gl/*

Topic	Assumptions
Fuel used in conventional vehicles	▪ HV: The type considers trucks and buses (2,538 in 2029 and 24,306 in 2048). ▪ LV: gasoline ▪ HV: diesel
Vehicle technology	▪ All conventional vehicles are considered Euro I and on (it is noted that the energy consumption factor is the same for all categories from Euro I and onwards.
Fuel consumption in conventional vehicles	Tier 2 average fuel/energy consumption values that are provided by *EMEP/EEA air pollutant emission inventory guidebook 2023 – Update 2024* ▪ LVs: 2.89 MJ/km ▪ HVs: 8.97 MJ/km

Based on the available data and above assumption, total GHG emission for 2029 and 2048 are estimated which are 287.79 tons CO2e/day and 1,778.18 tons CO2e/day. The details of these emissions are mentioned in Table 5.

Table 0-5 - GHG Emissions by Vehicular traffic for 2029 and 2048

No of Car per day	Fuel	Fuel Consumption (MJ/km)	Fuel Consumption for 87km Section (MJ)	Total Fuel Consumption by Cars (MJ)	GHG Emission Factors (kg/TJ)			GHG Emission (kg)			Total GHG Emission $kgCO_2e$/day
					CO_2	CH_4	N_2O	CO_2	CH_4	N_2O	
2029											
2,538	Diesel	8.97	780.39	1,980,630	74,100	3.9	3.9	146,764.67	7.72	7.72	149,103.64
7,637	Gasoline	2.89	251.43	1,920,171	69,300	25	8	133,067.84	48.00	15.36	138,692.02
2048											
24,306	Diesel	8.97	780.39	18,968,159	74,100	3.9	3.9	1,405,540.6	74.0	74.0	1,427,940.49
19,286	Gasoline	2.89	251.43	4,849,079	69,300	25	8	336,041.2	121.2	38.8	350,244.13

Hence, total operation phase GHG emissions are 291.85 tons CO_2e/day for 2029 and 1,782.24 tons CO_2e/day for 2048 considering the lighting, maintenance activities and traffic based emission.

Annex 5 - Construction Spoil and Waste Management Plan

1. GENERAL INTRODUCTION

Construction work refers to a wide range of materials depending on their origin; they are categorized as excavation material, demolition materials, spoil and worksite waste material. Construction waste material and spoil of the proposed project consist mainly of concrete, bentonite, masonry, limestone, sandstone, metal, and wood. In addition to this, significant amount of municipal waste will also generate from the construction camps.

2. ORIGINS AND CAUSES OF CONSTRUCTION WASTE

Origins of Waste/Spoil	Causes of Waste/Spoil Material
Contractual	▪ Errors in contract documents; and ▪ Contract documents incomplete at commencement of construction.
Design	▪ Design changes; ▪ Design and detailing complexity; ▪ Design and construction detail errors; ▪ Unclear and unsuitable specifications; and ▪ Poor coordination and communication (late information, last minute client requirements, slow drawing revision and distribution).
Procurement	▪ Ordering errors (i.e. ordering items not in compliance with specification); ▪ Over allowances (i.e. difficulties to order small quantities); and ▪ Supplier errors.
Transportation	▪ Damage during transportation; ▪ Difficulties for delivery vehicles accessing construction sites; ▪ Insufficient protection during unloading; and ▪ Inefficient methods of unloading
On-Site Management and Planning	▪ Lack of on-site waste management plans; ▪ Improper planning for required quantities; ▪ Delays in passing information on types and sizes of materials and components to be used; ▪ Lack of on-site material control; and ▪ Lack of supervision.
Material Storage	▪ Inappropriate site storage space leading to damage or deterioration; ▪ Improper storing methods; and ▪ Materials stored far away from point of application.
Material Handling	▪ Materials supplied in loose form; ▪ On-site transportation methods from storage to the point of application; and ▪ Inadequate material handling.
Site Operation	▪ Accidents due to negligence; ▪ Unused materials and products; ▪ Equipment malfunction; ▪ Poor craftsmanship; ▪ Use of wrong materials resulting in their disposal; ▪ Time pressure; and ▪ Poor work ethics.
Residual	▪ Waste from application processes (i.e. over preparation of mortar);

Origins of Waste/Spoil	Causes of Waste/Spoil Material
	▪ Off-cuts from cutting materials to length; ▪ Waste from cutting uneconomical shapes; and ▪ Packaging.
Other	▪ Weather ▪ Vandalism ▪ Theft

3. CONSTRUCTION WASTE MANAGEMENT PLAN

i) Waste Management Goals

The contractor established goal that this project will generate at least 50 percent less waste into landfills and the processes shall be employed to ensure that this goal is met. These shall include prevention of damage to materials to be incorporated into the work due to mishandling, improper storage, contamination, inadequate protection, minimizing poor quantity estimation, and through design.

ii) Responsibility

a) The Contractor shall be responsible for the implementation of the administrative portions of this program, including the notification of subcontractor management, the training of the site supervisor and the onsite posting of this plan.
b) The site supervisor shall be responsible for the implementation of the onsite portions of this program including the training of subcontractor personnel.

iii) Waste Prevention Planning

a) In addition to other requirements specified herein it is a requirement for the work of this project that the contractor comply with the applicable city waste disposal requirements.
b) Of the inevitable waste that is generated, the waste materials designated in this specification shall be salvaged for reuse and or recycling where practical and possible. Waste disposal in landfills shall be minimized as much as possible.
c) Project Construction Documents: The Contractor will contractually require all subcontractors to comply with the Construction Waste Management Plan (WMP)". A copy of the WMP will accompany all subcontractor agreements and require subcontractor participation.
d) The "Construction Waste Management Plan" shall be implemented and executed as follows and as on the chart:
    i) Salvageable materials will be diverted from disposal where feasible;
    ii) There will be a designated area on the construction site reserved for materials that can be recycled;
    iii) Areas shall be marked to designate what recycle materials are to be stored there; and
    iv) Hazardous waste shall be managed by a licensed hazardous waste vendor.

iv) Communication and Education Plan

a) This Waste Management Plan will be posted onsite;
b) Each subcontractor will be made aware of the intent of this project with respect to reduction of waste and recycling. Onsite recycling containers and/or areas will be plainly marked;
c) The subcontractor will be expected to make sure all their crews comply with the Waste Management Plan;
d) All recycling containers and areas will be clearly marked;
e) Lists of acceptable and unacceptable materials will be posted at the site; and
f) All subcontractors will be informed in writing of the importance of non-contamination with other materials or trash.

v) Motivation Plan

The Contractor will conduct a pre-award meeting for subcontractors. Subcontractors under consideration will be required to attend the meeting to review project goals and requirements with the project team. Attendance will be a prerequisite for award of subcontracts. This document will be an attachment to every subcontract. Copies of the attachment will be posted prominently at the job site.

vi) Expected Project Waste, Disposal, and Handling

The following chart identifies waste materials expected on the proposed project, their expected disposal methods and handling procedures. New items may be added as needed.

Material	Disposal Method	Handling Procedure
Land Clearing Debris	Keep separate for reuse and or wood sale. Suitable materials may be delivered to a composting site. Separate topsoil and rock for future landscaping use.	Keep separated in designated areas onsite.
Clean Dimensional Wood and Palette Wood	Keep separate for reuse by on-site construction or by site employees for either heating stoves or reuse in home projects. May be offered to public.	Keep separated in designated areas onsite.
Painted or Treated Wood	Reuse, off site recycle, and landfill.	Keep separated in designated areas onsite. Place in “Trash” container.
Concrete	Recycle when possible.	Keep separated in designated areas onsite.
Concrete Masonry Units	Keep separate for re-use by on-site construction or by site employees	Keep separated in designated areas onsite
Metals	Recycle off site when possible. Separate copper wire when possible.	Keep separated in designated areas onsite.

Material	Disposal Method	Handling Procedure
		Place in "Metals" container.
Gypsum drywall (unpainted)	Recycle with supplier when possible.	Keep scraps separate for recycling – stack on pallets in provided onsite. All scrap drywall should be taken back by contractor to drywall supplier
Paint	Reuse onsite; donate to Habitat for Humanity Restore.	Keep separated in designated areas onsite
Insulation	Reuse and landfill.	Keep separated in designated areas onsite.
Glass	Recycle locally.	Keep separated in designated areas onsite.
Plastics	Plastic Bottles: recycle locally; be aware of plastics that are acceptable to recycle facility.	Keep separated in designated areas onsite.

vii) Recycle Hauler

a) To be determined;
b) Contact Address; and
c) Some or all recycle may be hauled by the authorized representative.

viii) Possible Recycle Locations and Acceptable Materials

a) Coordinate with companies which are registered in Atyrau that accept materials for recycle; and
a) Using the above as a resource, a list will be kept indicating local opportunities for recycle of expected materials. New locations should be added as needed.

Annex 6 - GUIDELINE TRAFFIC MANAGEMENT PLAN

Need for Plan

During the construction period of the project, considerable vehicular movement carrying large amounts of material and machinery is expected. This will definitely interrupt the local traffic and is therefore important to manage the traffic to avoid the nuisance to local residents in terms of noise, dust, congestion and inconvenience.

The plan

The objective of Traffic Management Plan (TMP) is to define the requirements that should be implemented to mitigate any potential negative risks to the environment, workers or the community resulting from construction traffic.

The TMP will advise and inform site Contractors and external suppliers of equipment and materials of access and entry points along with other key information such tipping areas and wash-out areas. It is intended to compliment and work alongside relevant ESMP. The TMP will be classed as “live” and therefore be subjected to updates as required.

The Contractor, at the time of the execution of the project, will prepare a comprehensive TMP in coordination with local traffic police department, QazAvtoZhol, emergency services and other concerned agencies. PMC and CSC will review and approve the Contractor’s TMP. The Contractor’s TMP shall include following mitigation measures during its preparation:

- Undertake a road conditions assessment prior to and following the peak construction period, to assess any damage to road infrastructure that can be attributed to Project development.
- Repair damage as appropriate or enter into a voluntary agreement with the relevant roads authority to reimburse the cost of any repairs required to the public road network as a result of the Project.
- Spoil dumpsites located close to project site to minimize journey distance and limit movements to site access roads.
- Construction of worker accommodation on site to reduce light vehicle movements relating to travel to/ from the site.
- Provision of bus/minibus services for personnel living in nearby settlements.
- Movements of construction workers will be planned to avoid the busiest roads and times of day when traffic is at its greatest.
- Schedule deliveries and road movements to avoid peak periods.
- Driver training for HGV drivers and refresher course every six months for project drivers.
- Speed restrictions for project traffic travelling through communities (to be agreed with National Highway Authority).
- Run a safety campaign to improve the people’s knowledge of the traffic hazard on their roads, public information and other activities to address the issues.

- Run a pedestrian awareness programme.
- Temporary signage

The traffic management plan for the project corridor is provided below.

Policy steps for the TMP are shown in Figure 1. However, operating policy for TMP for the construction of the proposed building along various types of roads is shown in Figures 2 to 4.

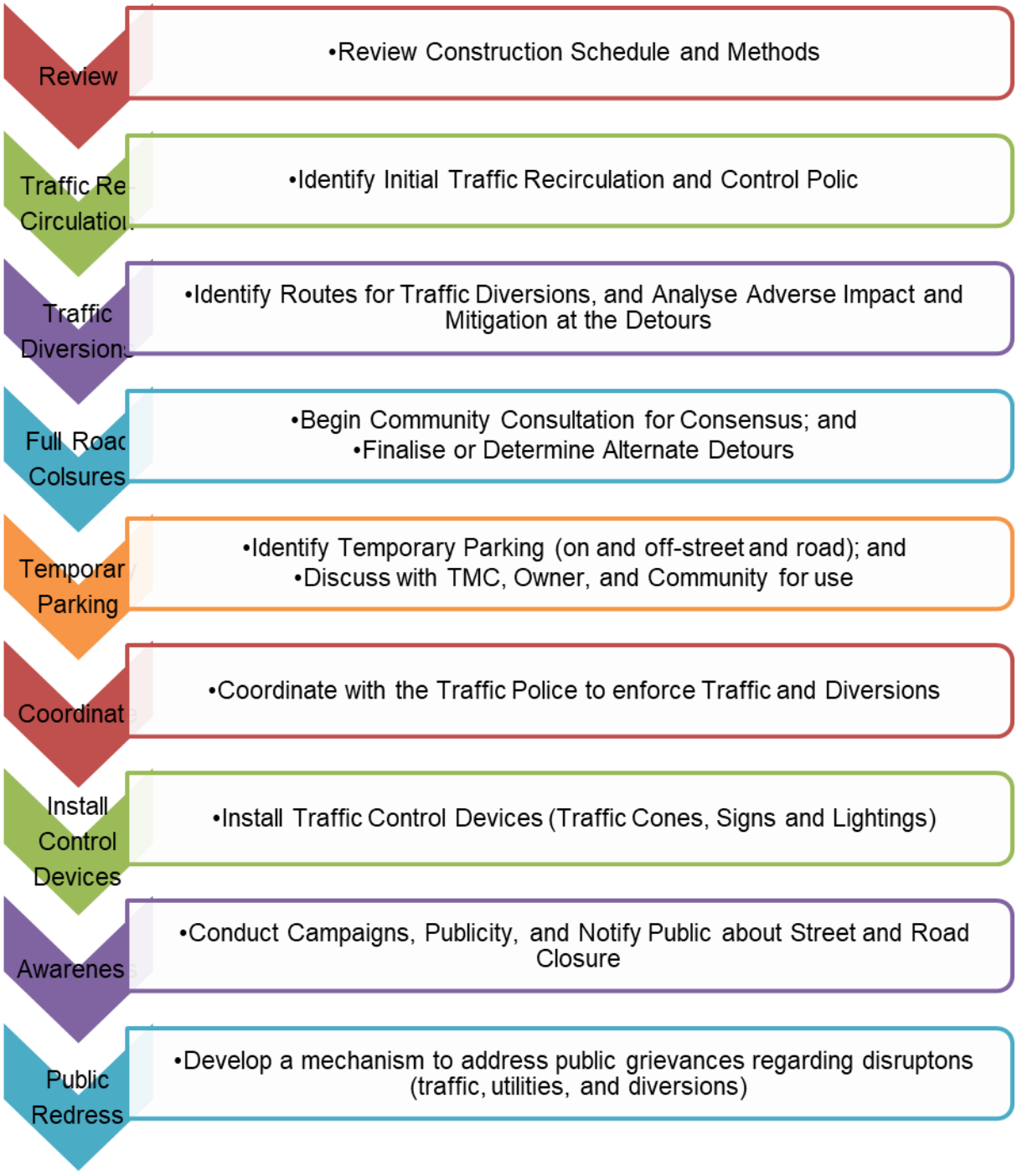


Figure 1: Policy Steps for the TMP

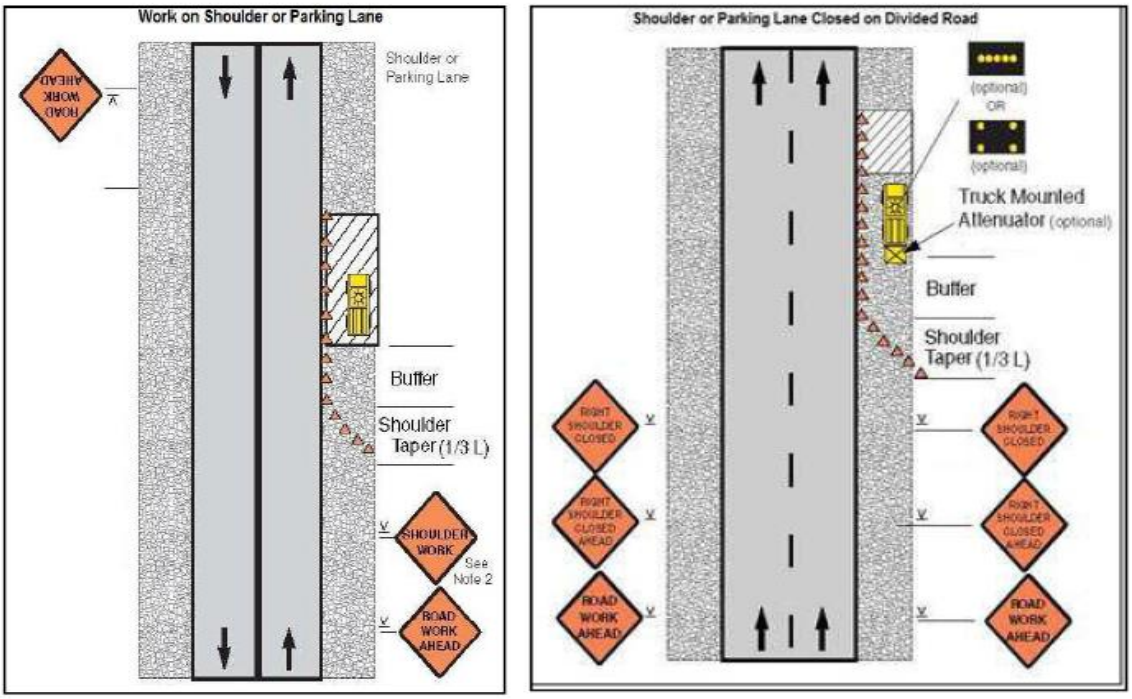


Figure 2: Work on Shoulder and Parking Lane and Shoulder and Parking Lane Closed on Divided Road

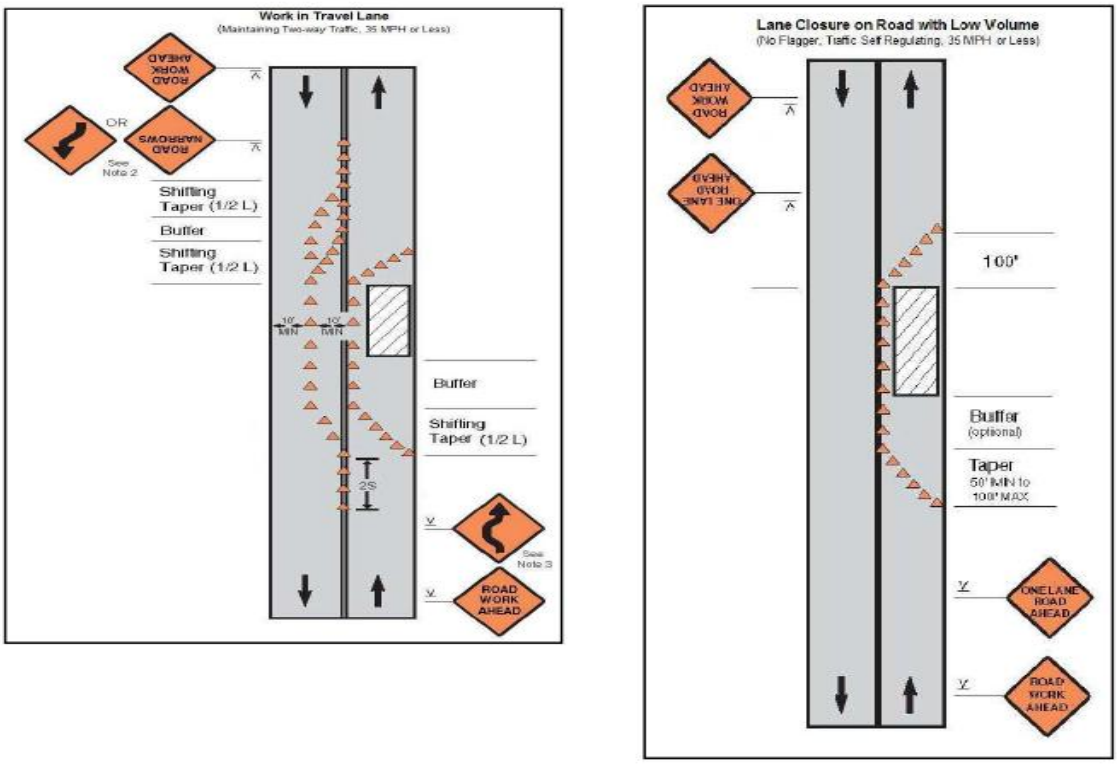


Figure 3: Work in Travel lane and Lane Closure on Road with Low Volume

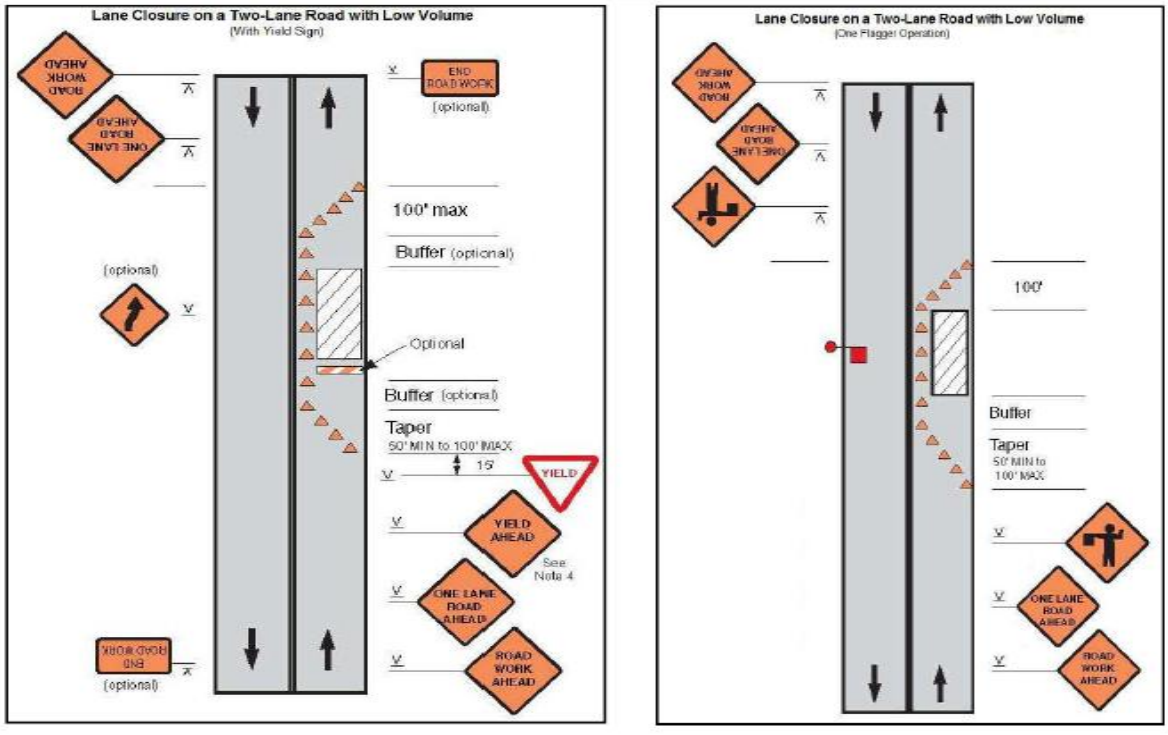


Figure 4: Lane closure on a Two-Line Road with Low Volume (with yield sign) and Lane Closure on a Two-Line Road with Low Volume (one flagger operation)

Other Recommendations

It is important to manage public access routes during construction because it can cause delay to local traffic and create a safety hazard both on and offsite. People working and living near the tower sites would be annoyed by the emissions, noise and visual intrusion of queuing vehicles. Some important factors involved in access routes and site traffic are as follows:

Public Access Routes

The use of public road for site access may be restricted in terms of:

- Vehicle size, width and type of load
- Time limits
- Parking
- Pedestrian conflicts

Contractor should have consultation with the local police or local authority to address these issues and to effectively manage them before the beginning of the construction.

Site Workers Traffic

Site personnel should not be permitted to park vehicles right on the road; this will lead to disruption in material deliveries. Designated parking areas with appropriate parking space will be needed for this purpose; any plain area near construction site can be used for this purpose.

Site Rules

- Access to and from the site must be only via the specified entrance.
- On leaving the site, vehicles must be directed to follow the directions given.
- Drivers must adhere to the site speed limits.
- All material deliveries to site must keep allocated time limits.
- No material or rubbish should be left in the loading-unloading area.
- Develop a map for alternate routes showing material delivery services.
- Assign designated personnel on site to receive deliveries and to direct the vehicles.
- Monitor vehicle movement to reduce the likelihood of queuing or causing congestion in and around the area.
- Project vehicles should have a unanimous badge or logo on windscreen displaying that they belong to the project.

Contractor's Obligation

The traffic management plan of the Contractor should be safe enough and widening of any access roads and construction of the detours (as applicable and practical) must be completed prior to start of project construction activities so that heavy vehicular transportation for construction activities do not hinder the normal course of traffic lanes. Contractor must ensure

that road closures are carried out by a competent person. The Contractor obligation must include the display of traffic signs according to the need to divert the traffic volume and to guide the road users in advance. The traffic sign, traffic light should be placed from any diverting route or road marking.

The Contractor should consider the environmental and social impacts of the traffic during construction. It will be sole responsibility of the Contractor to implement a plan which produces minimum nuisance to the local people and to the environment. Safety of the people should be given due importance. It will be under Contractor obligation to notify the traffic management plan and its later changes to CSC, PMC, emergency services and Traffic Police, and also publish weekly programme in the local newspaper.

Annex 7 - Guideline Emergency Preparedness And Response Plan

PURPOSE

The purpose of this Emergency Response Procedure is to provide measures and guidance for the establishment and implementation of emergency preparedness plans for the project. The aim of the Emergency Response Procedure is to:

i. Ensure all personnel and visitors to the office/job sites are given the maximum protection from unforeseen events.
ii. Ensure all personnel are aware of the importance of this procedure to protection of life and property.

EMERGENCY PREPARATION AND RESPONSE MEASURE SCOPE

The emergency management program is applied to all Project elements and intended for use throughout the Project life cycle. The following are some emergencies that may require coordinated response.

i. Construction Accident
ii. Road & Traffic Accident
iii. Hazardous material spills
iv. Structure collapse or failure
v. Trauma or serious illness
vi. Sabotage
vii. Fire
viii. Environmental Pollution
ix. Loss of person
x. Community Accident

RESPONSIBILITIES

The detailed roles and responsibilities of certain key members of the Emergency Response team available to assist in emergency are provided in **Table 1** below.

Table 1: Emergency Response Team

Action Group	Responsibility
Emergency Coordinator	▪ Overall control of personnel and resources. ▪ The Emergency Coordinator will support and advise the Site Safety Supervision as necessary. ▪ Serves as public relations spokes persons, or delegates to some staff member the responsibility for working with news media regarding any disaster or emergency. Also assure proper coordination of news release with appropriate corporate staff or other designated people.
Site Safety Supervision (Emergency Commander)	▪ Overall responsibility for activating emergency plan and for terminating emergency actions. ▪ Be alternative of emergency response chairpersons. ▪ Disseminates warnings and information as required to ensure all people in the immediate area have been warned and evacuated either by alarms or by word of mouth. ▪ Supervise the actions of the Emergency Response Team to ensure all persons are safe from the danger.

Action Group	Responsibility
	▪ Notify outside authorities if assistance is required. ▪ Carries the responsibility for coordinating actions including other organizations in accordance with the needs of the situation. ▪ Ensure maximum co-operation and assistance is provided to any outside groups called to respond to an emergency. ▪ Establish and appoint all emergency organization structure and team. ▪ Assures adequate delegation of responsibilities for all key positions of assistants on the Project to assist with any foreseeable emergency. ▪ Ensure resources available to purchase needed emergency response equipment and supplies. ▪ Assures that all persons on the Emergency Response Team aware and fully understand their individual responsibilities for implementing and supporting the emergency plan. ▪ Establish the emergency drill schedule of all identified emergency scenarios, track the status and evaluate the emergency. ▪ The Emergency Commander shall ensure that senior management personnel have been reported of the emergency as soon as practical after the event.
Security Team	▪ Ensure that the exit route is regularly tested and maintained in good working order. ▪ Maintain station at the security gate or most suitable location to secure the area during any emergency such that only authorized personnel and equipment may enter, prevent access to the site of unauthorized personnel. ▪ Assist with strong/activation of services during an emergency. ▪ Ensure vehicles and obstructions are moved to give incoming emergency vehicles access to the scene, if ambulance or emergency services are attending the site, ensure clear access and personnel are located to direct any incoming emergency service to the site of emergency.
Rescue & Medical Team	▪ Protect the injured from further danger and weather. ▪ Provide treatment to the victim(s) to the best of their ability by first aid and then transfer to hospital. ▪ Remain familiar with the rescue activities and rescue apparatus. ▪ Assist outside medical services personnel when they arrive
General Administration Team	Response to support any requested general facilities for assisting Emergency Response Team in their work.
Government Relation Team	▪ Coordinate with local government on a matter of concerned in the emergency response plan to liaise with local officers in their affair for support Emergency Response Team. ▪ Coordinate emergency plan with the government authorities, local community.
Environment Team	In case of emergency related to the environmental pollution such as the chemical spill, oil spill into the ambient, the environment team will support the technical advice to control and mitigate the pollution until return to the normal situation.
Department Heads	▪ Call up of personnel into the safe location for protective life and property. ▪ Take immediate and appropriate action while Emergency Response Team is being mobilized. ▪ Keep in touch with the Emergency Commander

Action Group	Responsibility
	▪ Control and supervise operators and contractors on the implementation of this procedure, with consultation with Safety Team as necessary. ▪ Provide and maintain emergency equipment of their responsible areas.
Other Staff and Employees	▪ All other staff and employees will remain at their workstations or assembly point unless directed otherwise from Emergency Response Team. ▪ Each supervisor will ensure that all members of his work group are accounted for and keep in touch with each of their Department Head.

PROCEDURE

Emergency situation and injuries to person can occur at any time or place either on Project site or elsewhere. The most two common types of emergencies on site are fire and serious accident.

Figure 3.1 Emergency Procedures for Fire

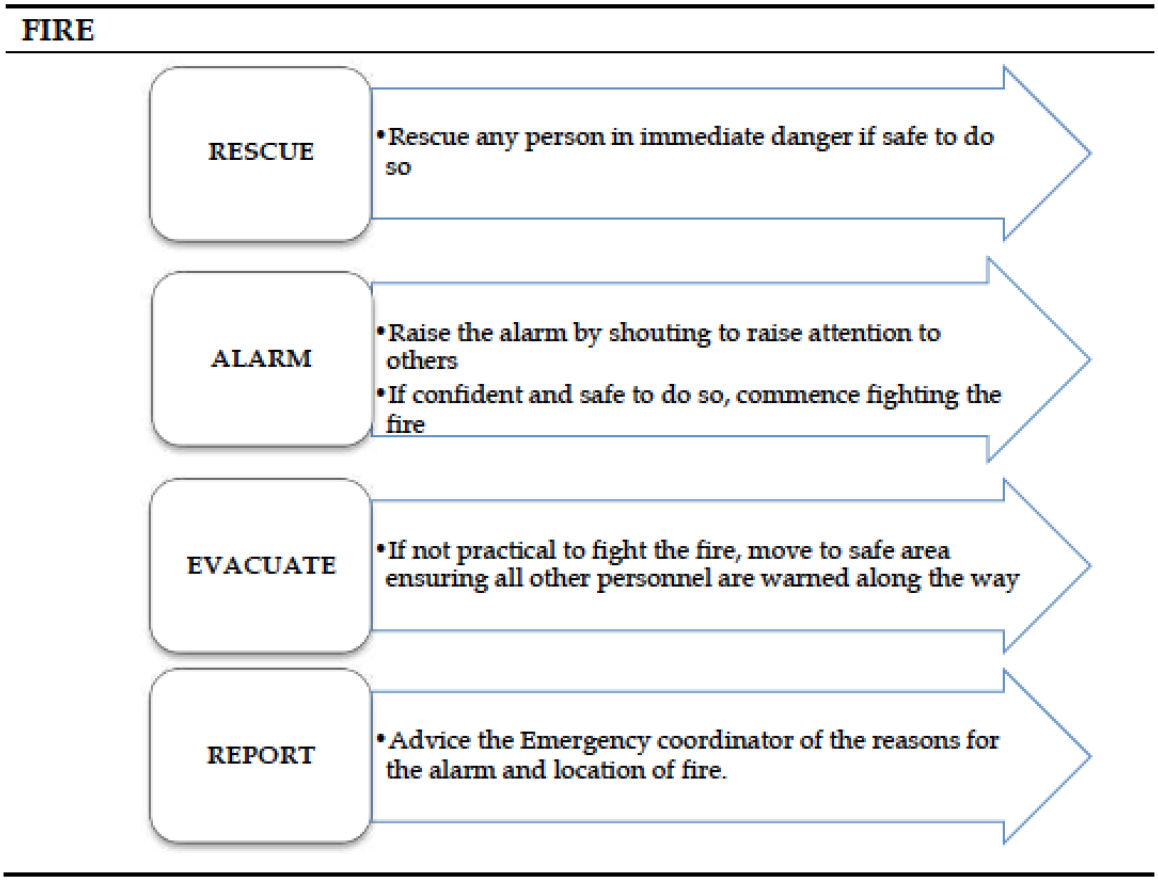
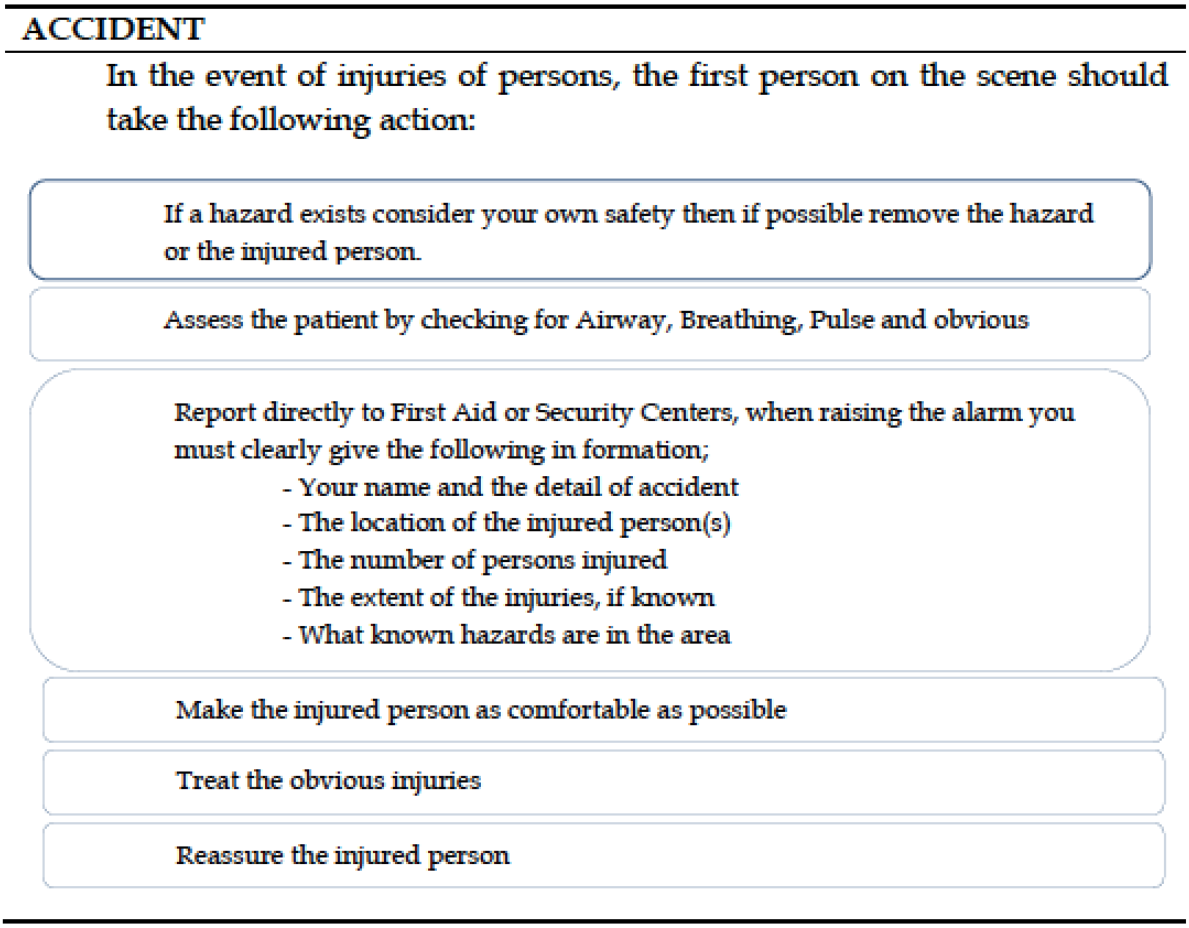


Figure 3.2 Emergency Procedures for Serious Accident



COMMUNICATION WITH AUTHORITIES / PRESS AT SITE

In the event of an accident or incident, only senior staff is permitted to give factual information to the authorities for resource of liability exposure. The press must be avoiding politely, at all costs, with the terse comment that “the matter is under investigation and relevant information when available will be provided by our Head Office” Do not ever give your opinion or story.

FIRST AID PERSONS

Upon advice of medical emergency, make immediate assessment to response required and if necessary, advise security to summon ambulance or medical assistance, the qualified first aid attendant should also,

- Provide treatment to the victim(s) to the best of his/her ability.
- Ensure the safety of victims by ceasing any work activity in the area.
- Protect the injured from further danger and weather.
- Assist medical services personnel when they arrive.

GENERAL ADMINISTRATION TEAM

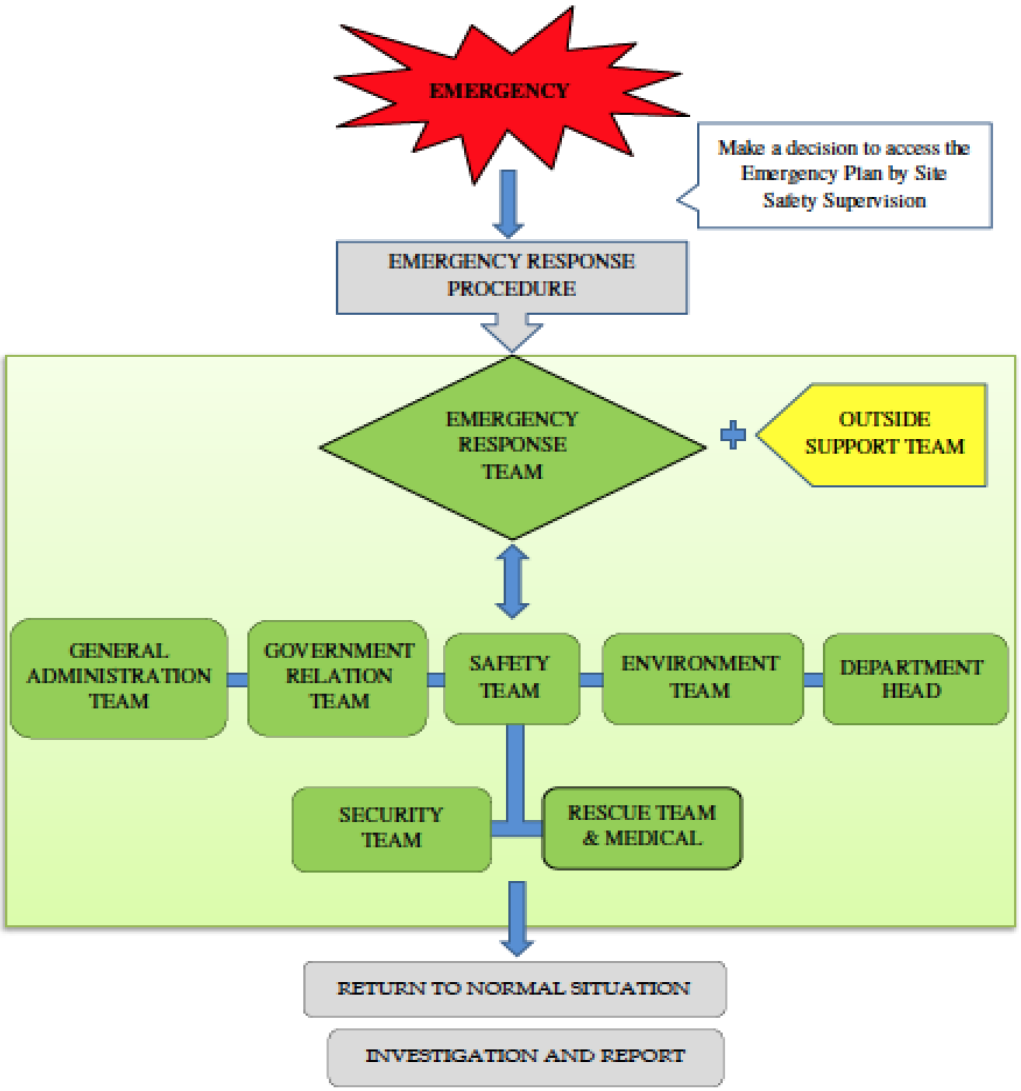
Upon advice of medical emergency, maintain contact with first aid personnel and summon ambulance if required.

SECURITY TEAM

- If ambulance or emergency services are attending the site, ensure clear access and personnel are located to direct vehicle closest to the scene.
- Prevent access to the site of unauthorized personnel (press, etc.).

EMERGENCY COORDINATOR

- The Emergency Coordinator shall assist emergency personnel at the scene as required through allocation of company resources.
- The Emergency Coordinator shall ensure next-of-kin are properly notified as soon as possible and give whatever company support and assistance is necessary to assist them bundle the situation
- The Emergency Coordinator shall ensure that senior management personnel are advised of the emergency as soon as practical after the event.



Note: Name of contact person and call number from Owner/Contractor to be determined.

INCIDENT AND ACCIDENT REPORT

Section A: Identification Data

Report No:	Date of Reported:	Reporter:	Sign:
Job Title:		Company Name:	

Section B: Violence Rate

Accident Violence: ☐ 01-Death ☐ 02-Serious Injury ☐ 03-Lost Time Injury ☐ 04-First Aid ☐ 05- Not Injury ☐ 06-Near Miss

Property Damage Cost: ☐ 1-2,000 USD ☐ 2,001-10,000 USD ☐ 10,001-50,000 ☐ > 50,001

Section C: Environmental Impact

Affected area	☐ Construction area	☐ Public area	
Receptor	☐ None	☐ Workers	☐ Community
Type of pollution	☐ Physical	☐ Chemical	☐ Biological
Toxicity	☐ Non-toxic	☐ Low - toxic	☐ High - toxic
Return to Normal	☐ 1 day	☐ 1 day to 1 week	☐ ≥ 1 week
Cumulative impact	☐ Non-cumulative	☐ Cumulative	

Section D: Injured/Illness Employee

1.Name:	Sex: ☐ Male ☐ Female	Date of Birth: Month / Day / Year	Age:	Regular Job Title:	Experience: In this job title Years Weeks	In this Project Years Weeks

Site:	Company:	Reference:	Phone No:	Social Security Number

Part of Body Injured or Affected:

☐ Head	☐ Hands	☐ Face	☐ Nose
☐ Eyes	☐ Legs	☐ Teeth	☐ Neck
☐ Trunk	☐ Toes	☐ Elbow	☐ Shoulder
☐ Back	☐ Ankle	☐ Wrist	☐ Foot
☐ Arms	☐ Thump	☐ Fingers	☐ Internal

Remark: .....

Nature of Injury or Illness:

☐ Laceration	☐ Amputation	☐ Puncture	☐ Fracture
☐ Strain & Sprain	☐ Burns	☐ Contusion	☐ Dry Heat Friction
☐ Hernia	☐ Foreign Body	☐ Chemical	☐ Contamination
☐ Skin (Occupationnel)	☐ Rash	☐ Irritation	

Remark: .....

2.Name:	Sex: ☐ Male ☐ Female	Date of Birth: Month / Day / Year	Age:	Regular Job Title:	Experience: In this job title Years Weeks	In this Project Years Weeks

Site:	Company:	Reference:	Phone No:	Social Security Number

Part of Body Injured or Affected:

☐ Head	☐ Hands	☐ Face	☐ Nose
☐ Eyes	☐ Legs	☐ Teeth	☐ Neck
☐ Trunk	☐ Toes	☐ Elbow	☐ Shoulder
☐ Back	☐ Ankle	☐ Wrist	☐ Foot
☐ Arms	☐ Thump	☐ Fingers	☐ Internal

Remark: .....

Nature of Injury or Illness:

☐ Laceration	☐ Amputation	☐ Puncture	☐ Fracture
☐ Strain & Sprain	☐ Burns	☐ Contusion	☐ Dry Heat Friction
☐ Hernia	☐ Foreign Body	☐ Contamination	☐ Chemical
☐ Skin (Occupationnel)	☐ Rash	☐ Irritation	

Remark: .....

Section E: Accidents/incident Details

Date Accident/Incident Occurred:	Time Accident/Incident Occurred:	Exact Location of the Accident / Incident:

Details of the actual Job Being done at the time:

Details of Accident/Incident/What actually happened?

Section F: Accident Cause (Basic cause mark X/Contributing cause, if any mark O)

UNSAFE CONDITIONS		UNSAFE ACTS	
1	☐ Inadequately Guarded	1	☐ Operating Without Authority / Training
2	☐ Unguarded	2	☐ Operating at Unsafe Speed
3	☐ Defective Tools, Equipment, or Substance	3	☐ Marking SHE Device Inoperative
4	☐ Unsafe Design or Construction	4	☐ Using Unsafe Equipment or Equipment Unsafely
5	☐ Hazardous Arrangement	5	☐ Unsafe Loading, Placing, Mixing
6	☐ Unsafe Illumination	6	☐ Taking Unsafe Position
7	☐ Unsafe Ventilation	7	☐ Working on Moving or Dangerous Equipment
8	☐ Unsafe Clothing	8	☐ Distraction, Teasing, Horse Play
9	☐ Insufficient Instruction	9	☐ Failure to use Personal Protective Devices
10	☐ Lack of system of work	10	☐ Lack of effective instruction or supervision

Why was the unsafe act committed? _____ Why did the unsafe condition exist? _____

Section G: Guide to Corrective Action (Base on the cause checked above, I am taking the following corrective action)

UNSAFE ACT	UNSAFE CONDITION	If Supervisor can't handle, then recommend to
☐ Stop the Behaviour	☐ Remove	☐ Site Engineer, or
☐ Study the job	☐ Guard	☐ Site Manager, or
☐ Instruct (tell-show-try-check)	☐ Warn	☐ Project Manager, or
☐ Follow Up	☐ Supervisory Training	☐ Safety Committee
☐ Enforce		

Detail below any immediate remedial actions that have been taken:

Detail below any corrective and preventative actions that could be taken to prevent future re-occurrence:	Responsible	Completion Date

Section H: Witness Statement	
Witness Name	**Interviewer Name**

Section I: Reviewed & Recommend by			
Recommendation:			
Reviewed By:	Position:	Signature:	Date:

Remarks : If Accident or Incident happened with lost time injury and affected to the publicity must further report to Safety Department;
: First Aid Cases will not applicable to this form;
: The accident report shall submit to Safety Department within 3 days
: Attached the photograph or sketch the location of accident / incident;

SUGGESTED CONTENTS OF EPRP

The Contractor should prepare the EPRP based on the guidelines provided in the above sections. The suggested structure of the EPRP is listed below:

1. Purpose
2. Applicable Scope
3. Preparation Basis
4. Emergency Response System
   - 4.1 Generals
   - 4.2 Emergency Response System
   - 4.3 Responsibilities
5. Major Safety Risks
6. Precautionary Measures
   - 6.1 Training and Exercise
   - 6.2 Hazard Source Monitor
   - 6.3 Alert Action
   - 6.4 Management Measures
7. Control Measures
   - 7.1 Response
   - 7.2 Response Procedures
   - 7.3 Emergency Response
   - 7.4 Emergency Completion and Restoration
8. Emergency Response Report and Settlement
9. Supporting Measures
   - 9.1 Communication
   - 9.2 Emergency Team
   - 9.3 Funding for Emergency
   - 9.4 Provisions and Resources
10. Records

Annex 8 - Guideline Occupational Health And Safety Plan

Occupational Health and Safety covers all personnel working under the project and will be in line with the World Bank EHS guidelines on health and safety.

The Occupational Health and Safety program will aim to ensure that the workplace is safe and healthy by: addressing the hazards and risks at the workplace; outlining the procedures and responsibilities for preventing, eliminating and minimizing the effects of those hazards and risks; identifying the emergency management plans for the workplace or workplaces; and, specifying how consultation, training and information are to be provided to employees at various workplaces.

Some of the risks/hazards associated with workplaces are due to working close to or at sites associated with the various project construction activities. Other risks associated with the project construction phase include risk of increase of vector borne and other different diseases.

The following sections will be implemented during the construction phase to address and ensure workers' health and safety.

Screening and regular unannounced checking of workers

As per the procedure for hiring workers, all contractors and labor agencies are required to make all prospective workers undergo medical tests to screen for diseases and sicknesses, prior to selection and employment of any worker. The contractor is also responsible for ensuring that no worker who has a criminal record is employed at the project site. It will be ensured that all workers undergo medical tests to screen diseases at source and at sites in consultation with the designated Health Officer.

In addition to this, the Project Management will also undertake sudden, unannounced checks on workers to look for diseases such as COVID-19, HIV, STDs, and hepatitis and take necessary steps as mandated by the Contractual agreement between the Contractor and the Worker(s).

Minimizing hazards and risks at the workplace

To ensure safety at all work sites, the following will be carried out:

i. Installation of signboards and symbols in risky and hazardous areas, to inform workers to be careful.
ii. Construction of barricades around construction sites and deep excavated pits, to cordon off and deter entry of unauthorized personnel and workers into these areas.
iii. Providing a safe storage site/area for large equipment such as power tools and chains, to prevent misuse and loss.
iv. Proper Housekeeping: Ensuring that materials are all stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapse. Brick stacks will not be more than 7 feet in height and for concrete blocks they will not be more than 6 feet high.

v. Removing all scrap timber, waste material and rubbish from the immediate work area as the work progresses.
vi. Where scaffolds are required, ensuring that each scaffold or its components shall be capable of supporting its own weight and at least 4 times the maximum intended load applied or transmitted to it. The platform/scaffold plank shall be at least 15 inches wide and 1.5 inches thick. The rope should be capable of supporting at least 6 times the maximum intended load applied or transmitted to that rope. Pole scaffolds over 60 feet in height shall be designed by a registered professional engineer and shall be constructed and loaded in accordance with that design. Where scaffolds are not provided, safety belts/safety nets shall be provided;
vii. Ensure that all ramps or walkways are at least 6 feet wide, having slip resistance threads and not inclined at more than a slope of 1 vertical and 3 horizontal.
viii. Stacking away all excavated earth at least 2 feet from the pit to avoid material such as loose rocks from falling back into the excavated area and injuring those working inside excavated sites.
ix. Constructing support systems, such as bracing to adjoining structures that may be endangered by excavation works nearby.
x. Only a trained electrician to construct, install and repair all electrical equipment to prevent risks of electrical shocks and electrocution.
xi. Install fire extinguishers and/or other fire-fighting equipment at every work site to prepare for any accidental fire hazards.

Provision of Personal Protective Equipment

Risks to the health and safety of workers can be prevented by provision of Personal Protective Equipment (PPEs) to all workers. This will be included in the construction cost for each Contractor. Depending on the nature of work and the risks involved, contractors must provide without any cost to the workers, the following protective equipment:

i. High visibility clothing for all personnel during road works must be mandatory.
ii. Helmet shall be provided to all workers, or visitors visiting the site, for protection of the head against impact or penetration of falling or flying objects.
iii. Safety belt shall be provided to workers working at heights (more than 20 ft) such as roofing, painting, and plastering.
iv. Safety boots shall be provided to all workers for protection of feet from impact or penetration of falling objects on feet.
v. Ear protecting devices shall be provided to all workers and will be used during the occurrence of extensive noise.
vi. Eye and face protection equipment shall be provided to all welders to protect against sparks.
vii. Respiratory protection devices shall be provided to all workers during occurrence of fumes, dusts, or toxic gas/vapor.
viii. Safety nets shall be provided when workplaces are more than 25 feet (7.5 m) above the ground or other surfaces where the use of ladders, scaffolds, catch platforms, temporary floors or safety belts is impractical.

The specific PPE requirements for each type of work are summarized below.

Table 1: PPE Requirement List

Type of Work	PPE
Elevated work	Safety helmet, safety belt (height greater than 20 ft), footwear for elevated work.
Handling work safety	Helmet, leather safety shoes, work gloves.
Welding and cutting work	Eye protectors, shield and helmet, protective gloves.

Type of Work	PPE
Grinding work	Dust respirator, earplugs, eye protectors.
Work involving handling of chemical substances	Dust respirator, gas mask, chemical-proof gloves. Chemical proof clothing, air-lined mask, eye protectors.
Wood working	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.
Blasting	Hard hat, eye and hearing protection.
Concrete and masonry work	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.
Excavation, heavy equipment, motor graders, and bulldozer operation	Hard hat, safety boots, gloves, hearing protection.
Quarries	Hard hat, eye protectors, hearing protection, safety footwear, leather gloves and dust respirator.

Procedures to Deal with Emergencies such as Accidents, Sudden Illness and Death of Workers

First aid kits will be made available at all times throughout the entire construction period by the respective contractors. This is very important, because most work sites will be at some distance from the nearest hospital. In addition to the first aid kits, the following measures should be in place:

i. Provision of dispensaries by the individual contractor.
ii. A vehicle shall be on standby from the Project Office so that emergency transportation can be arranged to take severely injured/sick workers to the nearest hospital for immediate medical attention.
iii. A designated Health Officer/worker for the Project will be identified as a focal person to attend to all health and safety related issues. This employee's contact number will be posted at all work sites for speedy delivery of emergency services. The focal person shall be well versed with the medical system and facilities available at the hospital.
iv. Communication arrangements, such a provision of radios or mobile communication for all work sites, for efficient handling of emergencies, will be made.

Record Maintenance and Remedial action

The Project Management will maintain a record of all accidents and injuries that occur at the work site. This work will be delegated by the contractor to the site supervisor and regularly reviewed every quarter by project management. Reports prepared by the contractor shall include information on the place, date and time of the incident, name of persons involved, cause of incident, witnesses present and their statements. Based on such reports, the management can jointly identify any unsafe conditions, acts or procedures and recommend for the contractor to undertake certain mitigation actions to change any unsafe or harmful conditions.

Compensation for Injuries and Death

Any casualty or injury resulting from occupational activities should be compensated. Where compensation is sought by the injured party, proper procedures for documentation of the case will be followed, including a detailed report on the accident, written reports from witnesses, report of the examining doctor and his/her recommendation for treatment. Each individual contractor will be responsible for ensuring compensation for the respective workers.

Awareness Programs

The Project management will undertake awareness programs through posters, talks, and meetings with the contractors to undertake the following activities:

i. Dissemination sessions will clarify the rights and responsibilities of the workers regarding interactions with local people (including communicable disease risks, such as HIV/AIDS, COVID-19), work site health and safety, waste management (waste separation, recycling, and composting), and the illegality of poaching.
ii. Make workers aware of procedures to be followed in case of emergencies such as informing the focal health person who in turn will arrange the necessary emergency transportation or treatment.

Nomination of a Health and Safety Focal Person

Within each site (especially if different sites are being implemented by different contractors), a Health and Safety Focal Person will be appointed. The Terms of Reference for the focal person will mainly be as follows:

i. Function as the focal person/representative for all health and safety matters at the workplace;
ii. Responsible for maintaining records of all accidents and all health and safety issues at each site, the number of accidents and its cause, actions taken and remedial measures undertaken in case of safety issues;
iii. Be the link between the contractor and all workers and submit grievances of the workers to the contractor and instructions/directives on proper health care and safety from the contractors back to the workers;
iv. Ensure that all workers are adequately informed on the requirement to use Personal Protective Equipment and its correct use;
v. Also responsible for the first aid kit and making sure that the basic immediate medicines are readily available.

Suggested Contents of Occupational Health and Safety Plan

The suggested contents of Occupational Health and Safety Plan to be developed by the Contractor(s) are described below:

a Purpose
b Scope of Application
c Complying Basis
d Occupational Health and Safety Objectives
e Organization and Responsibility
  - Contractor's Project Manager
  - HSE Management Department of the Contractor(s)
  - Medical Treatment Room of the Contractor(s)
  - Subcontractor's Project Manager
  - Subcontractor's HSE Managers
  - Occupational Health and Safety
  - Community Health and Safety
f Risk Assessment
  - Risks Assessment Codes

- Likelihood and Consequence of Hazards
- Risks Assessment Matrix
- Summary of Assessed Risks

g Management System Processes

h Standard Operating Procedures (SOPs), Work Instructions and Forms

i Health Plan
- Labour Protection
- Sanitary Epidemic Prevention

j Safety Plan
- Summary
- Qualification Review
- Safety Training
- Construction Plans and Documents
- Control Measures
- Monitoring Measures
- Management of the Key Safety Accidents

k Public Security Plan

l Local Community Health and Safety

CONSTRUCTION HEALTH AND SAFETY CHECKLIST

GENERAL INTRODUCTION

This checklist identifies some of the hazards most commonly found on construction sites. The questions it asks are intended to help the safety supervisor decide whether the construction site is a safe and healthy place to work.

ACCESS ON SITE

- Can everyone get to their place of work safely?
- Are access routes free from obstructions and clearly signposted?
- Are holes protected with clearly marked and fixed covers to prevent falls?
- Are temporary structures stable, adequately braced and not overloaded?
- Will permanent structures remain stable during any refurbishment or demolition work?
- Is the site tidy, and are materials stored safely?
- Is lighting adequate, especially when work is being carried on after dark outside or inside tunnels?

WELFARE

- Are toilets readily available and are they kept clean and properly lit?
- Are there washbasins, hot and cold (or warm) running water, soap and towels?
- Are the washbasins large enough to wash up to the elbow and are they kept clean?
- Is there somewhere to change, dry and store clothing?
- Is there a place where workers can sit, make hot drinks and prepare food?
- Are drinking water and cups provided?
- Can everyone who needs to use them get to the welfare facilities easily and safely?

SCAFFOLDS

- Are scaffolds erected, altered and dismantled by competent people?
- Are all uprights provided with base plates (and where necessary, timber sole plates)?
- Are all uprights, ledgers, transoms and braces in position?
- Is the scaffold tied to the structure in enough places to prevent collapse?
- Are there double guard rails and toe boards or other suitable protection at every edge, to prevent falling?
- Are brick guards provided to prevent materials falling from scaffolds?
- Are the working platforms fully boarded and are the boards arranged to avoid tipping or tripping?
- Are there effective barriers or warning notices in place to stop people using an incomplete scaffold, e.g. where working platforms are not fully boarded?
- Is the scaffold strong enough to carry the weight of materials stored on it and are these evenly distributed?
- Does a competent person inspect the scaffold regularly, e.g. at least once a week if the working platform is two meter or above in height or at suitable intervals if less than two meter, and always after it has been altered or damaged and following extreme weather events?

- Are the results of inspections recorded and kept?
- Have proprietary scaffolds been inspected and are they being used in accordance with suppliers' instructions?
- Have the wheels of scaffolds been locked and outriggers deployed when in use and are the platforms empty when they are moved?

POWERED ACCESS EQUIPMENT

- Has the equipment been installed by a competent person?
- Are the operators trained and competent?
- Is the safe working load clearly marked?
- Is the equipment inspected by a competent person?
- Does the working platform of the powered access equipment have adequate, secure guard rails and toe boards or other barriers to prevent people and materials falling off?
- Have precautions been taken to prevent people being struck by the (i) moving platform; and (ii) falling materials?

TRAFFIC, VEHICLES AND PLANT

- Are vehicles and pedestrians kept apart? If not, do you:
- Separate them as much as you can and use barriers?
- Tell people about the problem, and what to do about it?
- Display warning signs?
- Can zero tail swing excavators be used or is there adequate clearance around slewing vehicles?
- Can reversing be avoided, e.g. by using a one-way system, or if not, are properly trained signallers used?
- Are vehicles and plant properly maintained?
- Have drivers received proper training and are they competent for the vehicles or plant they are operating?
- Are loads properly secured?
- Have you made sure that passengers are only carried on vehicles designed to carry them?
- Have you made sure that plant and vehicles are not used on dangerous slopes?

CRANES

- Is the crane suitable for the job?
- Has the lift been properly planned by an 'appointed person'?
- Is the crane on a firm, level base? Are the riggers properly set?
- Who is the appointed 'crane supervisor' responsible for controlling the lifting operation on site?
- Are the crane driver and signaller trained and competent?
- Is the load secure?
- Has the signaler and slinger been trained to give signals and to attach loads correctly?
- Have you made arrangements to make sure the driver can see the load or has a signaler been provided to help?
- Are people stopped from walking or working beneath a raised load?

- Does the crane have a current report of thorough examination and record of inspection?

EXCAVATIONS

- Is there adequate support for the excavation, or has it been sloped or battered back to a safe angle?
- Is there a safe method used for putting in the support, without people working in an unsupported trench?
- Is there safe access into the excavation, e.g. a sufficiently long and secured ladder?
- Are there barriers or other protection to stop people and vehicles falling in?
- Are properly secured stop blocks provided to prevent tipping vehicles falling in?
- Could the excavation affect the stability of neighboring structures or services?
- Are materials, spoil and plant stored away from the edge of the excavation to reduce the chance of a collapse?
- Is the excavation regularly inspected by a competent person?

MANUAL HANDLING

Are there heavy materials such as concrete lintels, curbstones or bagged products which could cause problems if they have to be moved by hand? If so, can you:

- choose lighter materials;
- use wheelbarrows, hoists, tail handlers and other plant or equipment so that – manual lifting of heavy objects is kept to a minimum;
- order materials such as cement and aggregates in 25 kilogram bags;
- Avoid the repetitive laying of heavy building blocks weighing more than 20 kilogram; and
- Have people been instructed and trained how to lift safely?

HAZARDOUS SUBSTANCES

- Have you identified all harmful substances and materials, such as asbestos, lead, solvents, paints, cement and dust?
- Have you checked whether a licensed contractor is needed to deal with asbestos on site?
- Have you identified and put into place precautions to prevent or control exposure to hazardous substances by:
    - Doing the work in a different way, to remove the risk entirely;
    - Using a less hazardous material; and
    - Using tools fitted with dust extraction?
- Have workers had information and training so they know what the risks are from the hazardous substances used and produced on site, and what they need to do to avoid the risks?
- Have you got procedures to prevent contact with wet cement (as this can cause both dermatitis and cement burns)?
- Have you arranged health surveillance for people using certain hazardous substances?

NOISE

- Have workers had information and training so they know what the risks are from noise on site, and what they need to do to avoid those risks?
- Have you identified and assessed workers' exposure to noise?
- Can the noise be reduced by using different working methods or selecting quieter plant, e.g. by fitting breakers and other plant or machinery with silencers?
- Are people not involved in the work kept away from the source of the noise?
- Is suitable hearing protection provided and worn in noisy areas?
- Have hearing protection zones been marked?
- Have you arranged health surveillance for people exposed to high levels of noise?

HAND-ARM VIBRATION

- Have workers had information and training so they know what the risks are from hand-arm vibration (HAV) on site, and what they need to do to avoid those risks?
- Have you identified and assessed risks to workers from prolonged use of vibrating tools such as concrete breakers, angle grinders or hammer drills?
- Has exposure to HAV been reduced as much as possible by selecting suitable work methods and plant?
- Are reduced-vibration tools used whenever possible?
- Have vibrating tools been properly maintained?
- Have you arranged health surveillance for people exposed to high levels of hand-arm vibration, especially when exposed for long periods?

ELECTRICITY AND OTHER SERVICES

- Have all necessary services been provided on site before work begins and have you also identified existing services present on site (e.g. electric cables or gas mains) and taken effective steps (if necessary) to prevent danger from them?
- Are you using low voltage for tools and equipment, e.g. battery-operated tools or low-voltage systems?
- Where mains voltage has to be used, are trip devices (e.g. residual current devices (RCDs)) provided for all equipment?
- Are RCDs checked daily by users and properly maintained?
- Are cables and leads protected from damage?
- Are all connections to the system properly made and are suitable plugs used?
- Are tools and equipment checked by users, visually examined on site and regularly inspected and tested by a competent person?
- Where there are overhead lines, has the electricity supply been turned off, or have other precautions been taken, such as providing goal posts or taped markers?
- Have hidden electricity cables and other services been located (e.g. with a locator and plans) and marked, and have you taken precautions for safe working?

CONFINED SPACES

- Do you work in confined spaces where there may be an inadequate supply of oxygen or the presence of poisonous or flammable gas? If so, have you taken all necessary precautions?

- Confined spaces include tanks, sewers and manholes; they do not have to look dirty to be dangerous?

TOOLS AND MACHINERY

- Are the right tools or machinery being used for the job?
- Are all dangerous parts guarded, e.g. gears, chains drives, projecting generator shafts?
- Are guards secured and in good repair?
- Are tools and machinery maintained in good repair and are all safety devices operating correctly?
- Are all operators trained and competent?

FIRES AND EMERGENCIES

General

- Are there emergency procedures, e.g. for evacuating the site in case of fire or for rescue from a confined space?
- Do people on site know what the procedures are?
- Is there a means of raising the alarm, and does it work?
- Is there a way to contact the emergency services from site?
- Are there adequate escape routes and are these kept clear?
- Is there adequate first-aid provision?

Fire

- Is the quantity of flammable materials, liquids and gases on site kept to a minimum?
- Are they properly stored?
- Are suitable containers used for flammable liquids?
- Are flammable gas cylinders returned to a ventilated store at the end of the shift?
- Are smoking and other ignition sources banned in areas where gases or flammable liquids are stored or used?
- Are gas cylinders, associated hoses and equipment properly maintained and in good condition?
- When gas cylinders are not in use, are the valves fully closed?
- Is flammable and combustible waste removed regularly and stored in suitable bins or skips?
- Are suitable fire extinguishers provided?

PROTECTING THE PUBLIC

- Is the work fenced off from the public?
- Are the public protected from falling material?
- Have you provided a safe route through road works or pavement scaffolding for people with prams, wheelchair users and visually impaired people?
- When work has stopped for the day:
    - Is the boundary secure and undamaged?
    - Are all ladders removed or their rungs boarded so that they cannot be used?

- Are excavations and openings securely covered or fenced off?
- Is all plant immobilized to prevent unauthorized use?
- Are bricks and materials safely stacked?
- Are flammable or dangerous substances locked away in secure storage places?

Annex 9 - Environmental Code of Practices (ECPs)

Introduction

The objective of the Environmental Code of Practices (ECPs) is to address all potential and general construction related impacts and risks during implementation of the Project. The ECPs consist of environmental and social management guidelines to be followed by the contractors for sustainable management of all environmental and social issues. These ECPs shall be annexed to the general conditions of all the contracts, including subcontracts, carried out under the Project.

The list of ECPs prepared for the Project is given below.

ECP 1: Waste Management
ECP 2: Fuels and Hazardous Goods Management
ECP 3: Water Resources Management
ECP 4: Drainage Management
ECP 5: Soil Quality Management
ECP 6: Erosion and Sediment Control
ECP 7: Top Soil Management
ECP 8: Topography and Landscaping
ECP 9: Quarry and Borrow Areas Development & Operation
ECP 10: Air Quality Management
ECP 11: Noise and Vibration Management
ECP 12 Protection of Flora
ECP 13: Protection of Fauna
ECP 14: Road Transport and Road Traffic Management
ECP 15: Construction Camp Management
ECP 16: Cultural and Religious Issues
ECP 17: Construction and Operation Phase Security

Contractors will prepare site specific management plans, namely Construction Environmental and Social Action Plan (CESAP) and Occupational Health and Safety Plan, in compliance with World Bank and Government Regulation and guidelines and based on the guidance given in the ECPs. The CESAP and OHS Plan will form the part of the contract documents and will be used as monitoring tool for compliance. It is mandatory for the main contractors procured directly by the project to include these ECPs in their subcontracts. Violation of the compliance requirements will be treated as non-compliance leading to the corrections or otherwise imposing penalty on the contractors.

ECP 1: Waste Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
General Waste	Soil and water pollution from the improper management of wastes and excess materials from the construction sites.	The Contractor shall • Develop site specific waste management plan for various specific waste streams (e.g., reusable waste, flammable waste, construction debris, food waste etc.) prior to commencing of construction and submit to supervision consultant for approval. • Organize disposal of all wastes generated during construction in the designated disposal sites approved by the Project. • Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach. • Segregate and reuse or recycle all the wastes, wherever practical. • Vehicles transporting solid waste shall be covered with tarps or nets to prevent spilling waste along the route. • Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process. • Provide refuse containers at each worksite. • Request suppliers to minimize packaging where practicable. • Place a high emphasis on good housekeeping practices. • Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary storage of all wastes before transportation and final disposal. • Potable water should be supplied in bulk containers to reduce the quantity of plastic waste (plastic bottles). Plastic bag use should be avoided.
Hazardous Waste	Health hazards and environmental impacts due to improper waste management practices	The Contractor shall • Collect chemical wastes in 200 liter drums (or similar sealed container), appropriately labeled for safe transport to an approved chemical waste depot. • Store, transport and handle all chemicals avoiding potential environmental pollution.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Store all hazardous wastes appropriately in bunded areas away from water courses. • Make available Material Safety Data Sheets (MSDS) for hazardous materials on-site during construction. • Collect hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations. • Construct concrete or other impermeable flooring to prevent seepage in case of spills.

ECP 2: Fuels and Hazardous Goods Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Fuels and hazardous goods.	Materials used in construction have a potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals and hazardous goods/materials on-site, and potential spills from these goods may harm the environment or health of construction workers.	The Contractor shall • Prepare spill control procedures and submit them for supervision consultant approval. • Train the relevant construction personnel in handling of fuels and spill control procedures. • Store dangerous goods in bunded areas on top of a sealed plastic sheet away from watercourses. • Refueling shall occur only within bunded areas. • Store and use fuels in accordance with material safety data sheets (MSDS). Make available MSDS for chemicals and dangerous goods on-site. • Transport waste of dangerous goods, which cannot be recycled, to a designated disposal site. • Provide absorbent and containment material (e.g., absorbent matting) where hazardous material are used and stored; and ensure personnel trained in the correct use.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Provide protective clothing, safety boots, helmets, masks, gloves, goggles, to the construction personnel, appropriate to materials in use. • Make sure all containers, drums, and tanks that are used for storage are in good condition and are labeled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur. • Store and use fuels in accordance with material safety data sheets (MSDSs). • Store all liquid fuels in fully bunded storage containers, with appropriate volumes, a roof, a collection point and appropriate filling/decanting point. • Store hazardous materials above flood level considered for construction purposes • Put containers and drums in temporary storages in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area shall preferably slope or drain to a safe collection area in the event of a spill. • Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution. • Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials.

ECP 3: Water Resources Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Hazardous material and Waste	Water pollution from the storage, handling and disposal of hazardous materials and general construction waste, and accidental spillage	The Contractor shall • Follow the management guidelines proposed in ECPs 1 and 2. • Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		chemical wastes). These substances must not enter waterways or storm water systems.
Discharge from construction sites	Construction activities, sewerages from construction sites and work camps may affect the surface water quality. The construction works will modify groundcover and topography changing the surface water drainage patterns of the area. These changes in hydrological regime lead to increased rate of runoff, increase in sediment and contaminant loading, increased flooding, and effect habitat of fish and other aquatic biology.	The Contractor shall • Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials. • Install temporary sediment basins, where appropriate, to capture sediment-laden run-off from site. • Divert runoff from undisturbed areas around the construction site. • Stockpile materials away from drainage lines • Prevent all solid and liquid wastes entering waterways by collecting solid waste, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting where possible and transport to an approved waste disposal site or recycling depot. • Wash out ready-mix concrete agitators and concrete handling equipment at washing facilities off site or into approved bunded areas on site. Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This should be done in every exit of each construction vehicle to ensure the local roads are kept clean.
Soil erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	The Contractor shall • Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion. • Ensure that roads used by construction vehicles are swept regularly to remove dust and sediment.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Water the loose material stockpiles, access roads and bare soils on an as required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g., high winds).
Construction activities in water bodies	Construction works in the water bodies will increase sediment and contaminant loading, and effect habitat of fish and other aquatic biology.	The Contractor Shall • Dewater sites by pumping water to a sediment basin prior to release off site – do not pump directly off site. • Monitor the water quality in the runoff from the site or areas affected by dredge/excavation plumes, and improve work practices as necessary. • Protect water bodies from sediment loads by silt screen or other barriers. • Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways or storm water systems. • Do not discharge cement and water curing used for cement concrete directly into water courses and drainage inlets.
Drinking water	Untreated surface water is not suitable for drinking purposes due to presence of suspended solids and ecoli.	The Contractor Shall • Provide the drinking water that meets national standards. Drinking water to be chlorinated at source, and ensure presence of residual chlorine 0.1 ~ 0.25 ppm as minimum after 30 minutes of chlorine contact time.

ECP 4: Drainage Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Excavation and earth works, and construction yards	Lack of proper drainage for rainwater/liquid waste or wastewater owing to the construction activities	The Contractor shall

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	harms environment in terms of water and soil contamination, and mosquito growth.	• Prepare drainage management procedures and submit them for supervision consultant approval. • Prepare a program to prevent/avoid standing waters, which supervision consultant will verify in advance and confirm during implementation. • Provide alternative drainage for rainwater if the construction works/earth-fillings cut the established drainage line. • Establish local drainage line with appropriate silt collector and silt screen for rainwater or wastewater connecting to the existing established drainage lines already there. • Rehabilitate road drainage structures immediately if damaged by contractors' road transports. • Build new drainage lines as appropriate and required for wastewater from construction yards connecting to the available nearby recipient water bodies. Ensure wastewater quality conforms to national Environmental Quality Standards of Kazakhstan, before it is being discharged into the recipient water bodies. • Ensure that there will be no water stagnation at the construction sites and camps. • Provide appropriate silt collector and silt screen at the inlet and manholes and periodically clean the drainage system to avoid drainage congestion. • Protect natural slopes of drainage channels to ensure adequate storm water drains. • Regularly inspect and maintain all drainage channels to assess and alleviate any drainage congestion problem.
Ponding of water	Health hazards due to mosquito breeding	• Do not allow ponding of water especially near the waste storage areas and construction camps. • Discard all the storage containers that are capable of storing of water, after use or store them in inverted position.

ECP 5:Soil Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Storage of hazardous and toxic chemicals	Spillage of hazardous and toxic chemicals will contaminate the soils	The Contractor shall • Strictly manage the wastes management plans proposed in ECP1 and storage of materials in ECP2. • Construct appropriate spill contaminant facilities for all fuel storage areas. • Establish and maintain a hazardous material register detailing the location and quantities of hazardous substances including the storage, and their disposals. • Train personnel and implement safe work practices for minimizing the risk of spillage. • Identify the cause of contamination, if it is reported, and contain the area of contamination. The impact may be contained by isolating the source or implementing controls around the affected site. • Remediate the contaminated land using the most appropriate available method.
Construction material stock piles	Erosion from construction material stockpiles may contaminate the soils	The Contractor shall • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds.

ECP 6: Erosion and Sediment Control

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Clearing of construction sites	Cleared areas and slopes are susceptible for erosion of top soils, which affects the	The Contractor shall • Prepare site specific erosion and sediment control measures and submit them for supervision consultant approval.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	growth of vegetation and causes ecological imbalance.	• Reinstate and protect cleared areas as soon as possible. • Cover unused area of disturbed or exposed surfaces immediately with mulch/grass turf/tree plantations.
Construction activities and material stockpiles	The impact of soil erosion are (i) Increased run off and sedimentation causing a greater flood hazard to the downstream, and (ii) destruction of aquatic environment by erosion and/or deposition of sediment damaging the spawning grounds of fish	The Contractor shall • Locate stockpiles away from drainage lines. • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds. • Remove debris from drainage paths and sediment control structures. • Cover the loose sediments of construction material and water them if required. • Divert natural runoff around construction areas prior to any site disturbance. • Install protective measures on site prior to construction, for example, sediment traps. • Install 'cut off drains' on large cut/fill batter slopes to control water runoff speed and hence erosion. • Observe the performance of drainage structures and erosion controls during rain and modify as required.
Soil erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	The Contractor shall • Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion. • Ensure that roads used by construction vehicles are swept regularly to remove sediment. • Water the material stockpiles, access roads and bare soils on an as required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g. high winds).

ECP 7: Top Soil Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Land clearing and earth works	Earthworks will impact the fertile top soils that are enriched with nutrients required for plant growth or agricultural development.	The Contractor shall • Strip the top soil to a depth of 15 cm and store in stock piles of height not exceeding 2m. • Remove unwanted materials from top soil like grass, roots of trees and similar others. • The stockpiles will be done in slopes of 2:1 to reduce surface runoff and enhance percolation through the mass of stored soil. • Locate topsoil stockpiles in areas outside drainage lines and protect from erosion. • Construct diversion channels and silt fences around the topsoil stockpiles to prevent erosion and loss of topsoil. • Spread the topsoil to maintain the physico-chemical and biological activity of the soil. The stored top soil will be utilized for covering all disturbed area and along the proposed plantation sites. • Prior to the re-spreading of topsoil, the ground surface will be ripped to assist the bunding of the soil layers, water penetration and revegetation
Transport	Vehicular movement outside ROW or temporary access roads will affect the soil fertility of the agricultural lands	• Limit equipment and vehicular movements to within the approved construction zone. • Plan construction access to make use, if possible, of the final road alignment.

ECP 8: Topography and Landscaping

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Land clearing and earth works	Construction activities especially earthworks will change topography and disturb the natural rainwater/flood water drainage as well as will change the local landscape.	The Contractor shall • Prepare landscaping and plantation plan and submit the plan for supervision consultant approval. • Ensure the topography of the final surface of all raised lands (construction yards, approach roads and rails, access roads, etc.) are conducive to enhance natural draining of rainwater/flood water. • Keep the final or finished surface of all the raised lands free from any kind of depression that causes water logging. • Undertake mitigation measures for erosion control/prevention by grass-turfing and tree plantation, where there is a possibility of rain-cut that will change the shape of topography. • Cover immediately the uncovered open surface that has no use of construction activities with grass-cover and tree plantation to prevent soil erosion and bring improved landscaping. • Reinstate the natural landscape of the ancillary construction sites after completion of works.

ECP 9: Quarry and Borrow Areas Development & Operation

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Development and operation of borrow and quarry areas	Borrow and quarry areas will have impacts on local topography, landscaping and natural drainage.	The Contractor shall • Prepare borrow and quarry area management plan and submit the plan for supervision consultant approval. • Use only approved quarry and borrow sites

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Identify new borrow and quarry areas in consultation with Project Director, if required. • Reuse excavated or disposed material available in the project to the maximum extent possible. • Store top soil for reinstatement and landscaping. • Develop surface water collection and drainage systems, anti-erosion measures (berms, revegetation etc.) and retaining walls and gabions where required. Implement mitigation measures in ECP 3: Water Resources Management, ECP 6: Erosion and Sediment Control • The use of explosive should be used in as much minimum quantity as possible to reduce noise, vibration and dust. • Control dust and air quality deterioration by application of watering and implementing mitigation measures proposed in ECP 10: Air Quality Management • Noise and vibration control by ECP 11: Noise and Vibration Management.

ECP 10: Air and Dust Quality Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels.	The Contractor shall • Prepare air quality management plan (under the Pollution Prevention Plan) and submit the plan for supervision consultant approval. • Fit vehicles with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition. • Operate the vehicles in a fuel efficient manner. • Cover hauls vehicles carrying dusty materials moving outside the construction site. • Impose speed limits on all vehicle movement at the worksite to reduce dust emissions. • Control the movement of construction traffic. • Water construction materials prior to loading and transport. • Service all vehicles regularly to minimize emissions. • Limit the idling time of vehicles not more than 2 minutes.
Construction machinery	Air quality can be adversely affected by emissions from machinery and combustion of fuels.	The Contractor shall • Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition in accordance with the specifications defined by their manufacturers to maximize combustion efficiency and minimize the contaminant emissions. Proof or maintenance register shall be required by the equipment suppliers and contractors/subcontractors. • Focus special attention on containing the emissions from generators. • Machinery causing excess pollution (e.g. visible smoke) will be banned from construction sites. • Service all equipment regularly to minimize emissions. • Provide filtering systems, duct collectors or humidification or other techniques (as applicable) to the concrete batching and mixing plant to control the particle

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		emissions in all its stages, including unloading, collection, aggregate handling, cement dumping, circulation of trucks and machinery inside the installations.
Construction activities	Dust generation from construction sites, material stockpiles and access roads is a nuisance in the environment and can be a health hazard, and also can affect the local crops;	The Contractor shall • Water the material stockpiles, access roads and bare soils on an as required basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g. high winds). Stored materials such as gravel and sand shall be covered and confined to avoid their being wind-drifted. • Minimize the extent and period of exposure of the bare surfaces. • Restore disturbed areas as soon as practicable by vegetation/grass-turfing. • Store the cement in silos and minimize the emissions from silos by equipping them with filters. • Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations. • Not water as dust suppression on potentially contaminated areas so that a liquid waste stream will be generated. • Crushing of rocky and aggregate materials shall be wet-crushed, or performed with particle emission control systems. • Not permit the burning of solid waste.

ECP 11: Noise and Vibration Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Noise quality will be deteriorated due to vehicular traffic	The Contractor shall • Prepare a noise and vibration management plan (under the Pollution Prevention Plan) and submit the plan for supervision consultant approval.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures. • Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc. • Organize the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise on the work site.
Construction machinery	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor shall • Appropriately site all noise generating activities to avoid noise pollution to local residents. • Use the quietest available plant and equipment. • Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures. Equipment suppliers and contractors shall present proof of maintenance register of their equipment. • Install acoustic enclosures around generators to reduce noise levels. • Fit high efficiency mufflers to appropriate construction equipment. • Avoid the unnecessary use of alarms, horns and sirens.
Construction activity	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor shall • Notify adjacent landholders prior any typical noise events outside of daylight hours. • Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions. • Employ best available work practices on-site to minimize occupational noise levels. • Install temporary noise control barriers where appropriate.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Notify affected people if major noisy activities will be undertaken, e.g. blasting. • Plan activities on site and deliveries to and from site to minimize impact. • Monitor and analyze noise and vibration results and adjust construction practices as required. • Avoid undertaking the noisiest activities, where possible, when working at night near the residential areas.

ECP 12: Protection of Flora

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Vegetation clearance	Local flora are important to provide shelters for the birds, offer fruits and/or timber/fire wood, protect soil erosion and overall keep the environment very friendly to human-living. As such damage to flora has wide range of adverse environmental impacts.	The Contractor shall • Prepare a plan for protection of flora and submit the plan for supervision consultant approval. • Minimize disturbance to surrounding vegetation. • Use appropriate type and minimum size of machine to avoid disturbance to adjacent vegetation. • Get approval from supervision consultant for clearance of vegetation. • Make selective and careful pruning of trees where possible to reduce need of tree removal. • Control noxious weeds by disposing of at designated dump site or burn on site. • Clear only the vegetation that needs to be cleared in accordance with the engineering plans and designs. These measures are applicable to both the construction areas as well as to any associated activities such as sites for stockpiles, disposal of fill a, etc. • Not burn off cleared vegetation – where feasible, chip or mulch and reuse it for the rehabilitation of affected areas, temporary access tracks or

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		landscaping. Mulch provides a seed source, can limit embankment erosion, retains soil moisture and nutrients, and encourages re-growth and protection from weeds. • Return topsoil and mulched vegetation (in areas of native vegetation) to approximately the same area of the roadside it came from. • Avoid work within the drip-line of trees to prevent damage to the tree roots and compacting the soil. • Minimize the length of time the ground is exposed or excavation left open by clearing and re-vegetate the area at the earliest practically possible. • Ensure excavation works occur progressively and re-vegetation done at the earliest • Provide adequate knowledge to the workers regarding nature protection and the need of avoid felling trees during construction • Supply appropriate fuel in the work camps to prevent fuel wood collection.

ECP 13: Protection of Fauna

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities	The location of construction activities can result in the loss of wild life habitat and habitat quality,	The Contractor shall • Prepare a plan for protection of fauna and submit the plan for supervision consultant approval. • Limit the construction works within the designated sites allocated to the contractors. • Check the site for animals trapped in, or in danger from site works and use a qualified person to relocate the animal.
	Impact on migratory birds, its habitat and its active nests	The Contractor shall • Not be permitted to destruct active nests or eggs of migratory birds.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Minimize the tree removal during the bird breeding season. If works must be continued during the bird breeding season, a nest survey will be conducted by a qualified biologist prior to commence of works to identify and locate active nests. • If bird nests are located/ detected within the ledges and roadside embankments then those areas should be avoided. • Petroleum products should not come in contact with the natural and sensitive ecosystems. Contractor must minimize the release of oil, oil wastes or any other substances harmful to migratory birds' habitats, to any waters, wetlands or any areas frequented by migratory birds.
Vegetation clearance	Clearance of vegetation may impact shelter, feeding and/or breeding and/or physical destruction and severing of habitat areas	The Contractor shall • Restrict the tree removal to the minimum numbers required. • Relocate hollows, where appropriate. • Fell the hollow bearing trees in a manner which reduces the potential for fauna mortality. Felled trees will be inspected after felling for fauna and if identified and readily accessible will be removed and relocated or rendered assistance if injured. After felling, hollow bearing trees will remain unmoved overnight to allow animals to move of their own volition.
Night time lighting	Lighting from construction sites and construction camps may affect the visibility of night time migratory birds that use the moon and stars for navigation during their migrations.	The Contractor shall • Use lower wattage flat lens fixtures that direct light down and reduce glare, thus reducing light pollution, • Avoid flood lights unless they are absolutely required. • Use motion sensitive lighting to minimize unneeded lighting. • Use, if possible, green lights that are considered as bird's friendly lighting instead of white or red colored lights. • Install light shades or plan the direction of lights to reduce light spilling outside the construction area.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction camps	Illegal poaching	The Contractor shall • Provide adequate knowledge to the workers regarding protection of flora and fauna, and relevant government regulations and punishments for illegal poaching. • Ensure that staff and Subcontractors are trained and empowered to identify, address and report potential environmental problems.

ECP 34: Road Transport and Road Traffic Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Increased traffic use of road by construction vehicles will affect the movement of normal road traffics and the safety of the road-users.	The Contractor shall • Prepare a traffic management plan and submit the plan for supervision consultant approval. • Strictly follow the Project's 'Traffic Management Plan' and work with close coordination with the Traffic Management Unit. • Prepare and submit additional traffic plan, if any of his traffic routes are not covered in the Project's Traffic Management Plan, and requires traffic diversion and management. • Include in the traffic plan to ensure uninterrupted traffic movement during construction: detailed drawings of traffic arrangements showing all detours, temporary road, temporary bridges temporary diversions, necessary barricades, warning signs / lights, road signs etc. • Provide signs at strategic locations of the roads complying with the schedules of signs contained in the National Traffic Regulations.
	Accidents and spillage of fuels and chemicals	The Contractor shall • Restrict truck deliveries, where practicable, to day time working hours. • Restrict the transport of oversize loads.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Operate vehicles, if possible, to non-peak periods to minimize traffic disruptions. • Enforce on-site speed limit. • Report any accident within 12-24 hours.

ECP 45: Construction Camp Management

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Siting and Location of construction camps	Campsites for construction workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.	The Contractor shall • Prepare a construction camp management plan ensuring labor influx management and submit the plan to NTDC, WB and supervision consultant for approval. • Locate the construction camps within the designed sites or at areas which are acceptable from environmental, cultural or social point of view. • Consider the location of construction camps away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities. • Submit to the supervision consultant for approval a detailed layout plan for the development of the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, and drainage facilities, prior to the development of the construction camps.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Local authorities responsible for health, religious and security shall be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters.
Construction Camp Facilities	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	Contractor shall provide the following facilities in the campsites • Consider impacts of camps on local communities, keep distance and educate workers on code of conduct. • Adequate housing for all workers. • Safe and reliable water supply, which should meet national Environmental Quality Standards of Kazakhstan. Drinking water to be chlorinated at source, and ensure presence of residual chlorine 0.1 ~ 0.25 ppm as minimum after 30 minutes of chlorine contact time (WHO guideline). • Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. Provide separate latrines and bathing places for males and females with total isolation by location. The minimum number of toilet facilities required is one toilet for every ten persons. • Treatment facilities for sewerage of toilet and domestic wastes. • Storm water drainage facilities. • Paved internal roads. • Provide in-house community/common entertainment facilities. Dependence of local entertainment outlets by the construction camps to be discouraged/prohibited to the extent possible.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Disposal of waste	Management of wastes is crucial to minimize impacts on the environment	The Contractor shall • Ensure proper collection and disposal of solid wastes within the construction camps. • Insist waste separation by source; organic wastes in one container and inorganic wastes in another container at household level. • Store inorganic wastes in a safe place within the household and clear organic wastes on daily basis to waste collector. Establish waste collection, transportation and disposal systems with the manpower and equipment/vehicles needed. • Do not establish site specific landfill sites. All solid waste will be collected and removed from the work camps and disposed in approval waste disposal sites.
Fuel supplies for cooking purposes	Illegal sourcing of fuel wood by construction workers will impact the natural flora and fauna	The Contractor shall • Provide fuel to the construction camps for their domestic purpose, in order to discourage them to use fuel wood or other biomass. • Made available alternative fuels like natural gas or kerosene on ration to the workforce to prevent them using biomass for cooking. • Conduct awareness campaigns to educate workers on preserving the protecting the biodiversity and wildlife of the project area, and relevant government regulations and punishments on wildlife protection.
Health and Hygiene	Increased risk of communicable diseases and burden on local health services to be transmitted including malaria, exacerbated by inadequate health and safety practices.	The Contractor shall • Provide adequate health care facilities within construction sites. • Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint fulltime designated first aider or nurse.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Provide ambulance facility for the laborers during emergency to be transported to nearest hospitals. • Initial health screening of the laborers coming from outside areas. • Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work. • Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form. Regular mosquito repellant sprays during rainy season in offices and construction camps and yards. • Not dispose food waste openly as that will attract rats and stray dogs. • Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers. Place display boards at strategic locations within the camps containing messages on best hygienic practices.
Safety	In adequate safety facilities to the construction camps may create security problems and fire hazards	The Contractor shall • Provide appropriate security personnel (police or private security guards) and enclosures to prevent unauthorized entry in to the camp area. • Maintain register to keep a track on a head count of persons present in the camp at any given time. • Encourage use of flameproof material for the construction of labor housing / site office. Also, ensure that these houses/rooms are of sound construction and capable of withstanding wind storms/cyclones. • Provide appropriate type of firefighting equipment suitable for the construction camps • Display emergency contact numbers clearly and prominently at strategic places in camps.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Communicate the roles and responsibilities of laborers in case of emergency in the monthly meetings with contractors.
Social and cultural aspect for Camp setup	Labor Influx in the project area will have risk of social conflict, illicit behavior and crime, burden on and competition for public service provision	The Contractor will • The Contractor will schedule construction time particularly near the settlements, to cause least disturbance to the local population, particularly women. • Contractor will take due care of the local community and observe sanctity of local customs and traditions by his staff. Contractor will warn the staff strictly not to involve in any unethical activities and to obey the local norms and cultural restrictions. • The Contractor will carry out the construction activities in such a way that the open defecation timings by the local community should not be affected. The normal defecation timings are early in the morning and at late in the evening. So, the Contractor will have to take care of these timings. • During construction activities, if privacy of the nearby households is affected, the Contractor will inform the house owner to make some arrangements. Similarly, Contractor will take care as much as possible that the construction activities should not affect the privacy. • The Contractor will also ensure that noise and light pollution from the labor camp is kept at minimal levels especially at night. • Ensure an operational Grievance Mechanism, accessible to the public, is available.
Site Restoration	Restoration of the construction camps to original condition requires demolition of construction camps.	The Contractor shall • Dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates at the completion of the construction work.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Dismantle camps in phases and as the work gets decreased and not wait for the entire work to be completed. • Give prior notice to the laborers before demolishing their camps/units. • Maintain the noise levels within the national standards during demolition activities. • Different contractors should be hired to demolish different structures to promote recycling or reuse of demolished material. • Reuse the demolition debris to a maximum extent. Dispose remaining debris at the designated waste disposal site. • Handover the construction camps with all built facilities as it is if agreement between both parties (contactor and land-owner) has been made so. • Restore the site to its condition prior to commencement of the works or to an agreed condition with the landowner.

ECP 56: Cultural and Religious Issues

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities near religious and cultural sites	Disturbance from construction works to the cultural and religious sites, and contractors lack of knowledge on cultural issues cause social disturbances.	The Contractor shall • Communicate to the public through community consultation regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restriction. • Not block access to cultural and religious sites, wherever possible. • Restrict all construction activities within the foot prints of the construction sites.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Stop construction works that produce noise (particularly during prayer time) should there be any mosque/religious/educational institutions close to the construction sites and users make objections. • Take special care and use appropriate equipment when working next to a cultural/religious institution. • Stop work immediately and notify the site manager if, during construction, an archaeological or burial site is discovered. It is an offence to recommence work in the vicinity of the site until approval to continue is given. • Provide separate prayer facilities to the construction workers. • Show appropriate behavior with all construction workers especially women and elderly people. • Allow the workers to participate in praying during construction time. • Resolve cultural issues in consultation with local leaders and supervision consultants. • Establish a mechanism that allows local people to raise grievances arising from the construction process. • Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works so as to maintain effective surveillance over public health, social and security matters.

ECP 17: Construction and Operation Phase Security

Project Activity/ Impact Source	Impacts /Concerns	Mitigation Measures/ Management Guidelines
Construction Phase	Inadequate construction site security poses a significant risk to assets, construction materials and property. Theft/vandalism of assets, materials and	The Contractor shall:

Project Activity/ Impact Source	Impacts /Concerns	Mitigation Measures/ Management Guidelines
	property would increase construction costs and cause delays in project completion.	• Provide appropriate security personnel (i.e. security guards) to prevent unauthorized entry into the camp area. • Employ night watchman for periods of significant on-site storage or when the area necessitates. • Ensure all assets (i.e., tools, equipment, etc.) and construction materials at construction site are identified, inventoried and tracked as closely as possible. All assets should be clearly labeled and marked. Keep records of tool serial numbers and check inventory on a regular basis. • All tools and equipment should have a check out/in system, if not in use should be secured and stored in a proper place to prevent theft or loss. Provide storage sheds for the secure storage of equipment and tools when not in use. • Ensure there is proper fencing around construction site perimeter. Fencing should be chain-link at least 2.4 m high and secured with a steel chain and lock. If possible the entire site should be fenced; if this is not possible, make sure construction trailer and any equipment storage areas are fenced. • Ensure construction site has controlled access points (one or two entry points at most), allowing for close monitoring of comings and goings from the site. • Workers should be easily identified and have credentials that indicate site access. • No trespassing signs should be posted in conspicuous areas throughout the job site. • List of employees who have after hour access to the property should be available to the BWB and local authorities.

Project Activity/ Impact Source	Impacts /Concerns	Mitigation Measures/ Management Guidelines
		• Ensure job site is properly lighted at night. Well-lit areas should include any office trailers and equipment storage trailers. Floodlights operated by sensors should also be installed where appropriate. • Pre-employment screening investigations should be used to verify the applicants relating to their employment, education and criminal history background.
	Improper security measures may pose security risk for construction workers and especially foreign staff on construction sites.	The Contractor shall: • Prepare site specific security plan. • Maintain register to keep track of number of persons present in the camp at any given time. • Provide appropriate security personnel at job sites as mentioned above. • Ensure proper fencing as mentioned above. • Ensure controlled access points to job site as mentioned above. • Ensure works have easily identified credentials as mentioned above. • Ensure job sites are properly lighted at night, as mentioned above.
Operation Phase	Vandalism/damage (including use of explosives) and theft of infrastructure (i.e. metals and etc.).	• Ensure strategic infrastructure sites are secure and fenced with controlled access points. Fencing should be chain-link at least 2.4 m high and secured with a steel chain and lock.

Annex 10 - Contractor's ESMP (C-ESMP) GUIDE & TEMPLATE

1. GUIDE FOR DEVELOPMENT OF C-ESMP

Step 1: Define Project Boundaries
Step 2: Identify Sensitive Receptors
Step 3: Specify construction activities
Step 4: Conduct Risk Assessment
Step 5: Assign Environment and Social Management measures
Step 6: Prepare Site Specific Management Plans
Step 7: Prepare Work Permits
Step 8: Monitoring and Evaluation

Step 1: The project area needs to be clearly defined.

Step 2: The mapping of sensitive receptors has already been conducted and needs to be presented clearly in a map. Consult ESIA as a guideline to identify the sensitive receptors.

Step 3: The tentative construction activities to be conducted are as follows:

- Layout Setting and Survey
- Site Clearance and relocation of Utilities
- Establishment of Construction Camps & Workshop
- Transportation & Storage of Construction Materials
- Use of Construction Material and Heavy Machinery
- Roadwork (levelling, preparation of sub grade, sub base, base and wearing course);
- Structure works and reinstatement of roads
- Spoil Disposal
- Miscellaneous Works
- Finishing, Road Furniture and Commissioning

Step 4: The Risk Assessment matrix template is provided in the table below.

Risk is assessed as the <u>likelihood</u> that the activity will have an effect on the environment and social component as well as the <u>consequence</u> of the effect occurring. It is often described like this:

Risk = Likelihood × Consequence

Likelihood Scale

Likelihood	Definition	Scale
Certain	Will certainly occur during the activity at a frequency greater than every week if preventative measures are not applied	5
Likely	Will occur more than once or twice during the activity but less than weekly if preventative measures are not applied	3
Unlikely	May occur once or twice during the activity if preventative measures are not applied	2
Rare	Unlikely to occur during the project	1

Consequence Scale

Consequence	Definition	Score
Catastrophic	The action will cause unprecedented damage or impacts on the environment and social components or surrounding communities' e.g. • extreme loss of trees, crops soil and water resources and quality • extreme pollution of soil and water resources including major contamination from hazardous materials • widespread effects on ecosystems with deaths of fauna/flora • widespread community impacts resulting in illness, injury or inconvenience • loss or destruction of archaeological or historical sites • Occurrence will almost certainly result in the work being halted and a significant fine.	5
Major	The action will cause major adverse damage on the environment and social components or surrounding communities' e.g. • major loss of crops, trees, soil and water resources and quality from storm water runoff • major pollution of soil and water resources including contamination from hazardous materials • significant effects on ecosystems with isolated deaths of non-vulnerable flora and fauna • significant annoyance or nuisance to communities • major damage to or movement required to archaeological or historical sites • Occurrence may result in work being halted and a fine	3
Moderate	No or minimal adverse environmental or social impacts e.g. • No measurable or noticeable changes in water quality. Water quality remains within tolerable limits • little noticeable effect on ecosystems • no or isolated community complaints • no or unlikely damage to archaeological or historical sites • no likelihood of being fined	2
Minor	No or minimal adverse environmental or social impacts e.g. • No measurable or noticeable changes in water quality. Water quality remains within tolerable limits • little noticeable effect on ecosystems • no or isolated community complaints • no or unlikely damage to archaeological or historical sites • no likelihood of being fined	1

Risk Score Table

Likelihood	Consequence				
		Catastrophic	Major	Moderate	Minor
	Certain	25	15	10	5
	Likely	15	9	6	3
	Unlikely	10	6	4	2
	Rare	5	3	2	1

Risk: **Critical: >25**

High: 15-25

Medium: 6-10

Low: 2-5

Negligible: 1

Any Medium to High risk requires environmental and social management measures to manage the potential environmental risk. Judgment will be required concerning the application of an environmental and social management measure to mitigate low risk situations.

The Critical risk, more intensive the mitigation measures will be required. The selection of the appropriate mitigation measure will require judgement based on the level of risk and the specific site parameters.

Step 5: The Environmental and Social Management measures are to be extracted from the ESIA study for this project and will be added in the last column of the *table* below.

Step 6: The Site plans are a critical part of the C-ESMP and will need to be prepared; otherwise the document will be considered as incomplete.

The each site plan will need to provide the following:

- Indication of north and scale
- Existing and planned supporting infrastructure
- Location of planned work
- Contours
- Locations of sensitive receptors
- Risk Assessment as per project activity
- Management and monitoring procedures, resources, role and responsibility and frequency.
- Registration of non-compliance and corrective action accordingly.

Step 7: The completed C-ESMP provides details of all the environmental and social management requirements for all stages of the construction process. For individual activity, teams who are responsible for only a small part of the overall construction works might be confused as to what extent management and mitigation is required for their particular work component.

In situations where different work activities are required at different times or at different locations, environmental and social working plans will be prepared. These are similar to the work method statements that are often produced for major construction projects.

Step 8: A detailed monitoring plan will be provided along with frequency and responsibilities to ensure all key environmental parameters are monitored to ensure compliance with both national and AIIB's ESF requirements.

No.	Construction Activity	Impact / Hazards to Consider	Likelihood that the site or sensitive receptors will be affected?	Consequence of the site or sensitive receptors being affected?	Risk Score (consequence x likelihood)	Environmental and Social Management Measures
1						
2						
3						
4						
5						
6						

1. TEMPLATE FOR C-ESMP

1. **Introduction**
   1.1 Project Overview
   1.2 Scope of C-ESMP
   1.3 Objectives of C-ESMP
2. **Map of Sensitive Receptors**
3. **Construction Activities**
   3.1 Activities
4. **Risk Assessment**
   4.1 Risk Assessment Matrix & Mitigation Measures
5. **Site Plan(s)**
6. **Environmental Monitoring Plan**
   6.1 Instrumental Monitoring of Environmental Parameters by Contractor as per ESMP
   6.2 In-house monitoring
   6.3 Third Party environmental monitoring
   6.4 Visual monitoring of Environmental and Social Parameters by Contractor as per ESMP
7. **Responsibilities**
   7.1 Organizational Responsibilities and Communication
   7.2 Responsibility of E&S specialist of PMC
   7.3 Responsibility of Construction Supervision Consultant (CSC)
   7.4 Responsibility of Contractor
   7.5 Responsibility of AIIB and MENR

Annex 11 - Chance Find Procedure

1. BACKGROUND

The purpose of this document is to address the possibility of archaeological deposits becoming exposed during ground altering activities within the project area and to provide protocols to follow in the case of a chance archaeological find to ensure that archaeological sites are documented and protected as required.

The Law No. 288-VI "On Protection and Use of Historical & Cultural Heritage Sites" of Kazakhstan 2019, protects archaeological sites, whether on Kazakhstan Government owned or private land. They are non-renewable, very susceptible to disturbance and are finite in number. Archaeological sites are an important resource that is protected for their historical, cultural, scientific and educational value to the general public and local communities. Impacts to archaeological sites must be avoided or managed by development proponents. The objectives of this 'Archaeological Chance Find Procedure' are to promote preservation of archaeological data while minimizing disruption of construction scheduling It is recommended that due to the moderate to high archaeological potential of some areas within the project area, all on site personnel and contractors be informed of the Archaeological Chance Find Procedure and have access to a copy while on site.

2. POTENTIAL IMPACTS TO ARCHAEOLOGICAL SITES

Developments that involve excavation, movement, or disturbance of soils have the potential to impact archaeological materials, if present. Activities such as road construction, land clearing, and excavation are all examples of activities that may adversely affect archaeological deposits.

3. RELEVANT LEGISLATION

Law No. 288-VI "On Protection and Use of Historical & Cultural Heritage Sites" of Kazakhstan 2019 ensures the protection, preservation, development and maintenance of antiquities. The Act defines "antiquities" as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the relevant provincial governments to prohibit excavation in any area that may contain articles of archaeological significance. Under the Act, the project proponents are obligated to ensure that no activity is undertaken in the proximity of a protected antiquity, report to the Ministry of Culture and Information (MCI) of the Republic of Kazakhstan, any archaeological discovery made during the course of the project.

4. ARCHAEOLOGICAL 'CHANCE FIND' PROCEDURE

If you believe that you may have encountered any archaeological materials, stop work in the area and follow the procedure below:

The following 'chance-find' principles will be implemented by the contractor throughout the construction works to account for any undiscovered items identified during construction works:

i. Workers will be trained in the location of heritage zones within the construction area and in the identification of potential items of heritage significance.
ii. Should any potential items be located, the site supervisor will be immediately contacted and work will be temporarily stopped in that area.
iii. If the site supervisor determines that the item is of potential significance, an officer from

the MCI will be invited to inspect the site and work will be stopped until MCI has responded to this invitation.

iv. Work will not re-commence in this location until agreement has been reached

v. between MCI and QazAvtoZhol as to any required mitigation measures, which may include excavation and recovery of the item.

vi. A precautionary approach will be adopted in the application of these procedures.

5. DETAILED PROCEDURAL STEPS

- If the official of MCI receives any information or otherwise has the knowledge of the discovery or existence of an antiquity of which there is no owner, he shall, after satisfying himself as to the correctness of the information or knowledge, take such steps with the approval of the Government, as he may consider necessary for the custody, preservation and protection of the antiquity.
- Whoever discovers, or finds accidentally, any movable antiquity shall inform forth with the MCI within seven days of its being discovered or found.
- If, within seven days of his being informed, the official decides to take over the antiquity for purposes of custody, preservation and protection, the person discovering or finding it shall hand it over to the official or a person authorized by him in writing.
- Where the official decides to take over an antiquity, he may pay to the person by whom it is handed over to him such cash reward as may be decided in consultation with the Advisory Committee.
- If any person, who discovers or finds any movable antiquity contravenes the provisions of the Act, he shall be punishable with imprisonment for a term which may extend to five (05) years, or with fine not less than fifteen hundred thousand rupees or with both and the Court convicting such person shall direct that the antiquity in respect of which such contravention has taken place shall stand forfeited to Government.
- The officer authorized by him with police assistance may, after giving reasonable notice, enter into, inspect and examine any premises, place or area which or the sub-soil of which he may have reason to believe to be, or to contain an antiquity and may cause any site, building, object or any antiquity or the remains of any antiquity in such premises, place or area to be photographed, copied or reproduced by any process suitable for the purpose.
- The owner or occupier of the premises, place or area shall afford all reasonable opportunity and assistance to the Official.
- No photograph, copy of reproduction taken or made shall be sold or offered for sale except by or with the consent of the owner of the object of which the photograph, copy or the reproduction has been taken or made.
- Where substantial damage is caused to any property as a result of the inspection, the officer shall pay to the owner thereof reasonable compensation for the damage in consultation with the Advisory Committee.
- If the official after conducting an inquiry, has reasonable grounds to believe that any land contains any antiquity, he may approach the relevant Government department to acquire such land or any part thereof and the department shall thereupon acquire such land, as for a public purpose.

ANNEX 12 GUIDELINE NOISE MANAGEMENT PLAN (NMP)

This Noise Management Plan (NMP) forms part of the Environmental and Social Management Plan (ESMP) for the A-27 Atyrau–Dossor highway reconstruction project. It outlines procedures, responsibilities, and mitigation measures to manage and minimize adverse noise impacts during both construction and operation phases.

Objective

To prevent, minimize, and manage noise and vibration impacts generated by project activities on workers, nearby communities, and sensitive receptors, ensuring compliance with national noise standards / IFC/WHO guidelines whichever is stringent.

Applicable Standards and Guideline Limits

The NMP ensures compliance with the Environmental Code of Kazakhstan (2021), SanPiN Standards for Noise and Vibration (Order No. KR DSM-15, 2022), AIIB Environmental and Social Policy (ESP 2016), and IFC/WHO guidelines.

Table: Applicable Noise Standards

Receptor Type	Daytime (07:00–22:00)	Nighttime (22:00–07:00)	Reference
Residential, Institutional, Educational	55 dB(A)	45 dB(A)	IFC/WHO EHS Guidelines
	55 dB(A)	45 dB(A)	Kazakhstan SanPiN (2022)
Industrial, Commercial	70 dB(A)	70 dB(A)	IFC/WHO EHS Guidelines
	70 dB(A)	60 dB(A)	Kazakhstan SanPiN (2022)
Construction Site Boundary	75 dB(A)	70 dB(A)	IFC EHS Guidelines

Key Noise Sources

Construction Phase:

- Heavy machinery (excavators, bulldozers, compactors, cranes, batching plants)
- Material transport vehicles and dump trucks
- Piling, concrete mixing, and asphalting activities
- Temporary crushing or batching sites
- Workers' camp and vehicle maintenance yards

Operational Phase:

- Continuous road traffic noise (light and heavy vehicles)
- Intermittent noise from braking, acceleration, and loading/unloading

- Maintenance works (asphalt milling, grass cutting, street sweeping)
- Combined or **cumulative noise** with adjacent **railway operations**

Mitigation and Management Measures

Following mitigation and management measures must be ensured during construction and operation phases of the project.

Table Noise Mitigation and Management Measures

Aspect	Mitigation / Management Measures
Construction Phase	
Equipment Noise	• Use only well-maintained and modern equipment fitted with mufflers and silencers. • Install acoustic enclosures for stationary generators, compressors, and batching plants. • Avoid simultaneous operation of multiple high-noise equipment where feasible.
Scheduling	• Restrict high-noise activities (piling, compaction, concrete mixing) to daytime hours (07:00–19:00). • Nighttime works only permitted in exceptional cases with prior notice to local authorities and affected communities.
Site Layout	• Locate noisy equipment and temporary facilities away from sensitive receptors (minimum 300 m where possible). • Use natural temporary noise barriers (earth bunds, containers, panels) around high-noise sources.
Traffic and Haul Routes	• Designate fixed haulage routes avoiding residential clusters. • Enforce speed limits (≤30 km/h) within construction zones. • Use reverse alarms of lower frequency (“broadband” type) for trucks and machinery.
Worker Protection	• Provide PPE such as earmuffs or earplugs to personnel working near noisy equipment (>85 dB(A)). • Implement rotational work schedules to limit exposure duration.
Community Communication	• Notify nearby residents and local authorities at least one week prior to noisy construction activities. • Provide a grievance redress mechanism for noise-related complaints.
Operation Phase	
Road Design	• Use low-noise pavement. • Maintain smooth pavement conditions to minimize tire–road noise.
Traffic Management	• Enforce speed limits near settlements. • Restrict heavy vehicle movement during nighttime near sensitive areas.
Noise Barriers	• Noise modeling shall be carried out before completion of construction to provide effective measures before the start of the O&M phase. Install vegetative greenbelts, earth berms, or acoustic walls along road segments adjoining sensitive receptors based on the outcomes of noise modeling prior to the operation phase. • Coordinate placement with railway noise sources to maximize combined effect.

Aspect	Mitigation / Management Measures
Maintenance	• Regular maintenance of road surface and vehicles to avoid excessive mechanical noise. • Schedule road maintenance works during daytime.
Cumulative Noise Coordination	• Collaborate with railway authorities to synchronize operations and avoid overlapping noise peaks. • Conduct joint noise monitoring campaigns to assess cumulative exposure levels.

Monitoring Plan

Contractor will prepare a comprehensive noise monitoring plan for construction phase while QazAvtoZhol will ensure the monitoring of the operation phase activities in collaboration with the line department. The plan is shown in Table.

Table: Noise Monitoring Plan

Parameter	Location	Frequency	Responsibility	Remarks
Ambient Noise (Leq dB(A))	At sensitive receptors (e.g., nearest residential areas, schools, health facility)	Baseline prior to works; Quarterly during construction; Annually during operation	Contractor (construction); O&M Agency (operation)	Compare with stringent noise limits (IFC and Kazakh limits)
Occupational Noise (dB(A))	At work zones and equipment operator cabins	Quarterly	Contractor (HSE Officer)	Maintain below 85 dB(A) for 8-hour TWA
Cumulative Noise (Road + Rail)	At overlapping transport corridor	Semi-annual (first two years of operation)	Joint Road & Rail Authority	Assess interaction with railway noise
Community Feedback	Hotline and grievance logs	Continuous	Contractor / PIU / O&M Agency	Respond within 7 days to all noise complaints

Reporting and Responsibilities

Contractor and supervision consultant will ensure compliance during construction. The Road Operating Agency (QazAvtoZhol) in collaboration with line departments will manage operational monitoring.

Corrective Actions

If monitoring results exceed stringent noise limits, the following corrective action will be adopted:

- Identify and verify the source of exceedance.
- Implement additional control measures (e.g., temporary barriers, equipment replacement, rescheduling).
- Re-monitor within two weeks to confirm effectiveness.
- Document findings and corrective actions in environmental compliance reports.

Documentation and Reporting

The following documentation will be ensured to report the noise impact and its mitigation and management actions.

- Baseline noise survey reports
- Noise monitoring data sheets
- Equipment maintenance logs
- Training and awareness records
- Community notification and grievance registers
- Quarterly Environmental and Social Monitoring Reports covering all above aspects

Anne 13 Women Empowerment and Gender Equality in Kazakhstan

This note on women Empowerment and Gender is prepared in the context of AIIB financed Atyrau-Dossor Reconstruction Project in Kazakhstan. This forms an integral part of the Environmental and Social Impact Assessment prepared by the Republic of Kazakhstan. Organization of this note is premised on capturing the Gender Equity achievements made by Kazakhstan in the past two decades; then identify areas for further improvement and the issues specific to the project, and finally a Gender Acton Plan to address the same.

Gender Achievements in Kazakhstan

Kazakhstan is the ninth largest country in the world. It is landlocked with just over 20 million people and has one of the lowest population densities. Kazakhstan is an upper-middle-income country with a per capita GDP of USD 13,088.5 (2023). As the country made significant economic advancement, the concept of Family and Gender has received substantial attention. Planned efforts have been made to develop a comprehensive approach to integrate the principle of equality between women and men in policy documents in all areas and at all levels of decision-making and implementation. Notable milestones are listed below.

- Kazakh women were afforded full suffrage in 1993, two years after independence.
- In 1999 the country adopted the National Action Plan on 'Improving the Status of Women in the Republic of Kazakhstan', which outlined twelve points to improve Kazakh women's lives.
- 2006, Kazakhstan adopted a ten-year national gender equality strategy, intending to improve women's participation in Kazakh public life.
- 2006-Kazakhstan became the first country in Central Asia to establish a national entity to promote gender equality --the National Commission on Women, Family and Demographic Policy.[32]
- 2006 Kazakhstan ranked 32nd globally out of 115 in the World Economic Forum's Gender Gap Index. The country ranked particularly highly in women's economic participation, placed 16th in the world. Within this subsection, Kazakhstan was 1st in gender balance when it came to professional and technical workers. In health and survival, the country ranked 36th, and achieved number one in healthy life expectancy.
- 2009, the Kazakh parliament ratified 'Law of State Guarantees of Equal Rights and Equal Opportunities for Men and Women' and the 'Law on the Prevention of Domestic Violence'.

[32] EIAS_Policy_Brief_Kazakhstan_Gender_Equality_2020.pdf

- 2016, Kazakhstan approved the Concept of Family and Gender Policy up to 2030, with the goal to ensure equal rights to women and prevent gender-based equality in female employment and career growth.

- The updated Concept of Family and Gender Policy until 2030 now includes plans to increase to 30 per cent by 2030 the share of women at decision-making levels in executive, representative and judicial authorities, state, quasi-state, and corporate sectors. The same policy sets steps to decrease domestic violence against women, improve the gender wage gap, and increase women's ownership of assets

- Kazakhstan has ratified several international conventions, including the Beijing Declaration and Platform for Action (1995), the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), the Convention on the Political Rights of Women (1999), the Convention on the Nationality of Married Woman (1999), and eight fundamental Conventions of the International Labour Organization (ILO), and the 2030 Agenda for Sustainable Development.

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Strategy Focus, Achievements and Gaps

Kazakhstan's Gender Strategy is focused on seven priority areas:

- Gender equality in the public and political spheres;
- Gender equality in the economic sphere;
- Gender education;
- Improving reproductive health of men and women;
- Prevention of gender-based violence;
- Strengthening of the family; and
- Raising public awareness on gender equality

Achievements & Gaps

Accomplishments. Kazakhstan stands classified as having "very high human development" according to the Gender Development Index (GDI). It is one of only 21 countries worldwide, and the only in Central Asia, in which the female Human Development Index (HDI) score is equal to or greater than the male HDI score.[33] With a higher life expectancy and greater educational

[33] https://files.acquia.undp.org/public/migration/kz/9d96eb2ba9b703996f92a3c2b0e737ba1d4ba71cf14dea3338e9cd440da25974.pdf

attainment, Among the countries of Central Asia, Kazakhstan is a leader in progress on gender equality, ranking 76th out of 146 countries in the Global Gender Gap Index 2024,[34] a report designed to measure gender equality. The country has received the highest score in the "level of education" category and scored highly in the area of "survival and health". Kazakhstan's Gender Inequality Index (GII)l has also improved significantly since 2008 thanks to fewer maternal deaths, a reduced adolescent birth rate, more women in parliament, and a higher share of women with at least some secondary education.

Despite a higher female HDI, Gender Inequality Index (GII) results show that women in Kazakhstan are still not reaching their full human development potential due to gender inequalities across three dimensions: i) reproductive health, ii) empowerment (measured by educational attainment and political participation), and iii) labor market participation.

Gaps- Income and Participation. Women in Kazakhstan outperform men on all HDI indicators except for income. Persistently gender imbalances remain for wages and access to employment and career opportunities. In 2022, the gender wage gap was 25.2 per cent in favor of men. The disparity is most pronounced in high-paying sectors such as finance, construction, and transportation. Key factors contributing to this gap include:[35]

Industrial and Occupational Segregation. The over-representation of women in lower-paying sectors and their under-representation in high-paying industries directly contravenes the goal of equal economic opportunity

Sticky Floor and Glass ceilings**.** Structural phenomena, including the "sticky floor" that confines women to low-wage employment, portraying Social Norms, and the "glass ceiling" that blocks their advancement to senior leadership positions, are prevalent.

Unpaid Care Work and Motherhood Disadvantage**.** Women disproportionately undertake unpaid domestic and care responsibilities, a challenge recognized in SDG 5.4. This, combined with career interruptions and workplace prejudice related to motherhood, results in significant financial disadvantages and exacerbates economic inequality.

Traditional Gender Stereotypes**.** Deeply ingrained cultural norms and gender stereotypes remain a significant obstacle. A UNDP survey found that 96% of the population holds at least one gender bias, such as the belief that men are superior business executives or political leaders. These stereotypes limit women's professional advancement and reinforce occupational segregation, hindering the fundamental objective of gender equality.

Women participation in Kazakhstan – 2023, as depicted in Fig -1. reveals the following:[36]
Zero – Akims in regions
3% -- Corporate Leadership
16% -- Government
18%-- Mazhils

[34] Global Gender Gap Report 2024 | World Economic Forum
[35] Tackling the Gender Wage Gap in Kazakhstan – The Borgen Project – sdgtalks.ai
[36] Kazakhstan | UN Women – Europe and Central Asia

Despite a higher female HDI, Gender Inequality Index (GII) results show that women in Kazakhstan are still not reaching their full human development potential due to gender inequalities across three dimensions: i) reproductive health, ii) empowerment (measured by educational attainment and political participation), and iii) labor market participation In simple terms, progress still leaves room for improvement in the areas of "political empowerment" and "economic participation and opportunity".

Gender Gaps in Transport Sector

Gender-based occupational segregation is high in Kazakhstan, due to past exclusion of women from 287 occupations before Labor Code reforms in 2022. A 2024 review of twelve road construction companies operating in the country indicated that the road construction sector exemplifies this gender divide. It remains male-dominated, with women occupying less than six percent of highly skilled technical roles such as road engineers, laboratory engineers, and surveyors. The challenges construction companies face in recruiting women are multifaceted and include working conditions, distance from homes, and prevailing social norms that discourage women from pursuing careers in construction. These need to be overcome before the sector can attract women.

The labor market figures mirror education statistics, which exhibit gender segregation by fields of study. For example, according to the data collected from three technical universities located in the Project area and Almaty that teach courses relevant to the road construction sector, the share of female students graduating from undergraduate and graduate studies in the 2023-24 academic year varied from 8 percent to 26 percent depending on the institution.[37]

Current Scenario. Kazakhstan has almost reached gender parity for access to education, and women represent the majority of students at higher education institutions making up 64 percent of those studying for masters' degrees and 58 percent of those pursuing doctoral studies. Despite the high numbers of women in employment and in full-time education, Kazakh society is prone to traditional perceptions about the roles of women and men. Consequently, the majority of the female labor force is predominantly concentrated in three traditional sectors such as education, health and services.[38] The division of responsibilities within families remains rigid and women experience a double work burden of home-related tasks and employment in the labor force. There is significant underemployment and unemployment among women in Kazakhstan. It is estimated that there are two million women categorized as 'self-employed'. In fact, these are either women who are informally employed or are employed in the informal sector, and are denied and lack all social guarantees, such as maternity benefit, sickness benefit, and pensions. There is also vertical and horizontal discrimination of women in the labor market.

[37] ALT University in Almaty, named after Mukhametzhan Tynyshpayev, NJSC "Karaganda Technical University, named after Abylkas Saginov" and JSC "Zhezkazgan University, named after O.A. Baikonurov."
[38] The World Bank, Kazakhstan Sustainable Livestock Development Program (P170365) Environmental and Social Systems Assessment (ESSA), June 2020.

A significant socially vulnerable group in Kazakhstan is rural women – especially those who have been obliged to marry early or have low levels of education. Rural households in general suffer from high unemployment rates and low incomes, because seasonal work for many households is the only means of earning a living. The root cause of violence against children in rural areas is frequently household poverty and lack of opportunities for women. The prevalence of gender-based violence remains an important socio-economic barrier for women, with every one out of three women suffering from a form of physical, sexual or other form of violence.

In summary, the gender agenda—pursued integrally through economic and social policies—has been mainstreamed into education, health, social protection, and labor market policies. Key issues are the political empowerment of women; making the business climate friendlier to women and addressing unmet demand for childcare facilities. The coverage of preschool education is low and full coverage is an official objective. In addition, gender gaps in three areas require attention: low male life expectancy, lagging male tertiary enrollment, and the gender wage gap. The male-female gap in life expectancy at 10 years exceeds the world average of six years. The gender gap in tertiary education is large (32 percent vs. 45 percent), raising concerns about sustaining productivity gains into the future. Finally, the gender wage gap in Kazakhstan of 35 percent is above the regional average of 29 percent and could reflect factors such as occupation segregation, hours worked and years of experience. The forthcoming Concept on Family and Gender Policy for 2030 in Kazakhstan is currently being elaborated and includes, among other issues, important action plans to develop the public sector capacity, increase international collaboration, reduce stereotypes in education and employment and combat violence against women.

Women in Kazakhstan are still not reaching their full human development potential due to gender inequalities across three dimensions: i) reproductive health, ii) empowerment (measured by educational attainment and political participation), and iii) labor market participation In simple terms, progress still leaves room for improvement in the areas of "political empowerment" and "economic participation and opportunity". Given this backdrop, further efforts are being made to develop an Action Plan for the project.

ISSUES RELATED TO THE PROJECT

The people are very supportive and happy to have a modern 4-lane road. The main benefits they mentioned were increased safety, reduced time to reach towns, reduced car maintenance, development of roadside businesses and the opportunity for local people to open some small businesses to serve travelers on this road.

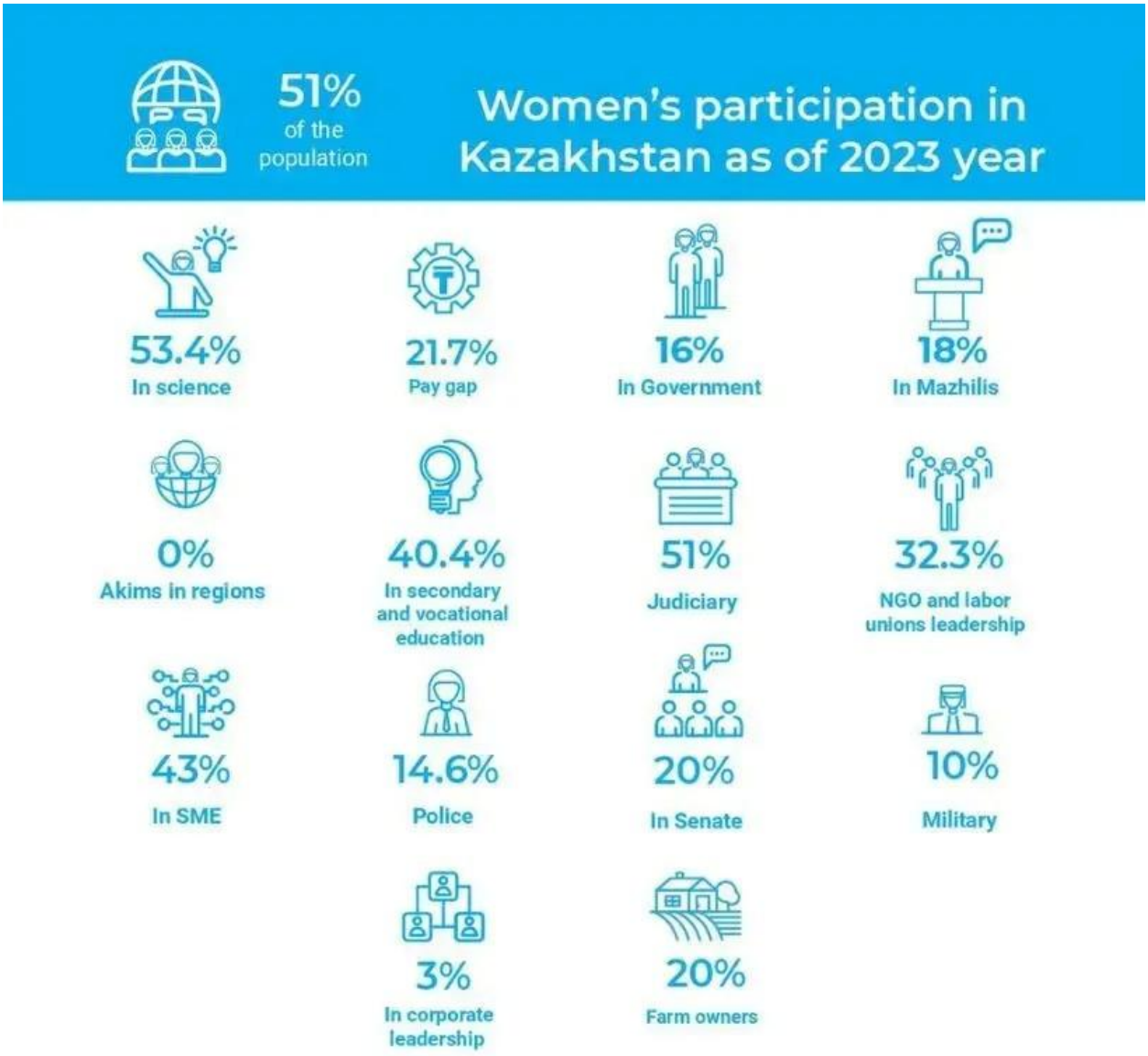
Women could be more confident to drive if the road had two lanes in each direction. This will enhance visibility and avoid accidents to a large extent. The women expect the driving culture to change when a modern road is completed, and they want proper signaling through the villages (light signals are best, as simple pedestrian crossings are usually disregarded by drivers). Fencing

the road should be done to prevent domestic animals from accessing the road, regular cleaning of the road to be organized, control of indiscriminate dumping of rubbish, and ensuring that the Contractor leaves everything clean when he moves on. They also are keen to have roadside plantations which may be quite difficult given the extreme climatic conditions.

All expect to gain some employment from the project, as there are many skilled people in the villages and employment opportunities are scarce. However, men stated that they would benefit from some short training on how to operate the new modern machinery that they expect the contractor to use. This will simply allow them to refresh their existing skills, which they have not used for some time as there has been no opportunity to do so. Other skills available include concrete workers, bricklayers, excavators, asphalt layers, drivers of all kinds, economists, engineers, and other university degrees professions. Women are also very keen to work on the project. They have office skills, they can cook, clean, sell their homemade products, rent out their additional buildings and earn some money. The women said that other responsibilities at home, with families, children, etc. would not interfere with their work. Women would like training in beauticians, hairdressers, accountancy, basic legal skills and small business management to enhance their income and lifestyle.

Particular issues for women in the project areas include limited employment opportunities, limited opportunities for young people who tend to complete education in the cities and do not return to live in their villages. The only places where men and women in these villages can find some employments are in schools, kindergartens, medical stations and akimats. There are no other opportunities for employment. Many men go to other regions to work, and they mostly work for two weeks and stay at home for two weeks. Women said that there are no restrictions on their employment, but there are no opportunities and probably not enough skills or desire for some positions such as heavy road machinery operators. They hope to get some work when the road construction starts.

The issue of resettlement was of paramount importance to women, although the number of women landowners affected by the road is negligeable. They are concerned about the ‘access’ both temporarily and permanently. Land loss is certainly an issue for those who do not possess substantial piece of land. The women are afraid that they would be paid a very low administrative price or offered land for land in places that would be very difficult for them to access. Men too expect expected fair compensation for their losses. For those with larger parcels of land, resettlement will not be an issue as the road will boost them economically.


51%
of the
population
Women's participation in
Kazakhstan as of 2023 year
53.4%
In science
21.7%
Pay gap
16%
In Government
18%
In Mazhilis
0%
Akims in regions
40.4%
In secondary
and vocational
education
51%
Judiciary
32.3%
NGO and labor
unions leadership
43%
In SME
14.6%
Police
20%
In Senate
10%
Military
3%
In corporate
leadership
20%
Farm owners

Gender Action Plan

Objectives

- Promote equitable access to project benefits for women and men.
- Enhance women's participation in decision-making and employment.
- Mitigate gender-based risks, including GBV, SEA/SH and exclusion.
- Align with Kazakhstan's national gender strategy and international commitments

The Gender Action Plan (GAP) developed for the project aims to ensure that women fully share in the benefits of the project and to address priority concerns expressed by local women themselves. It includes gender-sensitive road design and road safety features, as well as access roads to maximize benefits for women living away from the main route. The proposed project will provide opportunities for women to work and earn income during the reconstruction of the road and to participate in various capacity building activities and trainings that might be organized under the project. Some training on gender awareness/mainstreaming and decision-making will benefit women.

Women's jobs (as women stated) may include a variety of activities such as bookkeeping, cooking, selling their produce to road workers, cleaning, and other skilled and unskilled jobs.

Orientation and training of women on labor-based appropriate technology activities should be conducted in the villages to increase women's awareness about the project, the types of jobs or functions they could participate in, etc.

In the context of resettlement, women will be encouraged to participate in monitoring and evaluation and in addressing social and environmental impacts. Progress reports with gender-disaggregated socio-economic data will provide regular updates on the impact of land acquisition and resettlement on women. Internal and external monitoring of the implementation of the resettlement plan will integrate monitoring measures and progress in addressing gender-related aspects of the project.

GAP activities will be monitored on a regular basis and the GAP Progress Monitoring Report will be prepared by the PMC as part of the regular ES Progress Report for submission to the Executive and/or Implementing Agencies (EA/IA) and lenders.

The GAP will ensure that the program complies with the Constitution and Labor Code of the Republic of Kazakhstan and Law of the Republic of Kazakhstan No. 223-IV of 8 December 2009 "On State Guarantees of Equal Rights and Opportunities for Men and Women".

Action Plan

The following activities shall be undertaken to accomplish the objectives.

Component	Actions	Indicators
Baseline Assessment	**- Conduct gender-disaggregated socio-economic survey** **- Identify vulnerable groups**	**- Survey completed** **- % of female-headed households identified**
	Collect data on land ownership, employment, income, and access to services—broken down by gender. Identify vulnerable groups: female-headed households, widows, rural women, disabled women, etc. Use this data to inform design, compensation, and engagement strategies	
	Establish a gender-disaggregated database of unskilled labor at the PIU level (Akimat's level) and inventory of unskilled labor (men and women) to be prepared in each village for hiring of the unskilled labor prior to the commencement of the civil works.	
Stakeholder Engagement	**- Ensure women's participation in consultations** **- Use female facilitators and translators as needed.** - Schedule consultations at times and locations accessible to women.	**- % of women attending meetings** **- # of women consulted** -Number of programs conducted exclusively for women
Employment & Labor Inclusion	**- Promote hiring of women in construction and admin roles** **- Enforce equal pay**	**- % of female workers hired** **- Wage parity confirmed** -% of local workers
	Target of at least 50% of laborers to be from the local area and should include women during civil works, through conditions in bid documents. The efforts should be made to employ women at all levels, from low skilled (manual labour, cooks, cleaners), to mid-skilled (machine operators, etc.) to high-skilled (engineers, accountant, medical specialists, etc.).	Ensure that all civil works contracts include core labor standards including equal pay for the work of equal value. Confirm the same.

Workplace Safety & Capacity Building	**Provide gender-sensitive facilities (toilets, changing rooms/ lockers, PPE etc)** - Contractor shall provide necessary support by providing plastic boots. Gloves, helmets and other safety equipment - Conduct training for men and women in skills needed at the project construction phase (machinery operators, asphalt workers, guards, cooks etc)	**Facilities installed** **- # of workers trained on gender sensitivity**
Equitable Land Acquisition & Compensation	Recognize informal land use and ensure women are consulted during asset valuation. Ensure compensation mechanisms are accessible to women (e.g., bank accounts, literacy support).	
GBV, SEA/SH	**-Conduct GBV, SEA/SH risk assessment** **- Establish confidential reporting channels** - Conduct risk assessments during project design once and then as required. Train workers and contractors on respectful behavior and reporting protocols. Ensure signing of code of conduct by all the staff and contractor Partner with local health and legal services for survivor support.	**- GBV/ SEA/SH protocol in place** **- # of cases reported and resolved**
Road Safety	Training and inclusion of women in awareness training on the road safety issues at least in 2 districts covered by the project	**-% of women attending these programs.**
Grievance Redressal	**- Include gender focal points** **- Track gender-disaggregated complaints** Include women in grievance redress processes.	**- % of grievances filed by women** **- Resolution rate** -%of SEA/SH grievances -% resolved amicably.
Monitoring & Evaluation	**- Track gender indicators** **- Conduct midterm gender review**	**- Gender KPIs developed and reported quarterly** **- Midterm review completed** -Gendered Adjustments made based on the results of the MTR