



**MINISTRY OF TRANSPORT
THE REPUBLIC OF TAJIKISTAN**

**PROJECT IMPLEMENTATION UNIT
FOR ROAD REHABILITATION**

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

TAJIKISTAN: DANGARA – GULISTON ROAD

Supplementary Report

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List of Abbreviation

ADB	Asian Development Bank
AH	Affected Household
AP	Affected Person
BMP	Biodiversity Management Plan
BOQ	Bill of Quantities
CEP	State Committee for Environmental Protection of Tajikistan
CH	Critical Habitat
CSC	Construction Supervision Consultant
DMS	Digital Measurement Survey
E&S	Environmental and Social
EA	Executive Agency
EBRD	European Bank for Reconstruction and Development
EHS	Environment Health and Safety
EMP	Environmental Management Plan
ESAP	Environmental and Social Action Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy
EU	European Union
GHG	Greenhouse Gas
GOST	National Standards (Gosudarstvennye Standarty)
GRM	Grievance Redress Mechanism
HSMP	Health and Safety Management Plan
IBA	Important Bird Area
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature and Natural Resources
LARP	Land Acquisition and Resettlement Plan
LTA	Lender's Technical Advisor
MOT	Ministry of Transport
NTS	Non-Technical Summary
PAP	Project Affected People
PBF	Priority Biodiversity Features
PIURR	Project Implementation Unit for Road Reconstruction
PR(s)	Performance Requirement(s)
SAEMR	Semi-Annual Environmental Management Report
SEE	State Ecological Expertise
SEP	Stakeholder Engagement Plan
SES	Social Economic Survey
SMA	Stone Mastic Asphalt
SPS	ADB Safeguard Policy Statement
SSEMP	Site Specific Environmental Management Plan
WHO	World Health Organisation

1 Introduction and Background

The European Bank for Reconstruction and Development (the "EBRD" or the "Bank") is considering providing funds to the Government of the Republic of Tajikistan, in collaboration with the Asian Development Bank (ADB), for the reconstruction of the Dangara-Guliston road, a 49 km section of the 1000 km Dushanbe-Khorog-Kulma regional East-West corridor. EBRD and ADB are jointly referred to as Financiers.

The project road is part of the Bokhtar-Okmazor-Dangara-Guliston road, which is an important highway of international importance in Tajikistan. The road is partly hilly, and its route consists of small turns and steep slopes. The Dangara-Guliston road crosses three districts (Dangara, Farkhor and A. Hamadoni), connecting the jamoats of Korez, Ismat Sharif and Guliston with the cities of Dangara and Guliston. The existing section of the Dangara-Guliston road belongs to the technical category III road. The width of the existing roadway is from 9.0 to 11.0 m. The roadway surface is heavily damaged by cracks in places and visibility is not ensured. The current technical category of roads does not correspond to the expected future traffic volume. In this regard, it is planned to reconstruct and modernize the Dangara-Guliston road to technical category I (a four-lane highway). The project road passes through the following rural villages: Shahbur, Khurramzamin, Buleni poyon, Bakhoriston and Shukhtarar. The beginning of the project road section is taken as a T-junction of Bokhtar - Dangara - Guliston road, on the border of the designed road construction project "Reconstruction of Zebuniso street in Dangara". The end of the designed section is approximately 49 km, taken at the border of the project "Reconstruction of the Guliston-Kulob highway", financed by the World Bank.

The Project Road has deteriorated significantly over the years and is currently in poor condition, with numerous deficiencies and damages. Due to the existing substandard technical condition of the road, transportation has become unreliable and costly. The asphalt pavement is severely damaged, and the base, which consists of coarse soil, does not meet GOST standards. The average thickness of the base is 0.20 m. Additionally, there is no functioning drainage system, and various physical and geological processes are further degrading the remaining intact roadbed. In many areas, stagnant water persists for more than 30 days a year, causing flooding of the road embankment. In conclusion, the Project is urgently needed.

The Project is jointly financed by the Asian Development Bank (ADB) and the European Bank for Reconstruction and Development (EBRD). The project design and the safeguard documents, prepared in accordance with ADB standards, commenced in 2020 and are now nearing completion. Following ADB standards, the project has been environmentally categorized as 'B,' leading to the preparation of an Initial Environmental Examination (IEE), which is currently being updated based on the latest feedback from ADB. In terms of resettlement considerations, the project is categorized as 'A'.

The EBRD guidelines do not differentiate between environmental and social impact categories, and thus the entire Project is categorized as 'A'. As a result, an Environmental and Social Impact Assessment (ESIA) must be prepared following the latest EBRD standards (Environmental and Social Policy, April 2019).

Extensive environmental and social assessments have been conducted for the preparation and finalization of the ADB safeguard documents. However, with the EBRD's involvement as an additional financier, the Project documents must comply with both ADB and EBRD standards.

Therefore, additional documents needed to be prepared which include the following:

- ⇒ This ESIA Supplementary Report,
- ⇒ Livelihood Restoration Plan as an addendum to the Land Acquisition and Resettlement Plan (LARP) prepared under the ADB contract,
- ⇒ Stakeholder Engagement Plan (SEP),
- ⇒ Environmental and Social Action Plan (ESAP),
- ⇒ Non-Technical Summary (NTS),
- ⇒ Update of the Environmental Management Plan (EMP) prepared within scope of work of the ADB contract to an Environmental and Social Management Plan (ESMP) (with detailed mitigation measures).

1.1 Supplementary Report Rationale

The rationale of the supplementary report is to supplement to existing project E&S documentation gaps, which were identified as part of the project gap analysis conducted against EBRD Environmental and Social Policy (ESP) and EU requirements.

1.2 Supplementary Report Scope

Scope of work for preparation of the supplementary report is based on the outcome of the Gap Analysis against EBRD Environmental and Social Policy requirements

1.3 Supplementary Report Content

The report addresses the gaps identified in relation to the EBRD PRs. Therefore, the content of the report is structured according to the PRs 1 to 10 of the EBRD ESP (April 2019).

The present Supplementary ESIA report does not repeat the information and assessments already provided in the IEE, prepared for ADB (2024). The reader shall notably refer to the IEE for the following topics

- ⇒ **Environmental Baseline Conditions for the Physical, Biological and Socioeconomic Environment.** These are in detail described in the IEE in the chapter VI “Description of the Environment” under the subheadings: A Physical Resources in

Project Area, B Ecological Resources in the Project Area and C Socioeconomic Environment.

- ⇒ **Instrumental baseline measurements on water quality, air quality, noise and vibration.** These measurements are provided and discussed in the IEE chapter VI “Description of the Environment” under the subheading E BASELINE MEASUREMENTS. In addition, more detailed information on the instrumental measurement results are provided in the following annexes of the IEE: Annex 1 - REPORT ON WATER QUALITY, Annex 2 - REPORT ON AIR QUALITY AND NOISE, Annex 7 - BASELINE MEASUREMENTS ON VIBRATION AND AIR QUALITY INCLUSIVE PM 10 AND PM 2.5.
- ⇒ **Environmental Impacts and Mitigation Measures.** These are in detail provided and discussed in the chapter ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES of the IEE according to the pre-construction and design phase, the construction phase and the operation phase.

Although the technical Project is in detail described in the IEE, the description is repeated in the following chapters. This is because all assessments refer to the technical Project and therefore, repeating the technical description, allows the consistent reading of the whole report without the need to switch in between the 2 documents IEE and Supplementary ESIA report.

1.4 The Project

1.4.1 Overview

The Dangara-Guliston Project Road section is 49 km long and forms one of the important roads of regional significance in the southern region of the Republic. The Project Road is part of the Bokhtar-Okmazor-Dangara-Guliston road, which is an important trunk road of international significance in Tajikistan. It provides important transport links, supply of agricultural products and industrial raw materials. The road is running partly through hilly terrain and the road alignment consist of small curves and steep gradients. The Dangara-Guliston road traverses three districts (Dangara, Farkhor and A. Hamadoni Districts) by connecting the Jamoats of Korez, Ismat Sharif and Guliston to the cities of Dangara and Guliston.

The existing road falls into technical category III. The project road consists of one carriageway with two traffic lanes width of 3.50 m, in each lane. Traffic volumes indicates that the existing road category is not adequate for the anticipated future traffic volumes and improvement/upgrading of the road category to category I was therefore designed.

The Dangara-Guliston Project Road provides important transport links, supply of agricultural products and industrial raw materials. It forms part of a significant transport connection through the People's Republic of China, Afghanistan and further south to Pakistan. The project road section runs through arid country with steppe like vegetation. The relief is characterized by smooth low-lying mountains.

The below map in figure 1 provides an overview of the Project Road



Figure 1 – Project Location Map of the Dangara-Guliston Road

The Dangara-Guliston road reconstruction follows the existing alignment. No spatial alternatives are foreseen.

1.4.2 Type and Technical Category of Project

1.4.2.1 Existing Road Characteristics

The Project Road length is 49+032 km and forms one of the important roads of regional significance in the Khatlon region of the Republic of Tajikistan.

The geometrical parameters of the existing motor road correspond to technical road category III according to SNIP. Intersections and junctions with secondary roads are carried out at the same level. The general direction of the road is from north to south.

The existing carriageway consists of two traffic lanes (one in each direction) of 3.5 meters. Roadsides strips of 2.5 - 4.0 m width are stretching alongside both sides and are reinforced with soil and gravel materials. The existing carriageway has an asphalt concrete pavement with an average thickness of 0.139 m on a base layer of coarse soils. According to the visual survey, the existing roadway surface and adjoining ramps are worn out, which is expressed in the presence of longitudinal and transverse cracks and a large number of areas where patching was carried out (figure 6). Drain systems are mostly absent, drainage from the roadway is unsafe.

This road passes through the following village-type settlements: Shakhbur, Khurramzamin, Buleni Poyon, Bahoriston and Shukhtarer. In settlements, there are generally no sidewalks and street lighting, which contribute to a high level of traffic accidents in conditions of insufficient visibility at night.

Drainage is carried out by means of soil ditches, in some places by monolithic and prefabricated reinforced concrete trays.

The culvert system is made of prefabricated reinforced concrete, metal and asbestos cement pipes of different diameters

1.4.2.2 Designed Road Characteristics and Technical Parameters

The beginning of the projected section - km 0 + 000, is taken as a T-shaped junction of the Bokhtar - Dangara - Guliston highway, on the border of the projected object "Reconstruction of Zebuniso street in Dangara.

The end of the projected section is km 49+032, adopted at the border of the projected facility "Reconstruction of the Guliston-Kulyab Highway", financed by the World Bank.

The main purpose of this motor road is transport communication between the capital and some regions of the Khatlon region, as well as the Gorno-Badakhshan Autonomous region. It is possible to travel along it from the Republic of Uzbekistan and from the Islamic Republic of Afghanistan towards the Republic of Kyrgyzstan and the People's Republic of China.

According to the terms of reference for the design and based on the future anticipated traffic volumes, it was necessary to develop a project according to the norms of roads of the 1st category according to SNIP. Drawing the axis of the road in plan and profile was carried out in such a way as to maximize the use of the existing building line and minimize the impact of the project - the withdrawal of private land for permanent use. This will ensure the safety of all road users.

The road design is in accordance with SNiP 32-02-2012 "Automobile roads" and SNiP RT 30-01-2018 "Urban planning. Planning and development of settlements." The following main technical parameters were taken as a basis:

- ⇒ Road category - I-b in rough terrain, with an estimated speed of 100 km/h,
- ⇒ The lane width is 3.5-3.75 m,
- ⇒ Number of traffic lanes - 4 pcs,
- ⇒ The smallest width of the pedestrian part of the sidewalks is 1.5-3.0 m,
- ⇒ The smallest radius of curves in the plan is 600 m,
- ⇒ The smallest radius of curves in the longitudinal profile: convex - 10,000 m. concave - 3,000 m,
- ⇒ The maximum longitudinal slope is 50 ‰,
- ⇒ Type of road surface - asphalt concrete,
- ⇒ Estimated load for pavement - 115kN per axle.

When developing the design solutions, the main task was to maximize the preservation of the existing boundaries of building lines in settlements and to minimize the volume of earthworks, taking into account compliance with the requirements of current regulatory documents on the territory of the Republic of Tajikistan.

The guiding main criteria for developing the design were:

- ⇒ the maximum possible use of the open strip of land between the road edge and the adjacent building lines,
- ⇒ minimization of and land acquisition to the degree possible under the given technical constraints (upgrade from technical category III to category I and cross section widening from 2 to 4 lanes),
- ⇒ minimizing the demolition of existing building structures,
- ⇒ requirements for ensuring traffic safety

The designed cross section of the road includes four driving lanes, a central dividing strip, shoulders and sidewalks from the green zone in settlements. Sidewalks are located on both sides and in some places on one side of the road. According to the Terms of Reference for the design, a bicycle path is provided along the entire length of the road (on the right side). Depending on the terrain, twenty-four types of cross sections were adopted during the development of the project, which are given in Book 1 of the technical Project documentation - Typical Drawings. The below figures show some typical cross sections.

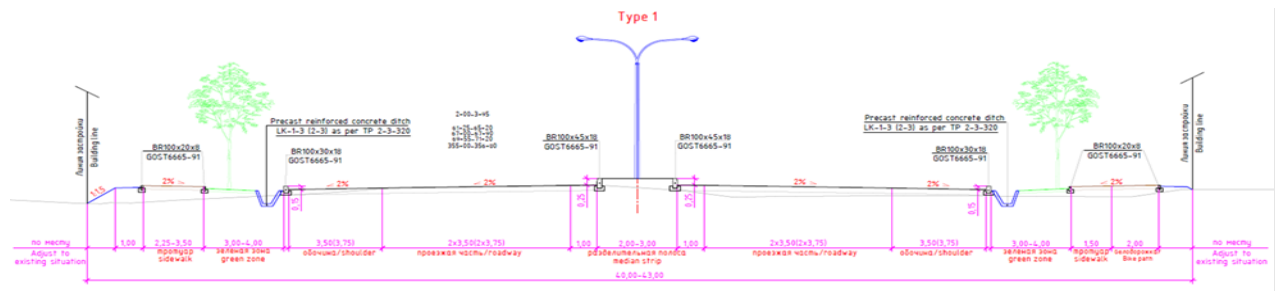


Figure 2 – Typical cross section in settlement with sidewalk and bicycle lane

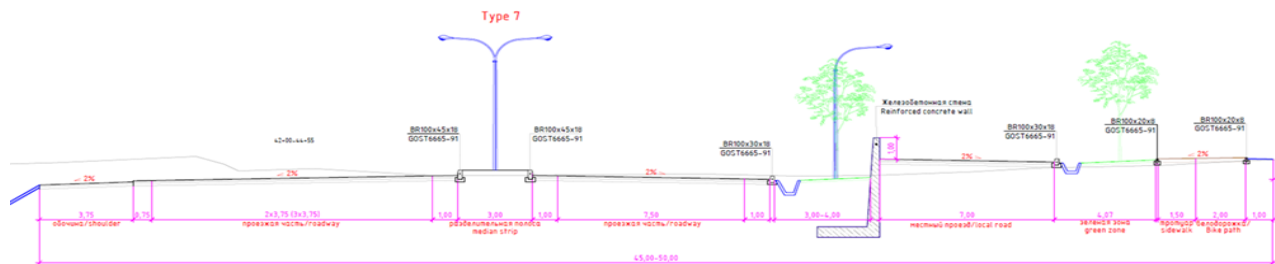


Figure 3 - Typical cross section in settlement area with local road (4 lanes plus local road)

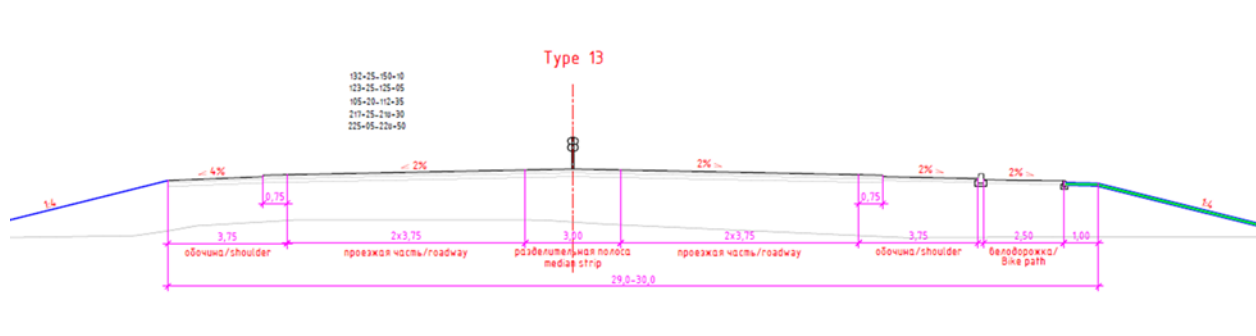


Figure 4 - Typical cross section outside settlements (4-lanes. Category I)

In settled areas, the implementation of sidewalks, street lightening and green strips for improvement of road safety are considered in the design.

Cross-section parameters are related to traffic flows and will vary with the requirements of vehicular traffic. The road cross-section incorporates all elements between the road boundaries including carriageways, shoulders, verges, including cutting or embankment slopes. The cross-section elements serve several purposes and have a significant impact on construction costs, road operation and safety. The cross section in combination with the alignment will determine the earthwork quantities. Lane and shoulder width greatly impact traffic operations and safety therefore the road width should be kept to a minimum so as to reduce the costs of construction and maintenance whilst being sufficient to carry traffic loading efficiently and safely. According to the intended classification of the road, the design speed is 100 km /h.

1.4.3 Need for the Project

The Project Road has deteriorated over the years and is in currently bad condition with numerous shortcomings and damages. Due to the existing poor technical condition of the road, transport is getting unreliable and expensive. The asphalt pavement is destroyed. The base, consisting of coarse soil, does not comply with GOST. The average thickness of the base is 0.20 m. There is no functioning drainage and numerous physical and geological processes are destroying the remaining intact roadbed. In many places stagnant water occur for more than 30 days over the year including flooding of the road embankment.

In summary the need for the reconstruction of the highway is caused by the inconsistency of the existing technical category and the deterioration of the existing route. Therefore, the reconstruction of the Dangara-Guliston road is urgently needed. The below photo (Figure 6) exemplifies the deficient situation of the existing Project road.



Figure 5 - Severely Damaged Road Pavement (Photo taken 30.04.2024)

1.4.4 Size or Magnitude of Operation

The Project involves the reconstruction and upgrade from technical category III to category I of the existing Dangara-Guliston road over the length of 49 km. The design alignment is mostly based on the existing alignment with minor adjustments made to improve geometric characteristics, wherever practical. No spatial alternatives or bypasses are foreseen under this Project. The Project will

involve a number of associated activities such as utilization of borrow areas, operation of asphalt plants and aggregate crusher, establishment of contractor's worker camps and storage sites, etc.

- ⇒ The anticipated works for reconstruction of the Dangara-Guliston Project Road comprise:
- ⇒ Reconstruction and widening of road pavement
- ⇒ Replacement of bridges
- ⇒ Replacement of culverts and improvement of drainage system
- ⇒ Construction of sidewalks and bicycle lane settled areas
- ⇒ Installation of road lighting in settled areas
- ⇒ Improvement of traffic safety due to proper road signing and marking and installation of guardrails
- ⇒ Provision of bus stops with passenger shelters
- ⇒ Construction of retaining walls.

The works will be procured in accordance with ADB procurement rules and guidelines for Open Competitive Bidding (OCB) and based on detailed design drawings. In addition, the bidding documents must comply with the EBRD ESP (2019), particularly the PR 2 (Labour and Working Conditions).

2 Address of the Gaps Identified in relation to the EBRD PRs and Proposed Solutions

In the following chapters the identified gaps in relation to the EBRD PRs are described and the proposed solutions to close these gaps presented.

2.1 Assessment and Management of Environmental and Social Impacts and Issues (PR 1)

As part of the ADB contract for the Project the consultant has prepared an Initial Environmental Examination (IEE). The IEE includes an extensive and detailed Environmental and Social Assessment for the Project and its whole lifecycle. The IEE is structured in compliance with the provisions of the ADB's Safeguard Policy Statement SPS (2009) and consists of the following 11 chapters:

- ⇒ Executive summary
- ⇒ Introduction
- ⇒ Policy, legal, and administrative framework
- ⇒ Description of the project

- ⇒ Analysis of alternatives
- ⇒ Description of the environment
- ⇒ Anticipated environmental impacts and mitigation measures
- ⇒ Environmental management plan
- ⇒ Information disclosure, consultation, and participation
- ⇒ Grievance redress mechanism
- ⇒ Conclusions and Recommendations

In addition, the IEE includes the following annexes

- ⇒ Annex 1 - REPORT ON WATER QUALITY
- ⇒ Annex 2 - REPORT ON AIR QUALITY AND NOISE
- ⇒ Annex 3 - ALIGNMENT SHEETS
- ⇒ Annex 4 - BIODIVERSITY SURVEY
- ⇒ Annex 5 - MOM OF PUBLIC CONSULTATIONS
- ⇒ Annex 6 - IDENTIFIED AREAS FOR SURPLUS MATERIAL DISPOSAL
- ⇒ Annex 7 - BASELINE MEASUREMENTS ON VIBRATION AND AIR QUALITY INCLUSIVE PM 10 AND PM 2.5

In order to be able to assess and manage the Environmental and Social impacts and issues it is necessary to establish the baseline conditions within the Project Area of Influence, meaning the study area. The study area for the environmental and social assessment is described in the chapter 1 of the IEE “Study Area and Project Categorization”. The environmental and social baseline data compiled for the Project are in detail described in the chapter VI “Description of the Environment”. It is structured into the physical, biological and socioeconomic environment. The baseline for each type of environment is in detail described.

Within scope of work of the IEE, in addition, instrumental measurements and laboratory analysis has been undertaken for water quality, air quality, noise and vibration (annex 1, annex 2 and annex 7 of the IEE). These complete the baseline data to a complete picture and allow to assess the Project’s impacts and risks.

There is no national protected area within the wider vicinity of the study area. There is however an IBA (Important Bird Area), the Dangara Massif, that is marginally traversed by the Project road. Therefore, a biodiversity baseline survey has been conducted in 2020 within scope of work of the

IEE. Potential impacts on the IBA were analysed in the IEE and mitigation measures developed in compliance with national law and ADB SPS (2009).

It is a gap that the biodiversity survey conducted 2020 is not fully complying with the PR 6. Therefore, in order to also verify compliance with the EBRD PR 6 an additional biodiversity survey has been undertaken which results are described in chapter 2.6.

In summary, with the exception of the gap identified regarding the biodiversity, the baseline data presented in the IEE are aligned with the requirements of the PR 1.

There are however discrepancies regarding the EBRD PR 1 which include the different reporting format and also the used terminology. Therefore, the following additional documents were prepared in addition to this ESIA Supplementary Report:

- ⇒ Environmental and Social Management Plan (ESMP)
- ⇒ Non-Technical Summary (NTS)
- ⇒ Stakeholder Engagement Plan (SEP)
- ⇒ Environmental and Social Action Plan (ESAP)
- ⇒ Livelihood Restoration Plan as addendum to the LARP prepared under the ADB contract

The IEE includes an Executive Summary. This needs to be updated and transformed into the Non-Technical Summary (NTS) which according to EBRD requirements is a standalone document. In addition, an Environmental and Social Action Plan (ESAP) needs to be prepared. The EMP which is included in the IEE needs to be revised and updated to an ESMP for fully compliance with PR1.

2.1.1 Environmental and Social Management Systems

For the Dangara-Guliston road reconstruction Project the relevant organizational entity for the project implementation and environmental and social management is the PIURR, as Project implementation authority. Within the PIURR the Project's Environmental and Social Management System rests with the Environmental and Social Officers.

PIURR will be responsible for the overall implementation of the environmental mitigation, management and monitoring measures and requirements specified in the Environmental and Social Management Plans prepared for this Project. They will be required to oversee implementation of the SSEMPs developed by the contractor to ensure it fulfils all identified environmental, health, safety and social requirements under the loan agreement for the Project.

PIURR is responsible for ensuring roles and responsibilities are clearly identified and allocated for environmental, health, safety and social, gender, both within PIURR itself, within the contractors' arrangements and for the handover to operations.

The organization structure for the PIURR safeguard team is shown in the below Organigram.

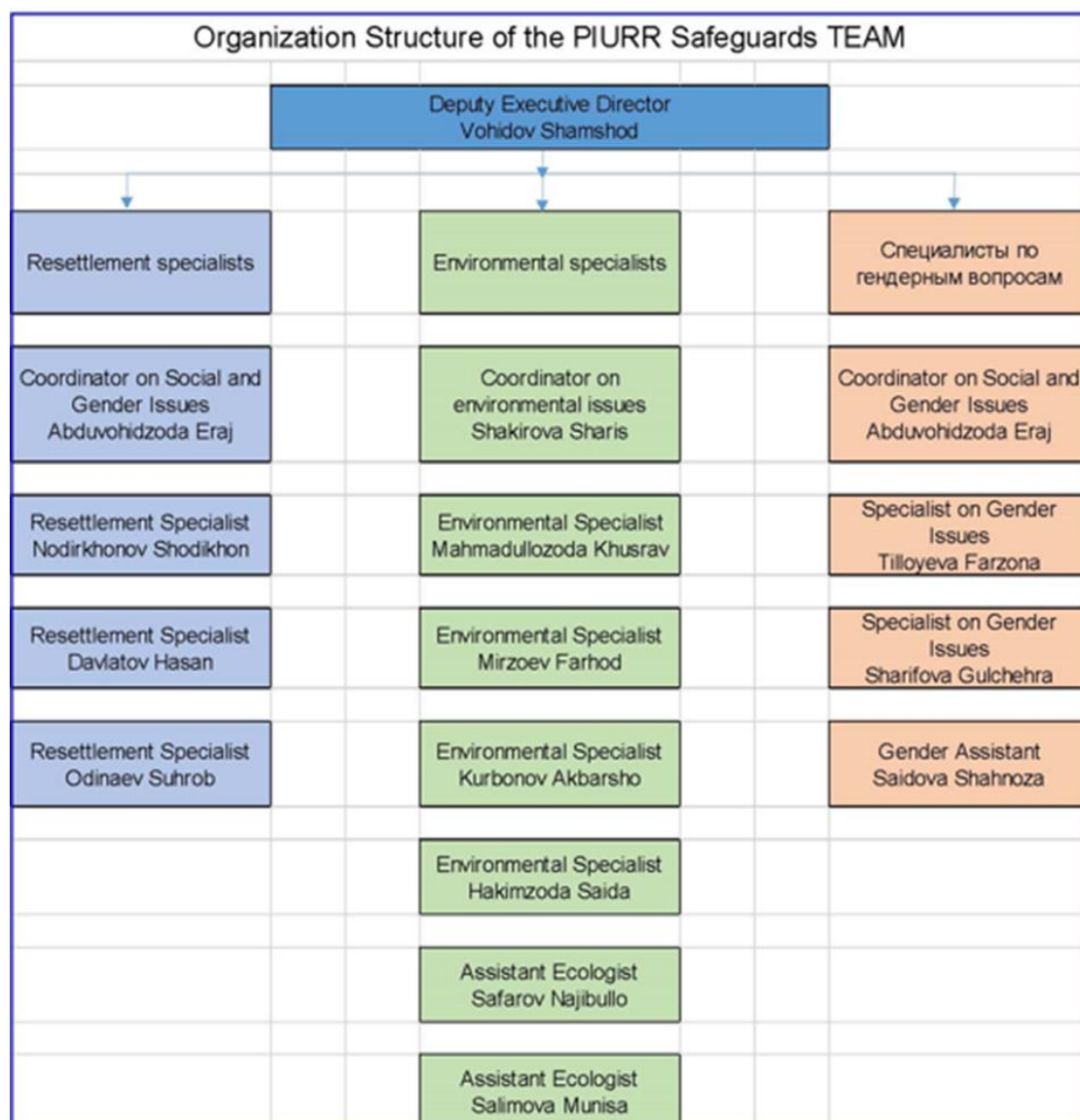


Figure 6 - Organization Structure of the PIURR Safeguard Team

Functional responsibilities of the PIURR safeguard experts and their main duty is to coordinate the implementation of environmental, social and gender issues. That is, supporting the consultants in reporting, harmonization, submission to ADB, etc.

The key Environmental and Social covenants are set out in the EMP of the IEE and in the ESMP which are part of the bidding documents during the Contractor selection process, for inclusion in the Contractor ESMS.

The Contractor will be responsible for implementing an ESMS that is in line with International Standards and Financiers' requirements.

The Contractor will be required to appoint appropriately qualified specialists with the following expertise, to ensure that the ESMS is implemented to the required standards:

- ⇒ Environment,
- ⇒ Health and Safety and
- ⇒ Social, Land Acquisition and Resettlement.

2.1.2 Environmental and Social Management Plan

For the reconstruction and widening from 2 to 4 lanes of the Dangara-Guliston road the following two Environmental and Social Management Plans (ESMPs) are in place:

- ⇒ The EMP which is included in the IEE and which describes the implementation arrangements and in addition all the various measures proposed under this Project, which were designed to avoid, mitigate, or compensate the adverse environmental impacts that may result from the Project. As such the EMP considers all phases of the Project cycle, namely the detailed design, construction and operational phases of the Project.
- ⇒ The framework ESMP which is a standalone document and supplements the EMP

In result the EMP of the IEE (in the following text named EMP) and the additional ESMP, prepared under the EBRD requirements, together form the Project's ESMP are included in the tender documents for Works.

Based on these two documents the Contractor is obliged to:

Implement Environmental and Social Management System for construction works aligned with Good International Practice and PIURR ESMS.

Appoint suitably qualified personnel responsible for management of specific projects aspects, as a minimum but not limited to:

- ⇒ Environmental Specialist
- ⇒ Health and Safety Coordinator
- ⇒ Social and Land acquisition and Resettlement Specialist.
- ⇒ Biodiversity Specialist
- ⇒ Gender Specialist

The contractor must prepare detailed Site Specific Environmental and Social Management Plans based on the EMP and ESMS.

Implement the plans and undertake the construction works in line with Financiers safeguards policies and specific provisions included in the ESAP, EMP, ESMP, SEP, LARP and Livelihood Restoration Plan.

2.1.3 Project Monitoring and Reporting

Regarding the monitoring during the construction phase, this in compliance with ADB SPS (2019) and national requirements.

Because the Project is categorized as A by EBRD, additional requirements regarding the monitoring activities may arise which includes the deployment of an LTA (Lender's Technical Advisor) and/or IESC (Independent Environmental and Social Advisor) to monitor the project implementation. Therefore, additional supervision will be appointed by PIURR based on the international financing which includes additional E&S resources as part of the CSC team to oversight and supervise the project and the ESAP implementation by the Contractor/s.

2.2 Labour and Working Conditions (PR 2)

Generally, projects are required to comply, at a minimum, with (i) national labour, employment and social security laws, (ii) the fundamental principles and standards embodied in the ILO core conventions, and (iii) EBRD PR 2.

Tajikistan has ratified the core International Conventions of ILO and has made significant efforts to harmonize the National Labour Legislation with widely accepted International practices. The ILO Conventions ratified by Tajikistan include:

- ⇒ ILO Convention No. 87 on Freedom of Association and Protection of the Right to Organize
- ⇒ ILO Convention No. 98 on the Right to Organize and Collective Bargaining
- ⇒ ILO Convention No. 29 on Forced Labor I
- ⇒ LO Convention No. 111 on Discrimination in Employment and Occupation
- ⇒ ILO Convention No. 100 on Equal Remuneration
- ⇒ ILO Convention No. 138 on Minimum Age for Admission to Employment
- ⇒ ILO Convention No. 182 on the Worst Forms of Child Labor
- ⇒ ILO Convention No. 155 on Occupational Safety and Health

The ratified international conventions take precedence over existing national legislation, and it is the country's obligation to ensure compliance by eliminating detected gaps and controversies. As a step towards the compliance with the International Labour practices

Tajikistan replaced the Labor Code of the Republic of Tajikistan with new one - No 1329 enacted on 23 July 2016 under No 1329, which was last amended in 2022. The Labour and Social Security issues are covered also in the various Laws and regulations which are being continuously reviewed and amended by the country's Government and Parliament.

In order to check the compliance of the prepared documents with the various subitems of the PR 2 the GCC (General Contract Conditions) and PCC (Particular Contract Conditions) for the Project have been in detail reviewed and the results are in detail presented in the following chapters.

As part of the EMP of the IEE the contractor needs to prepare 20 site specific management plans which include among others a Construction Camp Management Plan which shall detail the labourer's accommodation and management. In addition, and according to EBRD requirements a Labour Management Plan and Accommodation Management Plan is in place. These were prepared as part of the ESMP for inclusion into the tendering documents.

2.2.1 Human Resource Policies and Working Relationships

EBRD PR 2 requires the Client to maintain written understandable, accessible, and communicated to workers, human resources policies in accordance with the requirements of this PR and national law.

However, the Ministry of Transport, as the Project EA (Executive Agency), did not develop its policy as it requires complicated processing and approval procedure. Instead, it follows national labour legislation and project-specific requirements of the project's donor for managing labour issues. The EHS Code of the Conduct for the Contractor included in the tendering documents and include the provisions for maintaining of the safe and healthy working environment.

The requirements regarding the human resource policies are addressed in the IEE, but with focus is on the health and safety for the workers and on the Grievance Redress Mechanism.

This includes the client's approach for managing the workforce and is aligned with the national law and adequate to the size of the Project.

2.2.2 Child and Forced Labour

The Labour Code of Tajikistan permits the employment of workers who are 15 years old, but it enforces strict requirements for ensuring special work conditions for workers under 18. Article 4 of the Labor Code prohibits the use of female workers and workers under 18 years old in heavy, underground, and hazardous work conditions. Therefore, no workers under 18 years old will be employed for the project which is in compliance with PR 2 as mentioned in the Contract documents.

The Forced Labour as it defined by the ILO Convention No 29 is also prohibited by the Law (Labour Code, Article 18).

There will be a strong and professional Construction Supervision in place as stipulated in the EMP of the IEE and also in the chapter “Monitoring and Reporting” of the IEE. It is warranted that there is no risk of child labour or forced labour in the supply chain.

2.2.3 Non-Discrimination and Equal Opportunity

The Tajikistan’s Labour Code prohibits discrimination in the labour sector (Article 7) based on the differences in ethnicity, race, gender, religious, political beliefs, social status, education and property is warranted by National Law. Compared to national legislation, the non-discrimination requirements in EBRD PR 2 are more comprehensive, encompassing marital and family status as well as age, gender identity and other points.

2.2.4 Workers’ Organizations

EBRD PR 2 (15) requires to inform workers about their right to elect workers’ representatives, form or join workers’ organizations of their choosing and engage in collective bargaining, in accordance with national law.

The Labour Code of Tajikistan declares the right of the workers (Article 18) on the associations, including the professional unions, to present and protect their labor rights. The right is further delineated in the Law of Tajikistan regarding "Trade Unions," which was adopted on August 2, 2011.

Therefore the bullet is complied with on the basis of the National law.

2.2.5 Wages, Benefits and Conditions of Work

In accordance with the Labor Code of Tajikistan (Article 140.2), discrimination in wage payment is prohibited. The government established a minimal size of the payment to be paid to the workers. Wages and benefits are complied with on the basis of the National law.

Working conditions, with particular focus on training, health and safety is in detail described and addressed in the IEE.

The Employer will not provide Worker Accommodation under this project.

2.2.6 Retrenchment

Article 132 of Tajikistan's Labour Code requires the payment of at least one month's salary to a worker in the case of retrenchment. Under certain conditions, this could be extended to two or three months.

No collective dismissal is envisaged. Contractor will continue work at other construction Projects after finalization.

Also, there is no retrenchment at PIURR.

2.2.7 Worker Accommodation

EBRD PR2.19 states that “where a client provides accommodation for project workers, the PIURR will put in place and implement policies governing the quality and management of the accommodation and provision of services”. The requirements of PR 2 to worker accommodations are comprehensive and further outlined in the IFC and EBRD Guidance Note for Worker's accommodation processes and standards and Toolkit for EBRD Clients; EBRD Performance Requirement 2, Labour and Working Conditions.

Tajikistan has not established formal specific requirements for temporary construction camps. However, it has implemented numerous laws and regulations to ensure proper sanitary working conditions and protect workers' rights to a healthy environment.

To ensure compliance Accommodation Management Plan was prepared as part of the ESMP for inclusion into tendering documents. In addition, there will be check by the PIURR and the CSC to warrant compliance with national and financier's standards.

2.2.7.1 Grievance Mechanism

Tajikistan's legislation includes provisions for presenting and addressing complaints, and for resolving labour conflicts and disputes. However, it does not require the establishment of a comprehensive Grievance Mechanism. Nonetheless, the EA has vast experience working with donors, necessitating the establishment of such a mechanism at various levels.

An adequate Grievance Mechanism is established by PIURR and described in the IEE and the LARP. The requirements for the GRM for workers are added to the ESAP.

2.2.7.2 Non-Employee Workers

The Contractor engaged in the project will be entirely responsible for the compliance with National Labour legislation and requirements of the Donors. Non-employee workers will probably be

contracted through national or international organizations as subcontractors for various works and services. However the Labour legislation of Tajikistan, including the Labour Code doesn't differentiate between the employee and not- employee workers, as they are defined by the EBRD PR 2 in terms of Labour conditions, rights and obligations. PIURR will review and approve/disapprove all sub-contractor and monitor their compliance with the National Labor legislation and particular requirements of the project.

Training and measures to protect the health and safety of all workers under this Project are described and addressed in the IEE, particularly in the chapter "Establishment and operation of contractor's yard" and in addition in the EMP.

All workers have the right for complaints by means of the GRM. In addition, within scope of work of the ADB contract amendment "Green Corridor Project" also an initiative is included for inclusive growth which includes measures for giving preference to local labour and local contractors in the construction of the project. This is done by requesting prospective bidders to include a local sourcing plan (LSP) – for the procurement of material as well as the engagement of local contractors and workers.

2.2.7.3 Supply Chain

The legislation of Tajikistan doesn't have a provision for the supply chain supervision. However, the project suppliers will be registered and work in Tajikistan where the child and forced works are strictly prohibited by the law.

There will be a strong and professional Construction Supervision in place as stipulated in the EMP of the IEE and also in the chapter "Monitoring and Reporting" of the IEE. This ensures that the supply chain is professionally managed and it is warranted that there is no risk of child labour or forced labour in the supply chain.

2.3 Resource Efficiency and Pollution Prevention and Control (PR 3)

The IEE prepared for the ADB provides a comprehensive analysis of the efficient use of the resources and pollution control.

Within scope of work of the IEE instrumental measurements on water quality, air quality, noise and vibration have been conducted (Annex 2 - REPORT ON AIR QUALITY AND NOISE and Annex 7 - BASELINE MEASUREMENTS ON VIBRATION AND AIR QUALITY INCLUSIVE PM 10 AND PM 2.5). The results of the instrumental measurements show the current pollution level in the study area.

In order to monitor the Project's pollution impacts on the identified sensitive receptors described in the chapter 3 "Sensitive Receptors" instrumental monitoring must be undertaken

according to the monitoring plan shown in the table 26 of the IEE. The instrumental monitoring entails regular monitoring on water quality, air quality, noise and vibration during the construction phase of the Project.

2.3.1 Modelling

It has been identified as a gap in the IEE that no modelling of air quality and noise based on the traffic forecast have been undertaken for the Operation phase in order to assess the operation phase impacts. The modelling has been conducted within scope of work of this supplementary ESIA report. Results are presented in the following:

2.3.1.1 Air Quality Modelling

An air quality impact assessment was prepared for the construction of the Dangara Guliston Road reconstruction and widening from 2 to 4 lanes as part of the overall impact assessment process and supplements the supplementary ESIA report.

Some of the most pervasive sources of air pollutants come from transportation systems. Air emission from road traffic is a significant air pollutant source in urban environments and alongside the road corridor it is also a relevant pollutant source in rural environments particularly when traversing nearby sensitive receptors.

Air emissions from traffic have a variety of adverse impacts on human health and on ecosystems.

An increase in traffic volumes, vehicle speeds, or the number of heavy trucks will increase air emission levels from traffic. Therefore, an assessment has been undertaken to determine future pollution level due to traffic air emissions alongside the Project Road.

2.3.1.1.1 Purpose

The purpose of the project air emission assessment was to assess potential changes in pollution levels due to air pollutant emissions of the Project road and to determine if the Project meets relevant air quality standards. The approach for the Project air quality impact assessment was to:

- ⇒ determine the relevant assessment criteria for air quality for the pollutants which are the relevant emissions in road traffic and transport Projects;
- ⇒ predict air pollutant emissions for the relevant substances caused by road traffic for the baseline Year 2024 and the year 2040 at the identified existing sensitive receptor locations in the study area (Traffic forecasts for the base year 2024, and future year 2040 were provided for the project road by the Traffic Engineer/Transport Economist. To reduce Greenhouse Gas (GHG) emissions from the transport sector, Tajikistan is

promoting the use of E-vehicles. Due to uncertain of the proportion of E-vehicles in the further vehicle fleet, in the noise calculation the traffic forecast of year 2040 has been used and no provisions for E-vehicles were considered).

- ⇒ identify the need to provide air pollution attenuation strategies for existing air pollutant sensitive receptor locations within the study area as part of the project
- ⇒ recommend practical air pollutant attenuation strategies (if required).

2.3.1.1.2 Fundamentals of Traffic Air Emission

Combustion engines in motor vehicles cause air emissions which result in ambient air pollution. In particular the following substances are emitted:

- ⇒ Nitrogen monoxide (NO)
- ⇒ Nitrogen dioxide (NO₂)
- ⇒ Particle PM₁₀
- ⇒ Particle PM_{2.5}
- ⇒ Benzol (C₆H₆)
- ⇒ Carbon monoxide (CO)
- ⇒ Sulphur dioxide (SO₂)
- ⇒ Benzo (a) pyren (Ba P) (marker for polycyclic aromatic hydrocarbons)

In addition to the exhaust emissions, particles are also emitted from the road due to turbulence, friction of brakes, coupling and of road wearing course. The potential harmful effects of the various substances depend on concentration and exposure time.

The amount of emissions is dependent on traffic volume, technical condition of vehicle fleet, share of heavy vehicles, traffic speed and longitudinal gradient. In the future it is expected that with the development of low pollutant electric vehicles the air pollution due to road traffic will in general decrease.

2.3.1.1.3 Air Emission Criteria

For the protection of human health and ecosystems legal standards are applied. For Tajikistan the Law on the Protection of Atmospheric Air establishes the basic principles of the protection and rational use of the atmosphere in the country, economic mechanisms and responsibilities, as well as the directions of activity of state bodies.

The Tajikistan standards for relevant substances from traffic emissions are shown in the following table1.

In international financed Projects it is common practice that the Project complies with the respective national standards and in addition with the standards of the Financing Agency. In the Dangara-Guliston road Project the Tajikistan standards were taken.

Table 1 – Applied standards

Air Quality Standards Applied in the Project		EU Air Quality Standards according to Directive 2008/50/EC	WHO
Substance in mg/m ³	Tajikistan Standards ¹ in mg/m ³ (Annual Average Values)	EU Standards in mg/m ³	WHO Air Quality standards ²
CO	3.00	10 ³	
PM ₁₀	0.06	0.04	0.02
PM _{2.5}	0.035	0.025	0.01
NO ₂	0.04	0.04	0.04
NO	0.06		
SO	0.05	SO ₂ 0.350 ⁴	0.02 (24 h)

2.3.1.1.4 Baseline Conditions and Results of Conducted Air Quality Measurements

The project corridor does not have significant industrial sources of pollution; therefore, the main source of air pollution in the region is the burning of fossil fuels for heating and cooking. Another source of emissions into the atmosphere can be divided into two categories: exhaust gases from motor vehicles and dust raised by motor vehicles. In addition, there is dust from agriculture during harvest season.

Hence exhaust emissions to the atmosphere at the current level are relatively low and a priori it is therefore not expected that any air quality standards, national or international, are exceeded due to Project implementation.

As scope of work of the IEE air quality baseline conditions along the Project road were established by instrumental measurements. The measurements were conducted in April 2024 in order to also establish a baseline for the substances. The report is attached as Annex 7 to the IEE.

¹ Annex 3 to the Environmental Impact Assessment Procedure, adopted by resolution of the Government of the Republic of Tajikistan No. 464 of 3rd October 2006.

² The IFC cites WHO ambient air quality guidelines typically apply only in jurisdictions where there are no national standards in place.

³ Maximum daily 8 hour mean

⁴ 350 µg/m³, not to be exceeded more than 24 times a calendar year

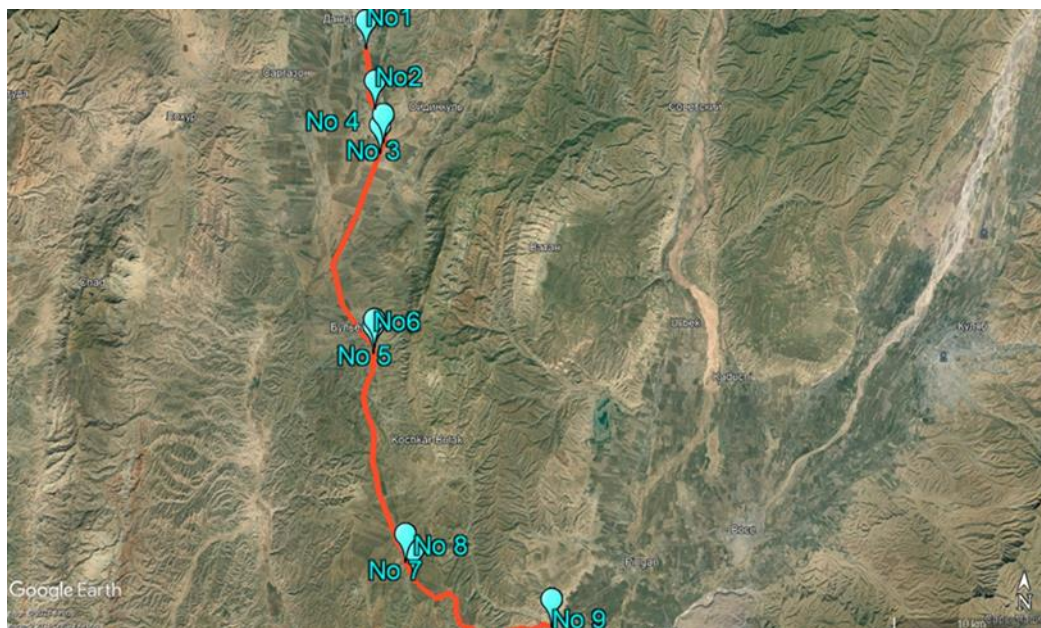


Figure 7 - Air Quality Instrumental Measurement Locations in April 2024

The measurement results are shown in the below table:

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Table 2 - Data of instrumental measurements of atmospheric air quality

CO mg/m³	NO mg/m³	NO ₂ mg/m³	SO ₂	NH ₃	CH ₄	Latitude/ longitude	PM10 mg/m³	PM2,5 mg/m³	Wind speed	Direction	Temperat ure C°	Pressure	PH %	Height	Mag/mtr
MPC 3 a/d 5 max/s	MPC 0,06 a/d 0,4 max/s	MPC 0,04 a/d 0,085 max/s	MPC 0,05 a/d 0,5 max/s	MPC 0,05 a/d 0,2 max/s	MPC 50 max/s		MPC 0,06 a/d 0,3 max/s	MPC 0,035 a/d 0,16 max/s	m/s	Dtg					
1. Dangara – Dining room “Aziz” km 0+000															
0,55	0,047	0,063	0,005	0,014	0,12	38°04'32.97” 069°20'35.77”	0,054	0,029	2,9	343	11,4	713	74	625	7,40
2. Dangara – И Jamoat I. Sharipov 4+000km															
0,24	0,008	0,018	0	0,011	1,32	38°02'21.94” 069°21'11.76”	0,011	0,005	1,05	306	12,7	714	70	623	7,44
3. Dangara – Shobur 6+300km															
0,43	0,035	0,042	0	0,003	1,05	38°01'18.75” 069°21'31.76”	0,020	0,013	0,8	201	13,5	714	68	605	7,35
4. Dangara – Khurramzamin 6+850km															
0,37	0,010	0,027	0	0,011	1,27	38°00'56.17” 069°21'25.23”	0,022	0,017	1,5	326	14,3	715	65	623	7,31
5. Dangara – Bulyoni Poyon, km 20+000															
0,25	0,007	0,027	0,001	0,007	1,24	38°00'55.94” 069°21'24.60”	0,023	0,020	5,3	63	15,0	705	66	733	7,38
6. Dangara - Durakhshon1 school No. 84 km 22+850															
0,22	0	0,013	0	0,005	0	38°00'55.94” 069°21'24.60”	0,030	0,027	5,1	229	15,0	706	63	728	7,36
7. Dangara – Bakhoriston km 35-300															
0,17	0,011	0,016	0,001	0,015	1,33	37°46'40.87” 069°23'14.24”	0,029	0,026	2,8	27	15,5	704	63	715	7,36
8. Dangara – Shuhrater km 36+600															
0,35	0	0,012	0	0,014	1,11	37°46'40.94” 069°23'13.91”	0,033	0,029	2,0	31	14,4	701	67	741	7,33
9. Dangara – Guliston km 48+200															
0,69	0,014	0,021	0	0,001	1,24	37°46'40.94” 069°23'13.91”	0,063	0,049	2,2	88	16,1	725	61	462	7,31

No exceedances of the applied Tajikistan standards were measured.

The instrumental measurements revealed that, due to the absence of any industrial pollutant sources, air quality in the Project area is good. The main sources of emission to the environment are from fuel for heating and cooking, vehicle emissions and emissions from agriculture, particularly dust during harvest season. Hence, the results of instrumental measurements shown in table 3 confirm that the concentration of harmful substances in the air alongside the Project road is well below the permissible norms (MPC) of Tajikistan.

2.3.1.1.5 Road Air Emission Calculation and Underlying Data

The air emission model RLuS2023 was developed for estimating the ambient air pollution alongside road Projects. The model is calculating the average annual concentration for the following substances.⁵

- ⇒ Nitrogen dioxide (NO₂)
- ⇒ Nitrogen monoxide (NO)
- ⇒ Particulate PM₁₀
- ⇒ Particulate (PM_{2.5})
- ⇒ Benzol (C₆H₆),
- ⇒ Carbon monoxide (CO) and
- ⇒ Sulphur dioxide (SO₂).

The following data are required for the calculation.

Traffic specific data

Average annual daily traffic AADT (vehicles/24 h)

Share of heavy traffic (heavy vehicles > 3.5 t in %)

Road specific data

Number of lanes

Longitudinal gradient

Road type: Highway / Regional road

⁵ The RLuS 2023 Model is recognized by German Control Agencies and Road Planning Administration.

The underlying legal text are the German Guidelines for determination of air quality alongside roads. The software has been developed in accordance with these guidelines and in accordance with European Union guidelines and requirements. It is therefore in compliance with requirements of European Agencies and Financiers.

Speed Limit:

Road condition: regular or bad

Additional data

Distance of emissions location from road edge (10 m steps)

Initial pollution level for the modelled substances

Annual average wind speed in m/sec

The RUS 2023 Air Emission Model allows the calculation of air emissions and emissions alongside the Project road. It allows also to calculate emissions from tunnels and at crossing and noise barriers.

2.3.1.1.5.1 Approach and Underlying Data

For the application of the modelling the following data input is required for the road sections.

- ⇒ Traffic Specific Data (average annual daily traffic, percentage of heavy vehicles, Year for the prognosis);
- ⇒ Road specific data (number of lanes, longitudinal gradient, road category, speed limit, condition of road surface)
- ⇒ Topographical and Environmental data (distance of emission spot and initial pollution level)
- ⇒ Meteorological data (annual arithmetic mean of wind speed)

These data are the emission factors which determine the modelling results. As shown in the following each of these factors has been carefully determined in order to best reflect the conditions of the Project Road and the environmental conditions in the Project area. Therefore, the conducted modelling can be considered representative for the Project area.

The Air Emission Calculation was conducted with the following data input.

Meteorology

The model RLU 2023 requires the average annual wind speed for factoring in the local meteorological conditions of dispersal. Windspeeds measured in April 2024 during the conduct of the instrumental measurements vary in between 0,8 m/sec and 5,3 m/sec.

Available data from meteorological stations of

- ⇒ Meteorologicheskies station Bostanabad located on the Eastern part of Faizabad district;
- ⇒ Weather station Nurabad, located in Nurabad district.

show the following:

In the area of Bostanabad the predominating wind direction is North-West (57% of the total number of cases). The average monthly wind speed ranges from 4-4.2 m/sec in the warm season to 5.2-5.8 m / sec in the cold season. Average annual winds speed is 4.8 m/ sec.

For the Nurabad meteorological station an average annual wind speed of 1 is recorded.

Higher wind speeds result in lower pollution levels. Therefore in order to be on the safe side the value of 1m/sec was chosen as average annual windspeed.

Initial Pollution Level

Within scope of work of the IEE instrumental air quality measurements were conducted for certain substances alongside the Project road. For these substances the measured average value was taken as the initial pollution level. This is for:

- ⇒ Carbon monoxide (CO): 0.36 mg/m³
- ⇒ Nitrogen oxide (NO): 0,0146
- ⇒ Nitrogen dioxide (NO₂) 0,0235
- ⇒ Sulphur dioxide (SO₂): 0.0007 mg/m³
- ⇒ PM 10: 0,0316
- ⇒ PM 2.5: 0,0238

For Benzol no instrumental measurements were taken. There are also no air quality monitoring data available for Benzol.

2.3.1.1.5.2 Road Traffic Data

Traffic forecasts for the base year 2024, and future year 2040 were provided for the project road by the Traffic Engineer/Transport Economist. To reduce Greenhouse Gas (GHG) emissions from the transport sector, Tajikistan is promoting the use of E-vehicles. Due to uncertain of the proportion of E-vehicles in the further vehicle fleet, in the noise calculation the traffic forecast of year 2040 has been used and no provisions for E-vehicles were considered.

The provided traffic data for the project road are shown in the table below.

Table 3 - Traffic Forecast in AADT

Year	Motor-cycle	Car	Utility	Mini-bus	Bus	2-axle truck	3-axle truck	≥4-axle truck	AADT
2024	92	8,784	468	33	10	353	73	65	9,878
2040	143	13,670	728	51	16	549	114	101	15,373

A minimum traffic load of 5000 vehicles/day is required to run the software which is given in the Project. The calculation was conducted for the year 2040 with the following input data.

Traffic specific data

Average daily traffic ADT (vehicles/24 h): 15,373 vehicles/day

Share of heavy traffic (busses, 2-axle trucks, 3-axle trucks, ≥4axle trucks):

5.00 %

Road specific data

Number of lanes: 4

Longitudinal gradient: +/- 4%

Road type: Regional road

Speed Limit: 90 km/h outside settlements / 40km/h inside settlements

Road condition: regular

2.3.1.1.6 Results of Air Emission Calculation for the Project Road

In the following the results of the emission calculation are described.

The calculation method for estimating traffic-related emissions of pollutants was conducted in accordance with the German guidelines for determining air quality on roads without or with loose peripheral development⁶, issued by the German Road and Transport Research Association, 2023. The following parameters were used for the Project road outside settlements, based on the design documents.

- ⇒ Forecast year: 2040
- ⇒ Road category: Motorway, speed limit 100
- ⇒ Longitudinal inclination class: +/-4 %

⁶ Richtlinien zur Ermittlung der Luftqualität an Straßen ohne oder mit lockerer Randbebauung. Ausgabe 2023 (Guidelines for determining air quality on roads without or with loose peripheral development. Issued 2023).

- ⇒ Number of lanes: 4
- ⇒ AADT: 9878 vehicles/24h (annual value)
- ⇒ Share of heavy goods vehicles: 5.0 % (SV > 3.5 tonnes)
- ⇒ Average car speed: 96.4 km/h
- ⇒ Wind speed: 1.0 m/s
- ⇒ Distance from the roadside: 10.0 m
- ⇒ Preload set manually according to traffic counts conducted in 2024:

The calculated emissions in g/(km*h) are the following:

- ⇒ CO: 97,352
- ⇒ NO_x: 30.123
- ⇒ NO₂: 8.165
- ⇒ SO₂: 0.260
- ⇒ Benzene: 0.033
- ⇒ PM₁₀: 15,443
- ⇒ PM_{2.5}: 5,567
- ⇒ BaP: 0.00029

The calculated emissions in µg/m³ for the year 2040 are shown in the following table.

Table 4 - Emission Loads for Year 2040 10 m Distant to Project Road

Component	Pre-pollution µg/m ³	Additional load µg/m ³	Total load µg/m ³	Legal Standard µg/m ³
CO	360	9,0	369	3000
NO	9,5	1,82	11,32	60
NO ₂	23,5	0	23,5	40
NO _x	38,1	2,79	40,89	
SO ₂	0,7	0,02	0,72	50
PM ₁₀	31,60	1,433	33,033	60
PM _{2.5}	23,8	0,516	24,316	35

The calculation results in the table 4 show that all standards are met for the for year 2040.

2.3.1.2 Noise Modelling

Noise baseline data have already been acquired within scope of work of the IEE. Measurements were conducted at identified sensitive receptors. Receptor locations are selected to reflect changes in traffic noise levels as a result of changes in traffic volumes, speed, composition (trucks and cars), and road alignment (horizontal and vertical). Selected receptors present a typical receptor category in the study area and the noise assessment of these receptors is assignable to adjacent buildings and areas with similar conditions.

The undertaken noise measurements quantify the existing noise levels and calibrate the noise model.

For the noise modelling we used the noise modelling and planning software SoundPLAN essential, Version 5. This is a widely used environmental noise modelling and prediction software developed by SoundPLAN GmbH, Germany. The road noise sources and sound propagation model included in the analysis follow German guideline RLS-19 for road traffic noise predictions.

RLS-19 is an effective calculation model, able to determine the noise rating level of road traffic. The RLS-19 model shows a good correlation between the measured and projected noise levels proving to be an adequate tool for road traffic noise prediction. The model requires an input of data regarding the average hourly traffic flow, separated into heavy and light vehicles, the average speed for each group, the dimension, geometry and type of the road and of any natural and artificial obstacles. This model also takes into account the main features which influence the propagation of noise, such as obstacles, vegetation, air absorption, reflections and diffraction. In particular it makes possible to verify the noise reduction produced by barriers and takes into account also the reflections produced by the opposite screens.

The purpose of the project noise modelling was to assess potential changes in noise levels due to the Project and to determine if the Project meets relevant noise regulations. The approach for the Project noise assessment was to:

- ⇒ determine the relevant assessment criteria for road traffic noise along project^[1] road corridor^[2]
- ⇒ predict road traffic noise levels for the Year 2040 at sensitive receptor locations in the study area
- ⇒ recommend practical noise attenuation strategies (if required).
- ⇒ The road noise prediction consists of the project road alignment and forecasted further traffic data. Noise levels for the base year 2024 and future years 2040 (after 16 years from the base year) were calculated and compared to the relevant criteria.
- ⇒ The location of the receptors, predicted noise levels and the corresponding noise contours for residential areas, are presented in Appendix 3 and 4 of the noise assessment report which is included in annex 2 of this supplementary ESIA report.

In result, the traffic noise levels at some receptors exceed the desirable level of 55 dB(A) in daytime and 45 dB(A) in nighttime in accordance with WHO 199 Guidance for community noise.

The following table 5 shows the results of the conducted noise modelling at representative sensitive receptors alongside the Project Road and the locations at which exceedances occur.

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Table 5 - Results of Noise Modelling

Point No.	Location (Chainage)	Permissible Noise Level IFC Guidelines dB(A)		Measured Daily Ambient Noise Level in 2020 Maximum dB(A)	Predicted Noise Level 2024 in dB(A)		Predicted Noise Level 2040 in dB(A)		Difference Noise Level 2024 - 2040 in dB(A)		Exceedance of the desirable noise level according to “WHO 199 Guidance for community noise” in dB for the Reference Year 2040
		LAeq day time	LAeq night time		LAeq day time	LAeq night time	LAeq day time	LAeq night time	day	night	
1	CH 0+500	55	45	52.6	52.6	44.9	54.7	47.1	2.1	2.2	Day time: no / Night time: 2.1
2	CH 4+200	55	45	55.0*	52.7	45.0	53.1	45.5	0.4	0.5	Day time: no / Night time 0.5
3	CH 6+400	55	45	56.7	53.2	45.6	55.1	47.5	1.9	1.9	Day time: 0.1 / Night time: 2.5
4	CH 7+120	55	45	57.5	51.1	43.4	53.0	45.4	1.9	2.0	Day time: no / Night time 0.4
5	CH 20+900	55	45	53.2	49.6	41.9	50.9	42.9	1.3	1.0	Day time: no / Night time no
6	CH 21+350	55	45	54.8	50.7	43.0	52.8	44.8	2.1	1.8	Day time: no / Night time no
7	CH 35+500	55	45	53.2	53.6	46.9	56.5	48.9	2.9	2.0	Day time: 1.5 / Night time 3.9
8	CH 36+670	55	45	51.4	51.2	43.6	52.7	45.2	1.5	1.6	Day time: no / Night time 0.2
9	CH 49+100	55	45	55.0	51.7	44.1	52.3	44.6	0.6	0.5	Day time: no / Night time no

Note: * Entrance to I.Sharipov village: 48,4 dB, Exit from I.Sharipov village: 55.0 dB

In result the traffic noise levels at some receptors exceed the desirable level of 55 dB(A) in daytime and 45 dB(A) in nighttime. It should be noted that the increase of the noise levels between the base year 2024 and the reference year 2040 will be less than 3 dB(A). This means that according to IFC standards no additional noise abatement measures would be required. This 3 dB(A) criteria according to the IFC standard would be applicable as in settled areas the project road alignment will use mainly the right-of-way of the existing road. The area is pre-polluted due to existing traffic and the increase of the ambient noise level from the anticipated traffic increase is below the threshold of perception.

However, in order to comply with the EBRD PR 3 the applied legal noise standards must be met. This is achieved by the provision of noise insulating, e.g. Stone Mastic Asphalt (SMA) as surface layer over the whole Project Road, which provides a noise reduction of 3 dB as compared to normal asphalt. This requirement is reflected in the project Technical Specifications

2.3.2 Borrow Pits and Disposal Site

The identification and assessment of borrow pits, quarries and potential areas/locations for disposal of spoil material that are expected to be generated by the project are in detail described in the IEE.

According to the detailed design and the Bill of Quantity (BoQ) the volume of 3,504.815 m³ needs to be provided for embankment fill and the volume of 5,585.402 m³ is excavated cut material.

Most of the required fill material needs to be sourced from quarries. Material generated from the excavation of the roadbed will be reused in the Project to the degree technically possible. The technical standards which need to be met for materials used in the Project are defined in the project specifications.

The quarries proposed to be used in the Project are described in chapter 2.3.2.1. In order to use resources efficiently all cut material suitable for reuse must be used as embankment fill or other fill material in the Project. The surplus soil resulting from cut sections needs to be transported to suitable disposal sites.

2.3.2.1 Borrow Pits

The borrow areas proposed to be used in the Project are described in the chapter IV “Description of the Project”, in subchapter J “Borrow Areas” of the IEE. In the following a brief summary is provided.

For the construction works, particularly for the embankment works, the production of asphalt concrete and concrete mixtures, construction aggregates are required which need to be extracted

from suitable borrow areas. There are no suitable aggregate reserves for the preparation of asphalt concrete, concrete mixtures, gravel-sand mixtures for the base of pavement closer than 20 km.

Following borrow areas are proposed to be used in the Project, subject to verification of the suitability by the Contractor:

Soil Reserve Number 1: Soil reserve No. 1 is the deposits of pebbles of the floodplain of the Surkhob River. It is located 8.0 km from the end of the course. The river sediment material can be used downstream >1000 m, upstream >1000 m, width more than 700m. Ways of access: it is necessary to organize a soil reserve in a flood, flooded from March to June. The useful thickness of deposits is up to 3m. There is a private crusher.

Soil Reserve Number 2: The proposed soil reserve is located 22 km from the end of the passageway of the projected route along the Guliston-Kulyab road and 2-3 km (from the bridge) to the north of the main road (upstream of the river) the riverbed and floodplain of the Yahsu River. The stock of material is not limited, since the excavation area can be expanded upstream of the river. The thickness of the pebble deposits is more than 3.0 m.

Soil reserve Number 3: The proposed soil reserve is located along the Dangara-Kangurt road. From the beginning of the course to the Gar-Gara quarry is 15 km. During the construction of the Vahdat-Dangara road by the Chinese company China Road, the deposits of the floodplain of the Tairsu River were used to obtain crushed stone and sand. It should be noted that the pebble deposits of the Tairsu River are saline. The increased content of chlorine makes it impossible to use the material as a filler for concrete. The extraction of pebbles from the Tairsu River can be used to obtain crushed stone, which is suitable for embankment and foundation, as well as for the preparation of asphalt concrete. The stock of material is not limited, since the excavation area can be expanded upstream of the river from the turn at the Gar-Gara village from the main road to Kangurt. The thickness of the pebble deposits is more than 3.0 m.

The proposed quarries (soil reserves 1, 2 and 3) can only be used after a detailed study of the quality of the material. Currently, the soil reserve material is used by private entrepreneurs.

Material quality control: After selecting one or another of the proposed soil reserves, the contractor is recommended to conduct material quality studies by laying the pits in places that are typical for quarry area. The number of pits should be 6 or more. The depth of the pits should reach the depth of the proposed soil reserve to be excavated. It is necessary to take soil samples from all marked layers and test them in the laboratory. Laboratory tests should include all tests specified in the Specifications. It is necessary to keep a protocol for laying pits and laboratory tests in accordance with the Specification.

The following soil resources 4 to 8 are loamy type of soil as preliminary categorised. These extraction sites can only be used for embankment fill.

Soil reserve number 4: Soil reserve No. 4 on the left along the axis of the road, loam deposits on the PK 122 + 80 - 143 + 00 in the form of hills. The thickness of the deposits recommended for development is 20m. The quarry is approximately 500m wide. Located from the axis of the road 500 meters.

Soil reserve number 4a: Soil reserve No. 4a (it is also the material of the excavation) on the left of the axis, there are more near-road deposits of loams on PK 233+00 - 235+60 in the form of hills. The thickness of the deposits recommended for development is the depth of the excavation. The quarry is approximately 500m wide. Adjacent to the axis of the road. It is possible to develop only to comply with a failure rate of 1: 1.5.

Soil reserve number 5: Soil reserve No. 5 to the right of the road axis there are loamy deposits along the road on PK 241+00 - 270+90 in the form of hills. The thickness of the deposits recommended for development is about 20m. The quarry is approximately 500m wide. Adjacent to the axis of the road.

On the left of the axis, there are near-road loam deposits on PK 242+80 - 277+20 in the form of hills. The thickness of the deposits recommended for development is about 20m. The quarry is approximately 500m wide. Adjacent to the axis of the road.

Soil reserve number 6: Soil reserve No. 6 (aka excavation soil) to the right and left of the road axis, loam deposits along the road on PK 392+00 - 401+00 in the form of hills. The thickness of the deposits recommended for development is about 20m. The width of the quarry is approximately 250m on the right and 50m on the left. It is possible to develop only for observance of a failure of 1: 1.5.

Soil reserve number 7: Soil reserve No. 7 (aka excavation soil) to the right and left of the road axis, there are loam deposits along the road on PK 417 + 00 - 455 + 00 in the form of hills. The thickness of the deposits recommended for development is the depth of the excavation. It is possible to develop only for observance of a failure of 1: 1.5.

Soil reserve number 8: Soil reserve No. 8 (aka excavation soil). Left side at PC 455+40 – 487+20. Right side at PC 455+40 – 482+20. The thickness of the deposits recommended for development is the depth of the excavation. It is possible to develop only for observance of a failure of 1: 1.5.

2.3.2.2 Disposal sites

The proposed disposal sites are shown in the following figure⁷:

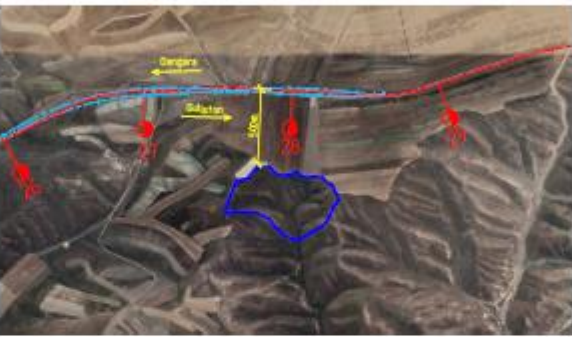


Approximate sections of the excavation soil dump along the Dangara - Guliston Road				
No. dump sites	Location, km	For section, km	Local map	Dump soil volume, m ³
1	28+000	26+000 to 27+000		300 000
2	40+500	40+000 to 42+000		666 000
3	42+500	42+000 to 45+000		950 000

Figure 8 - Identified Areas for Permanent Disposal of Surplus Material

⁷ Source: IEE (May 2024) Annex 6.

Currently the selected locations for disposal of excess soil have not yet been agreed with the local authorities, but the most suitable locations have been selected and as a rule before the start of construction works the Contractor will necessarily agree these locations with the local authorities.

Disposal of excess soil from the excavation to the dump is done by layer-by-layer levelling with a bulldozer/grader or excavator, taking into account the terrain and providing surface water drainage.

Selection of sites for disposal of excess soil was carried out depending on the volume of earthworks - excavation, as well as considering the terrain.

The contractor is free in selecting suitable disposal sites but must stick to the following rules:

- ⇒ No agricultural area or river floodplain will be selected as disposal site. Minimum distance to any watercourses must be at least 100 m. This need to be added in the spoil management plan.
- ⇒ Disposal sites will be preferably on barren land without any wooden vegetation.
- ⇒ After the closure of disposal sites, they will be stabilized where required;

The application for the permit must be submitted to the local authorities (Hukomats) which will issue the permit to use the proposed areas as disposal sites.

The proposed borrow areas for the Project are described in the IEE in the chapter “Borrow Areas”.

2.3.3 Greenhouse Gases

The Project will not generate the annual CO₂ equivalent of more than 25,000 tonnes.

A roughly estimated calculation has been done based on the information provided by the German website “CO₂online CO₂ emissions and carbon footprint of cars” “<https://www.co2online.de/klima-schuetzen/mobilitaet/auto-co2-ausstoss/>”.

To determine the CO₂ emissions of a petrol car, it is needed to multiply the average fuel consumption of the car per 100 kilometres by 2,370. If this is 6 litres, for example, it is the equivalent of 14,220 grams per 100 kilometres (6 litres x 2,370). For converting this to grams per 1 kilometre, it is necessary to divide the result by 100: 14,222 / 100. In this example calculation, the CO₂ emissions of the petrol car are 142 grams per kilometre.

Applying this to the Project Road with an additional AADT of 5,495 in the year 2040 the resulting yearly Project induced GHG⁸ emissions are:

⁸ CO₂ is the only Green House Gas in Vehicle Fleet Emissions

$5,495 \text{ cars/day} \times 352 \text{ days} = 1,934,240 \text{ cars per year.}$

Emission of GHG per km in tons: $1,934,240 \text{ multiplied by } 0,000142 = 274.66 \text{ tons}$

Emissions of GHG for the Project Road: $274.66 \text{ multiplied by } 49,5 \text{ km} = 13,595.78 \text{ tons}$

It must be emphasized that the Project entails many additional measures for greenhouse gas emissions reductions such as

- ⇒ additional tree plantings and implementation of measures for decarbonization / reuse of existing road materials
- ⇒ using of LED lights along the road
- ⇒ implementation of electric vehicle charging stations which will promote the transfer of the vehicle fleet from fossil fuel to clean energy in the future

These measures are in detail described in the Green Roads Measures Implementation report (June 2024) which was prepared under the ADB Dangara-Guliston Green Corridor Project “.

These measures will improve the GHG balance of the Project significantly. Therefore, it is warranted that the annual GHG emissions during operation phase are below 25,000 tons and no additional calculation or monitoring is required in this regard.

2.4 Health and Safety (PR 4)

Health and Safety is a crucial element in Project implementation. Hence the following tasks were performed to diligently address all requirements according to the PR 4:

- ⇒ Review the environmental, health and safety and social obligations that have been defined to manage environmental and social risks and meet the EBRD PRs; including the status of relevant permits and authorizations.
- ⇒ •Review whether potential risks to communities have been assessed and proposals for addressing key issues such as severance impacts, noise abatement, air pollution, vibration, road safety, haulage routes and collaboration on emergency response issues have been considered in plans and mitigation measures for construction and operational phase.
- ⇒ Review whether community road safety impacts, including road traffic accident rates and projected improvements and road safety mitigation measures have been adequately addressed in line with the Bank's commitments on road safety. In particular, consider if the road safety impacts have been assessed in relation to the vulnerable

Road Users (elderly people, children, people with disabilities, cyclist, pedestrians, farmers, horse carts), in the cases when road sections are near to local communities;

In the following the issues regarding PR 4 are analyzed following the general and specific requirements of the PR 4.

2.4.1 General Requirements for Health and Safety Management

As part of his Construction Environmental and Social Management Plan (CESMP) and connected subplans which are in detail described in the ESMP the contractor is required to prepare a Health and Safety Management Plan, an Emergency Response Plan, a Traffic Management Plan and a Hazardous Waste Management Plan for ensuring that hazardous waste is properly stored, collected and safely disposed to an official landfill.

2.4.1.1 Occupational Safety and Health

Occupational Health and Safety (OHS) is crucial in the Project. All workers (including manual labourers) of the contractor prior to dispatch to worksite are trained and instructed on relevant OHS issues. (Reference: Table 27 of the IEE: Suggested Capacity Building Program on EMP Implementation).

The Contractor shall carry out a risk assessment and introduce a system of work to eliminate or control hazards and foreseeable risks and prevent a risk of injury or ill health to workers. Particular attention must be paid to risks regarding working at height, work in confined space, hot works, electrical safety etc.

Requirements are in detail described in the health and safety management plan.

The provisions for preparing an occupational Health and Safety Management Plan (HSMP) as Part of the Contractor's Site-Specific Environmental Management Plan is included in the EMP of the IEE and as such also included in the bidding documents. Further to this, EBRD requires a dedicated HSMP to be prepared by the contractor, regular audits and inspections from Contractor H&S team, Supervision Engineer and the Client.

Consequently, the provisions for preparing the HSMP is also included in the ESMP which includes also regular audits and inspections.

Specific requirements, which the occupational health and safety plan must include due the specific risks of the Dangara-Guliston Project are the following:

- ⇒ Contractor's H&S Policy/Statement
- ⇒ Legal and other Requirements

- ⇒ Contractor's Health and Safety Organizational Chart
- ⇒ Roles and Responsibilities
- ⇒ Information and Training
- ⇒ Communication
- ⇒ Monitoring, inspections, audits, and non-conformances
- ⇒ Accident and Incident Investigation and Reporting
- ⇒ Arrangements for Controlling Significant Risks associated with the Work including but not limited to:
 - Working at height (particularly relevant with regard to the bridge reconstruction over the Tairsu River)
 - Lifting Operations
 - Ground disturbance and excavations
 - Working with and around live electrical conductors

2.4.1.2 Traffic and Road Safety

Traffic and Road Safety has been incorporated into the preparation and execution of the Dangara – Guliston Road Rehabilitation. This process ensures that all potential traffic and road safety risks to workers and project-affected communities are identified, evaluated, and mitigated in accordance with the Environmental and Social Policy.

The Road Safety audit of the project design was prepared and provided a comprehensive summary of the actions taken to address road safety concerns in the drawings for the proposed Dangara-Gulistan Road duplication and improvement. The measures outlined in this report summaries changes made to the design drawings as a result of discussions between stakeholders about the findings of the road safety audit of March 2024. The measures aim to enhance the safety of both pedestrians and drivers by implementing various design adjustments and infrastructure improvements.

- ⇒ Key Safety Concerns and Actions Taken
- ⇒ Pedestrian Crossings in Rural Areas
- ⇒ Speed Restriction Signs
- ⇒ Pedestrian Crossings in Settlements
- ⇒ Village Speed Restrictions

- ⇒ Traffic Signal Phasing and Timing
- ⇒ Landscaping and Sight Lines
- ⇒ Physical Channelization
- ⇒ Delineation
- ⇒ Roadside Hazards
- ⇒ Bridge Safety
- ⇒ Bicycle and Footpaths
- ⇒ U-turn Design

The overall marginal cost is an increase of \$ 380.496,01.

This figure represents the net increase in costs following the comprehensive implementation of the requested and suggested improvements. This investment underscores our commitment to enhancing road safety and ensuring a safer environment for all road users along the Dangara-Gulistan Road.

2.4.1.2.1 Identification, Evaluation, and Monitoring of Risks

Identification of Risks: The consultant has conducted a comprehensive risk assessment to identify all potential traffic and road safety risks associated with the project. This assessment includes both motorised and nonmotorised road users and considers the full lifecycle of the project.

Evaluation of Risks: Each identified risk has been thoroughly evaluated to determine its potential impact on workers and local communities. This evaluation process includes analysis of traffic patterns, road conditions, and historical accident data in the project area.

2.4.1.2.2 Development of Measures and Plans

Preventive Measures: The consultant has developed and implemented a series of preventive measures aimed at reducing the likelihood of traffic incidents and injuries. These measures include:

- ⇒ Traffic Management Plans: Detailed plans that outline traffic flow adjustments, detour routes, and timing of construction activities to minimise disruption and risk.
- ⇒ Safety Barriers and Signage: Installation of safety barriers, warning signs, and speed limits in high-risk areas to protect both workers and the public.

Incident Response Plans: In the event of a traffic incident, predefined response plans are in place to ensure swift and effective management, minimising potential harm to all parties involved.

2.4.1.2.3 Compliance with EU Road and Traffic Safety Standards

Adoption of Standards: The project design strictly adheres to relevant EU road and traffic safety management standards. These standards guide the identification and implementation of safety measures for all road users.

Road Safety Components: The consultant has incorporated technically and economically feasible, cost-effective road safety components into the project design. These components are designed to mitigate potential safety impacts on the local affected communities effectively.

2.4.1.2.4 Road Safety Audits and Incident Monitoring

Road Safety Audits: The consultant conducted road safety audits during the original design phase and as well during the update of the design in April 2024 as well an expert consultant from ADB was involved in the Audit process. These audits involve a thorough examination of road conditions, safety measures, and traffic management strategies to identify any potential safety issues.

Incident and Accident Reporting: A rigorous reporting system is in place to monitor and record all traffic incidents and accidents. This system enables us to identify negative safety trends promptly and implement corrective actions to address them.

2.4.1.2.5 Management of Road and Traffic Risks

Training Programs: The consultant has to provide comprehensive training to all workers on driver and vehicle safety in the specification for the project implementation stage. These programs cover safe driving practices, vehicle maintenance, and emergency response procedures.

Regular Maintenance: All project vehicles will undergo regular maintenance to ensure they are in optimal condition. This practice reduces the risk of mechanical failures and accidents.

2.4.1.2.6 Conclusion

Through rigorous risk identification, evaluation, and monitoring, as well as the implementation of preventive measures, compliance with EU standards, road safety audits, and comprehensive training programs, we are committed to ensuring the safety and wellbeing of all workers and project-affected communities.

2.5 Land Acquisition, Involuntary Resettlement and Economic Displacement (PR 5)

The tasks which were undertaken referring to the PR 5 include the:

- ⇒ Review the LARP developed and develop an addendum to LARP covering the PAP's livelihoods restoration and rehabilitation and how ESP PR 5 is expected to be met by the project.
- ⇒ Undertake necessary surveys within PAPs, whose livelihoods have been/will be affected due to the loss of agricultural lands and prepare livelihoods baseline for all PAPs had experience materials impacts on their land-based livelihoods strategies due to the project.
- ⇒ Review whether or not the project will result in any disproportionate impacts on any group of people as a result of their gender, age, ethnicity, disability, socio-economic status and/or other personal characteristics and identify any opportunities to specifically address their needs and concerns so as to enable them to benefit from project activities;

The socioeconomic baseline is the platform against which the impacts regarding the PR 6 need to be assessed. Based on the socioeconomic baseline of the Project area the LARP and the PAP's livelihood restoration plan was specified and developed. The socioeconomic baseline is described in the following.

2.5.1 Socioeconomic Baseline

This Chapter presents the findings on the major socio-economic characteristics of the affected Project communities.

The project is located in the Khatlon Region of Tajikistan. Khatlon Region is one of the most populated of the four regions of Tajikistan. It is situated in the southwest of the country, between the Hisor (Gissarr) Range in the north and the Panj River in the south and borders of Afghanistan in the southeast and on Uzbekistan in the west. Khatlon has an area of 24,800 square kilometres and consists of 24 districts – 14 in Western Khatlon and 10 in Eastern Khatlon⁹. The total population of Khatlon in 2018 was 3,274,900¹⁰. The population characteristics of the Project area is as follows:

Table 6 - Demographic Data in Project impacted Villages

Population in Project Impacted Villages							
Rayon	Jamoat	Villages affected by the Project	Population	Men	Women	Number of Households	Average number of household members
Dangara	Korez	Kayonush	2.072	1.061	1.011	437	4,7
		Cuisine	3.891	1.934	1.957	736	5,2

⁹ World Bank. 2013b. Tajikistan - Reinvigorating growth in the Khatlon oblast (English). Washington DC; World Bank. Available at: <http://documents.worldbank.org/curated/en/728911468119949897/Tajikistan-Reinvigorating-growth-in-the-Khatlon-oblast> (accessed 28 June, 2020)

¹⁰ Agency on Statistics under the President of the Republic of Tajikistan. Available at: <https://www.stat.tj/en/database-socio-demographic-sector> (accessed 28 June, 2020)

Population in Project Impacted Villages							
Rayon	Jamoat	Villages affected by the Project	Population	Men	Women	Number of Households	Average number of household members
	Ismat Sharif	Shabur	1.804	907	897	198	9,1
		Khuramzamin	5.786	2.892	2.894	826	7
		Buleoni Poyon	4.520	2.261	2.259	600	7,5
		Durakhshon	1.663	870	793	332	5
Vose	Guliston	Bahoriston	1.097	511	586	134	8,1
Sum:	3	7	20.833	10.436	10.397	3.263	46,6

Administratively, the Dangara-Gulistan highway passes through three districts of the Khatlon region: Dangara, Farkhor and A. Hamadoni as shown in the map in the below figure¹¹.



Figure 9 – Map of administrative units of the Dangara-Gulistan

2.5.1.1 Profile of the Project Area

The proposed road project is located in Khatlon Region. The above figure shows the administrative units and settlements¹² alongside the Project road.

¹¹ Map of administrative divisions of the Dangara-Gulistan highway. (Settlements are plotted from satellite images of 2015-2018).

¹² The settlements are plotted from space images of 2015-2017

196. Khatlon Region is one of the most populated of the four regions of Tajikistan. It is situated in the southwest of the country, between the Hisor (Gissar) Range in the north and the Panj River in the south and borders on Afghanistan in the southeast and on Uzbekistan in the west. 197. Khatlon has an area of 24,800 square kilometres and consists of 24 districts – 14 in Western Khatlon and 10 in Eastern Khatlon. The total population of Khatlon in 2019 was 3,274,900 up from 2,677,251 in the 2010 population census. The population in Khatlon is mainly engaged in Agriculture.

The following table presents the economic profile of the rayons in the Project area.

Table 7 - Economic profile of the rayons in the Project area

Economic Profile of the Rayons of the Project Area									
Rayon	Jamoat	Wheat (ha)	Orchard (ha)	Pasture (ha)	/ Irrigated Land (ha)	Non Irrigated Land (ha)	Number of Horses	Number of Sheep	Number of Cows
Dangara	Khorez	1.707	544	6.398	1.119	1.625	442	12.827	2.473
	Ismat Sharif	7.363	222	11.271	2.591	20286	559	34.603	8.895
Vose	Guliston	1.578	97	5.805	2005	1.478	483	19.164	7.692
Total:	3	10648	863	23474	5715	23389	1484	66594	19060

The poverty rate of the Project area is shown in the following table.

Table 8 - Poverty Rate in the Project Area

Rayon	Jamoat	Number of Households	Number of poor households	Percentage of poor households	Women headed household	Women headed poor households	Percentage of female headed poor households	Number of females in management positions
Dangara	Khorez	3.185	340	10,67	382	89	23,29	46
	Ismat Sharif	4.064	805	19,8	369	96	26,01	12
Vose	Guliston	3.161	567	17,93	418	124	29,66	21
Total :	3	10.410	1.712	48,400	1.169	309	78,96	79

2.5.1.2 Results of Socio-economic Assessment

The project influence area is extended over 21 villages of 3 towns and 9 Jamoats of 3 districts: Dangara, Farkhor and Vose. The proposed Road Project will affect private assets of 154 households (1,047 affected persons, among them 521 male and 526 female) and 68 legal entities (mainly Dehkna Farms).

The average size of the AH is 6.79 persons per household. However, several households comprise between 8-14 members. The majority (73.29 %) of AHs is represented by extended families, while nuclear families make up only 3.42 %.

The information on vulnerable groups disaggregated according to specific vulnerability category was collected from all (100 %) 154 AHs including business owners and their hired labor. A total of 33 AHs (22.60 % of AHs) have been defined as vulnerable: five (5) households are headed by women, six (6) AHs are headed by a person with disability, one (1) AH of these 6 AHs is also below poverty line and receives targeted aid from the state; lastly twenty-one (21) households have five and more under-age children in the family.

Based on the SES13 data local population in project area is literate with completed secondary education, while around 30 % has high education degree.

No ethnic minorities are among the APs. The APs are 100 % Tajik. No group of local residents showed any specific or unique features that could be identified as a distinct minority group. No impact on Indigenous People is expected from the Project

Potential adverse Social and LAR impacts are addressed thorough mitigation measures prescribed in the LARP.

Main economic activities in the region are related to agriculture farming and horticulture. Some run small shops selling construction materials, consumer goods as well as local agricultural produce.

Rural and urban lifestyles differ in terms of main sources of income. In terms of job opportunities regional centres are in more advantageous position because there are more operating state institutions, such as education and health care facilities, as well as enterprises and private businesses.

Most households in the Project area keep some cattle and poultry. Some households also run private business or are employed locally and receive regular wages. Many households rely on pensions and earnings from selling surplus agricultural produce at the local market or to the wholesalers at the farm gate prices. Additional source of income is remittances provided by family members working abroad, mainly men working in Russia as labour force engaged in construction.

Most of the women in rural settlement are mainly involved in household activities and tend in field to grown annual crops mainly for self-consumption. A few females work in public sector, or even run own shop. Women participate in household decision-making processes and organizing family matters. Women are actively involved in decision making process in family care, children's education, household issues, and sharing social responsibilities.

2.5.2 LARP and PAP's livelihoods restoration and rehabilitation

The prepared LARP under the ADB Project was assessed as being partly in compliance with the

¹³ Socio-economic surveys conducted during LARP covered 146 AHs (922 APs: 496 male and 496 female)

EBRD PR 5.

The social and resettlement aspects of the project also according to ADB categorization was categorized as A. The LARP prepared under the ADB contract contains the resettlement action plan and also includes livelihood restoration measures. PR5 has strong focus on livelihoods, especially since LARP includes acquisition of many agricultural land plots from farmers.

For addressing the identified gap there was need to develop an addendum to LARP to address livelihoods aspect of land acquisition.

The LARP and the addendum to LARP (Livelihood Restoration Plan) are standalone documents.

2.6 Biodiversity and Living Natural Resources (PR 6)

There are no protected areas under national law within the Project Area of Influence. Consequently, there is no measurable impact on any of these reserves due to the Project Road rehabilitation.

In order to identify areas of international protection status including areas of key biodiversity, an online search was conducted within scope of work of the IEE by means of the Integrated Biodiversity Assessment Tool (IBAT). The search revealed that the Dangara-Guliston road is running alongside and marginally traversing the IBA Dangara Massif. The area of the IBA Dangara Massiv in relation to the Project road is shown in the map in the below figure.

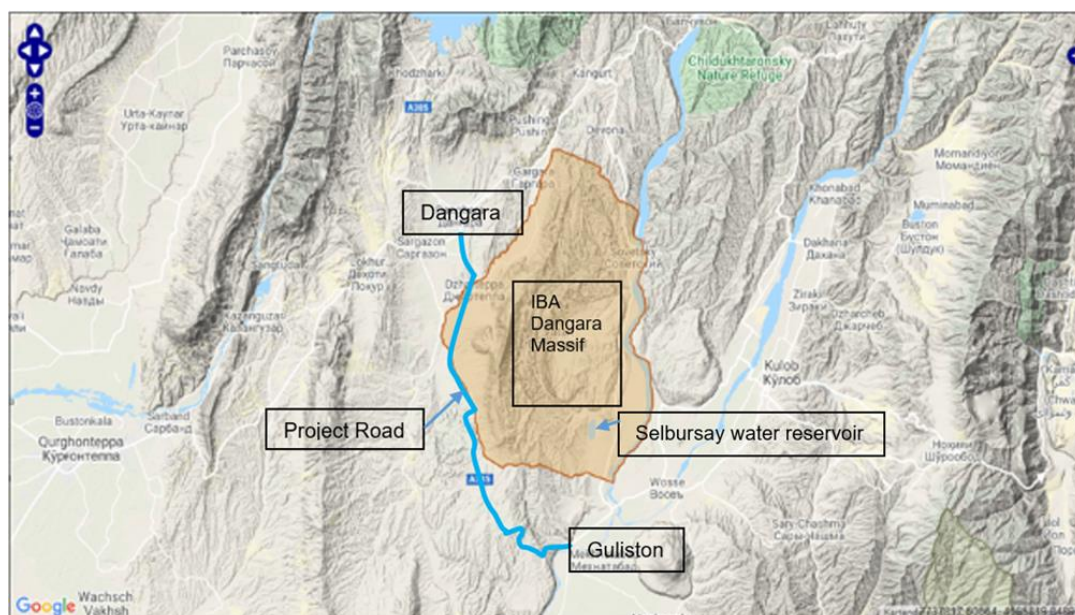


Figure 10 - IBA Dangara Massif in Relation to the Project Road

Therefore, to assess the potential impacts a biodiversity survey has been conducted within scope of work of the IEE and the results included in the EMP.

The studies for the IEE were conducted by using primary and secondary data. Primary data were obtained during the nesting season and in winter period by using the classical route method. This means that the investigators drove along the existing road and at each location at which any valuable habitat-structures appeared, these sections were surveyed by walking and monitored by use of a binocular.

The biodiversity surveys identified the following impacts and mitigation measures which were incorporated into the EMP.

Impacts

At locations where the Project Road is traversing alongside or cutting cliffs, particularly loess cliffs which bear potential nesting sites for cavity nesters, there is the impact of possible destruction of bird nesting sites. This refers to bird species representatives of the roller family (Coraciidae), particularly the European roller (*Coracias garrulus*), the family of bee-eater (Meropidae) (golden bee-eater *Merops apiaster*), starlings (lane or Indian starling) and weaver family (Indian sparrow). In addition, these cliffs are often habitats for wintering or sheltering reptiles and amphibians.

Mitigation Measures

At sections where the Project Road rehabilitation is traversing alongside cliffs, mainly formed by loess sediments which are suitable nesting sites for various birds such as the European roller *Coracias garrulus* (assessed as Least Concern by IUCN), bee-eater (*Merops apiaster*) evaluated as Least Concern or the Indian starling (Common Myna *Acridotheres tristis*) evaluated as Least Concern the design investigated the possibility of widening the cross section to the opposite side and avoid any impacts.

In addition, prior to construction start, a fast-track ecological survey will be conducted by CSC's ornithologist for purpose of identification of nesting sites at cliffs in the construction corridor. In case nesting sites are identified, then construction schedule will consider nesting season in order to avoid bird losses. This means that at the identified bird nesting sites no earthworks at the bird nesting cliffs are allowed during nesting season.

Also required tree felling and site clearance activities which involves the removal of vegetation must be outside nesting season (between October and February). The first SAEMR will include the photo-documentation, GPS coordinates, and strip map of nesting sites.

Identified locations and structures of biodiversity significance along the Dangara-Guliston Road are shown in the following map.

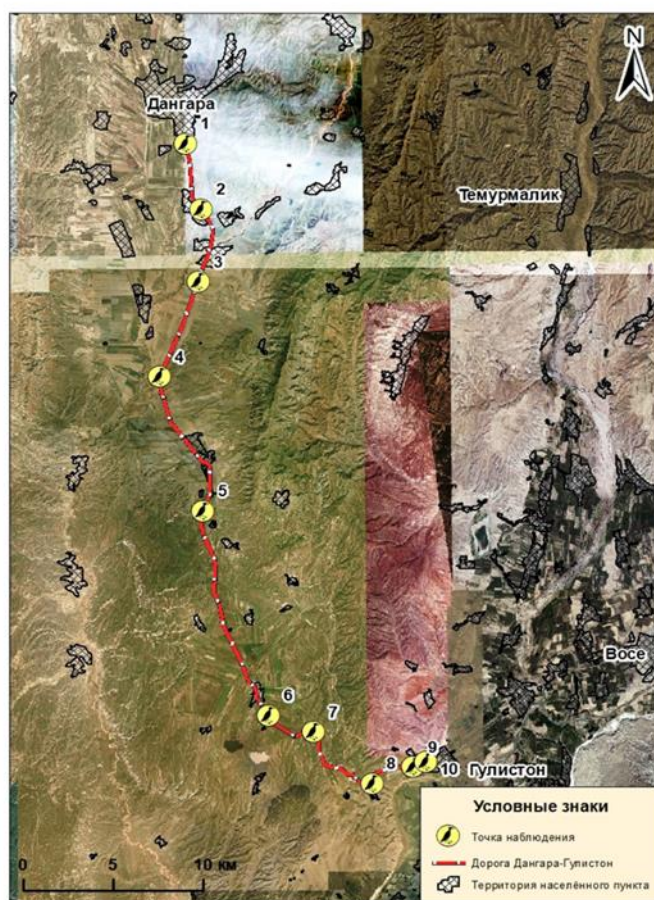


Figure 11 - Map showing Biodiversity Features

Following the gap analysis review, findings of the IEE were considered not sufficient to meet EBRD PR6 (2019) and the EBRD 2022 PR6 Guidance Note requirements. Therefore, a set of Project-related documents were reviewed, listed in the table below, which were supplemented with information from publicly available data sets and technical literature as well as an International Biodiversity Assessment Tool (IBAT) PS6 & ESS6 using the kmz file of the Project design.

No				
1.	Initial Environmental Examination	Project Implementation Unit for Roads Rehabilitation under Ministry of Transport of the Republic of Tajikistan for ADB	May 2024	274 page report structured like an ESIA, with similar scope and organization of content. Biodiversity survey report included as Annex 4 (dated 2020) based on field visits in May and October of 2020, as well

No				
				as desk-based review. Prepared by Kocks Consult GmbH with input from subcontracted regional biologists Alikon Latifi and Garibmamad Garibmamadov., who are listed as authors of Annex 4
2.	Report on the biodiversity study on the Dangara – Guliston road	(not listed – presumed to be Kocks Consult GmbH with support from Tajik biodiversity experts)	2024 (presumed June, 2024)	Supplemental biodiversity report, containing synthesis of biodiversity-related content, oriented toward EBRD PR6. Content mostly the same as in IEE, but also including results of a supplemental biodiversity survey in June, 2024, as well as a one-paragraph “Critical Habitat Assessment”
3.	IBAT PS6 & ESS6 Report.	Prepared by Juru based on kmz file of 49 km Dangara – Guliston road segment provided by Kocks	30 May, 2024	IBAT PS6 & ESS6 Report.

An additional field surveys have been conducted therefore in June 2024 by a team of National and International Biodiversity experts.

The survey conducted in June 2024 revealed that within the steppe hills traversed by the Project road (purple line in below map) which ranges between chainage km 22+000 to km 31+500 and chainage km 38+500 to km 49+000, there are potential habitats for rare plant and animal species that are classified as Priority Biodiversity Features (PBF) for the Project, per EBRD PR6 including the Tajikistan Even-fingered Gecko (*Alsophylax tadjikiensis*), Tajikistan Toad-head Agama (*Phrynocephalus sogdianus*) and the Central Asian tortoise (*Testudo horsfieldii*).

Therefore, the priority search area for a suitable camp site location should be outside the steppe hills. In addition, the contractor must assume two exclusion areas for habitat protection which have to be fenced and will be further defined in 2025.

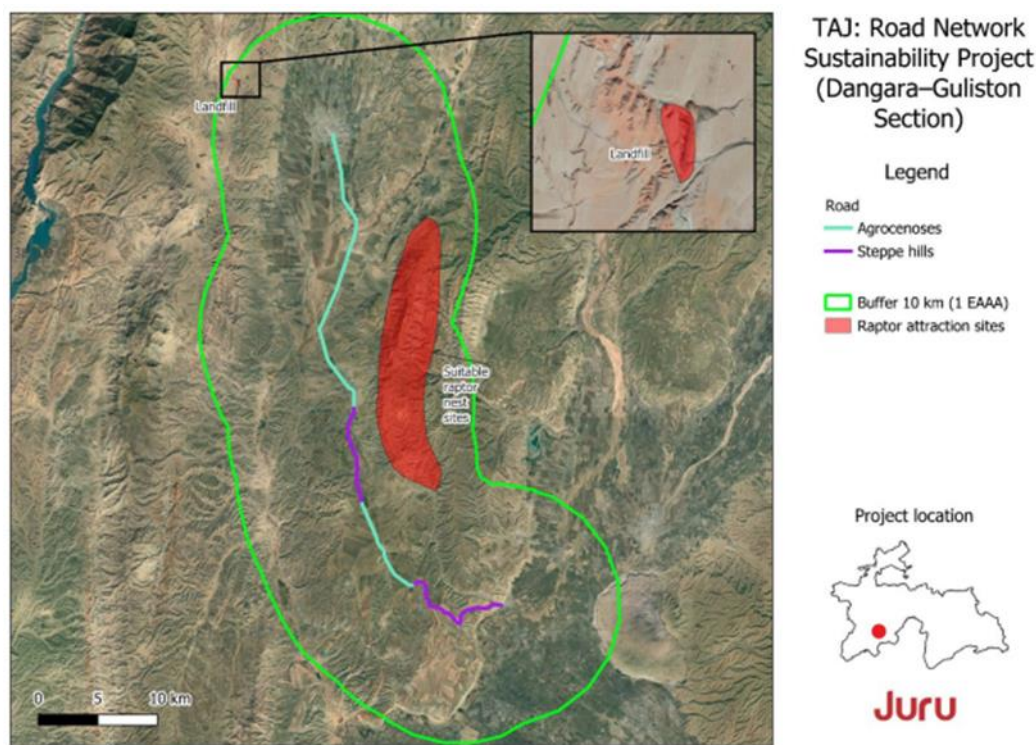


Figure 12 - Main habitats and raptor attraction sites on the project location

The survey conducted in June 2024 allowed the development of mitigation measures for during pre-construction and construction phase to protect the identified priority biodiversity features. The mitigation measures are described in the Biodiversity Management Plan which is the annex 7 of the ESMP.

2.6.1 Additional Investigation for Compliance with PR 6

EBRD PR6 defines two tiers of sensitive biodiversity features that must be conserved using a precautionary approach. The highest, or most sensitive tier of such biodiversity features are Critical Habitat (CH) features, defined by 5 criteria. The second tier of sensitive biodiversity features protected under PR6 are Priority Biodiversity Features (PBF), defined by 4 criteria.

In order to identify potentially impacted CH and PBFs a provisional and preliminary CH/PBF screening on the basis of the information available to date was conducted in June 2024.

2.6.1.1 Screening Results on Critical Habitats and Priority Biodiversity Features

As a result of this study the criterion for Critical Habitat (CH) was not met but the criterion for Priority Biodiversity Features (PBF) was met for 25 species (and their habitats). The screening results on CH and PBFs are included in this supplementary ESIA report.

The below table shows the results of the preliminary CH and PBF screening

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Table 9 - Summary of Preliminary Screening of Critical Habitats and Priority Biodiversity

Feature ¹⁴	Higher taxon (CLASS)	IUCN global status	Tajik status ¹⁵	Applicable CH/PBF criterion ¹⁶			EAAA ¹⁷	IUCN Minimum global population estimate ¹⁸	Determination ¹⁹	Rationale
				Threatened/Vulnerable Species	Range-restricted Species	Migratory/Congregatory Species				
				CH criterion ii, PBF criterion ii	CH criterion iii, PBF criterion ii	CH criterion iv, PBF criterion ii				
Small Amu-Darya Shovelnose Sturgeon <i>Pseudoscaphirhynchus hermanni</i>	Fish	CR	EN					N/A	Likely scoped out	No suitable habitat for this species.
Amu Darya Shovelnose Sturgeon <i>Pseudoscaphirhynchus kaufmanni</i>	Fish	CR	CR					N/A	Likely scoped out	No suitable habitat for this species.
Aspiolucius esocinus	Fish	EN	CR					N/A	Likely scoped	No suitable

¹⁴ The ecosystems and habitats potentially affected by the Project did not meet any of the criteria for “priority ecosystems,” including “threatened ecosystems,” “highly threatened or unique ecosystems” (IFC CH criterion 4 = EBRD CH criterion i), “areas associated with key evolutionary processes” (CH criterion v), or “threatened habitats” (PBF criterion i) as defined in EBRD PR6 and the associated Guidance Note 6. Neither were the criteria met for any “significant biodiversity features identified by a broad set of stakeholders or governments” (PBF criterion iii), or “ecological structure and functions needed to maintain the viability of priority biodiversity features” (PBF criterion iv), hence the only biodiversity features included in this table are species (and their habitats) that met one or more of the species-specific CH or PBF criteria/thresholds, as described in the table.

¹⁵ committee for environmental protection under the government of the Republic of Tajikistan, 2017. The Red Book of the Republic of Tajikistan, 2nd Edition., Vo. 2 – Fauna. Dushanbe, Tajikistan.

¹⁶ Tajikistan is neither a member of the EU, nor a Bern Convention signatory, hence the specific CH/PBF criteria relating to habitats and species that receive special protection under EU nature legislation are not considered applicable, per EBRD GN6.

¹⁷ EAAA refers to the Ecologically Appropriate Area of Analysis, which is equivalent to the Project’s effective area of influence for a particular biodiversity receptor, per EBRD PR6 (and see also IFC 2019, Guidance Note 6). The numbers in this column of the table refer to the different EAAA as numbered and described in Table 2

¹⁸ <https://www.iucnredlist.org/> accessed 2 May 2024

¹⁹ PBF = Priority Biodiversity Feature, per EBRD PR6

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Feature ¹⁴	Higher taxon (CLASS)	IUCN global status	Tajik status ¹⁵	Applicable CH/PBF criterion ¹⁶			EAAA ¹⁷	IUCN Minimum global population estimate ¹⁸	Determination ¹⁹	Rationale
				Threatened/ Vulnerable Species	Range-restricted Species	Migratory/ Congregatory Species				
				CH criterion ii, PBF criterion ii	CH criterion iii, PBF criterion ii	CH criterion iv, PBF criterion ii				
<i>Aspiolucius esocinus</i>									out	habitat for this species.
Capoetobrama kuschakewitschi <i>Capoetobrama kuschakewitschi</i>	Fish	EN	EN					N/A	Likely scoped out	No suitable habitat for this species.
Aral Barbel <i>Luciobarbus brachycephalus</i>	Fish	VU	-					N/A	Likely scoped out	No suitable habitat for this species.
Bulatmai Barbel <i>Luciobarbus capito</i>	Fish	VU	-					N/A	Likely scoped out	No suitable habitat for this species.
Snow Trout <i>Schizothorax plagiosomus</i>	Fish	VU	-					N/A	Likely scoped out	No suitable habitat for this species.
Eurasian Carp- <i>Cyprinus carpio</i>	Fish	VU	-					N/A	Likely scoped out	No suitable habitat for this species.
Saker Falcon <i>Falco cherrug</i>	AVES	EN	EN	X		X	1	12,200 – 29,800	PBF	Common migrant based on expert review
White-headed Duck <i>Oxyura leucocephala</i>	AVES	EN	-	X		X	1	5,300 – 8,700	PBF	Rare migrant based on expert review
Pallas's Fish-eagle <i>Haliaeetus leucoryphus</i>	AVES	EN	-	X		X	1	1,000 – 2,499	PBF	Common migrant based on expert review
Egyptian Vulture	AVES	EN	EN	X			1	12,300 – 36,000	PBF	EAAA contains less than 0.5% of global population and is not likely to

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Feature ¹⁴	Higher taxon (CLASS)	IUCN global status	Tajik status ¹⁵	Applicable CH/PBF criterion ¹⁶			EAAA ¹⁷	IUCN Minimum global population estimate ¹⁸	Determination ¹⁹	Rationale
				Threatened/ Vulnerable Species	Range-restricted Species	Migratory/ Congregatory Species				
				CH criterion ii, PBF criterion ii	CH criterion iii, PBF criterion ii	CH criterion iv, PBF criterion ii				
<i>Neophron percnopterus</i> ²⁰										contain ≥ 1% of the global population at any point in species' life cycle
Sociable Lapwing <i>Vanellus gregarius</i>	AVES	CR	-	X			1	11,200	PBF	No known observations in the area
Common Pochard <i>Aythya ferina</i>	AVES	VU	-	X			1	760,000 – 790,000	PBF	Common wintering species. EAAA contains less than 0.5% of global population and is not likely to contain ≥ 1% of the global population at any point in species' life cycle. Project not likely to result in species' up-listing to globally CR/EN
Lesser White-fronted Goose <i>Anser erythropus</i>	AVES	VU	-	X			1	16,000 – 27,000	PBF	No known observations in the area
Yellow-eyed Pigeon <i>Columba eversmanni</i>	AVES	VU	-	X			1	10,000 – 19,999	PBF	No known observations in the area

²⁰ 9 individuals observed at a rubbish dump located roughly 9 km from the Project during May 2024 site visit conducted by Juru.

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Feature ¹⁴	Higher taxon (CLASS)	IUCN global status	Tajik status ¹⁵	Applicable CH/PBF criterion ¹⁶			EAAA ¹⁷	IUCN Minimum global population estimate ¹⁸	Determination ¹⁹	Rationale
				Threatened/Vulnerable Species	Range-restricted Species	Migratory/Congregatory Species				
				CH criterion ii, PBF criterion ii	CH criterion iii, PBF criterion ii	CH criterion iv, PBF criterion ii				
Greater SpottedEagle <i>Clanga clanga</i>	AVES	VU	-	X			1	3,900 – 10,000	PBF	No known observations in the area.
Eastern ImperialEagle <i>Aquila heliaca</i>	AVES	VU	-	X		X		2,500-9,999	PBF	A rare migratory bird. Occurs not every year. Project not likely to result in species' up-listing to globally CR/EN
European Turtle-Dove <i>Streptopelia turtur</i>	AVES	VU	-	X			1	12,800,000 – 47,600,000	PBF	EAAA contains less than 0.5% of global population and is not likely to contain ≥ 1% of the global population at any point in species' life cycle. Project not likely to result in species' up-listing to globally CR/EN

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Feature ¹⁴	Higher taxon (CLASS)	IUCN global status	Tajik status ¹⁵	Applicable CH/PBF criterion ¹⁶			EAAA ¹⁷	IUCN Minimum global population estimate ¹⁸	Determination ¹⁹	Rationale
				Threatened/Vulnerable Species	Range-restricted Species	Migratory/Congregatory Species				
				CH criterion ii, PBF criterion ii	CH criterion iii, PBF criterion ii	CH criterion iv, PBF criterion ii				
Asian Houbara <i>Chlamydotis macqueenii</i>	AVES	VU	-	X			1	33,000 – 67,000	PBF	EAAA contains less than 0.5% of global population and is not likely to contain ≥ 1% of the global population at any point in species' life cycle. Project not likely to result in species' up-listing to globally CR/EN
Bearded Vulture <i>Gypaetus barbatus</i>	AVES	NT	EN	X			1	1,675 – 6,700	PBF	EAAA contains less than 0.5% of global population and is not likely to contain ≥ 1% of the global population at any point in species' life cycle. Project not likely to result in species' up-listing to globally CR/EN
Short-toed SnakeEagle <i>Circaetus gallicus</i>	AVES	LC	EN	X			1	50,000 – 99,999	PBF	EAAA contains less than 0.5% of global population and is not likely to contain ≥ 1% of the global population at any point in species'

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Feature ¹⁴	Higher taxon (CLASS)	IUCN global status	Tajik status ¹⁵	Applicable CH/PBF criterion ¹⁶			EAAA ¹⁷	IUCN Minimum global population estimate ¹⁸	Determination ¹⁹	Rationale
				Threatened/ Vulnerable Species	Range-restricted Species	Migratory/ Congregatory Species				
				CH criterion ii, PBF criterion ii	CH criterion iii, PBF criterion ii	CH criterion iv, PBF criterion ii				
										life cycle. Project not likely to result in species' up-listing globally CR/EN
Barbary Falcon <i>Falco pelegrinoides</i>	AVES	LC	EN	X			1	100,000 – 499,999	PBF	EAAA contains less than 0.5% of global population and is not likely to contain ≥ 1% of the global population at any point in species' life cycle. Project not likely to result in species' up-listing globally CR/EN
Great Bustard <i>Otis tarda</i>	AVES	EN	CR	X			1	29,600 – 33,000	PBF	EAAA contains less than 0.5% of global population and is not likely to contain ≥ 1% of the global population at any point in species' life cycle. Project not likely to result in species' up-listing globally CR/EN
Cinereous Vulture <i>Aegypius monachus</i>	AVES	NT	VU	x			1	16,800 – 22,800	PBF	EAAA contains less than 0.5% of global population

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Feature ¹⁴	Higher taxon (CLASS)	IUCN global status	Tajik status ¹⁵	Applicable CH/PBF criterion ¹⁶			EAAA ¹⁷	IUCN Minimum global population estimate ¹⁸	Determination ¹⁹	Rationale
				Threatened/Vulnerable Species	Range-restricted Species	Migratory/Congregatory Species				
				CH criterion ii, PBF criterion ii	CH criterion iii, PBF criterion ii	CH criterion iv, PBF criterion ii				
										and is not likely to contain ≥ 1% of the global population at any point in species' life cycle. Project not likely to result in species' up-listing to globally CR/EN
Tajikistan Even-fingered Gecko <i>Alsophylax tadjikiensis</i>	REPTILIA	CR	EN	X	X		3	N/A	Possibly scoped out	No known observations in the area.
Tajikistan Toadhead Agama <i>Phrynocephalus sogdianus</i>	REPTILIA	EN	-	X	X		3	N/A	Likely scoped out	No suitable habitat for this species.
Central Asian tortoise ²¹ <i>Testudo horsfieldii</i>	REPTILIA	VU	-	X			2	N/A	PBF	Project not likely to result in species' up-listing to globally CR/EN,

²¹ Observed at the site during May, 2024 site visit by Juru

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Feature ¹⁴	Higher taxon (CLASS)	IUCN global status	Tajik status ¹⁵	Applicable CH/PBF criterion ¹⁶			EAAA ¹⁷	IUCN Minimum global population estimate ¹⁸	Determination ¹⁹	Rationale
				Threatened/Vulnerable Species	Range-restricted Species	Migratory/Congregatory Species				
				CH criterion ii, PBF criterion ii	CH criterion iii, PBF criterion ii	CH criterion iv, PBF criterion ii				
Marbled Polecat <i>Vormela peregusna</i>	MAMMA-LIA	VU	EN	X			2	N/A	PBF	EAAA contains less than 0.5% of global population and is not likely to contain ≥ 1% of the global population at any point in species' life cycle
Urial <i>Ovis vignei</i>	MAMMA-LIA	VU	CR	X			1	18,000	PBF	EAAA contains less than 0.5% of global population and is not likely to contain ≥ 1% of the global population at any point in species' life cycle
Steppe Cat <i>Felis silvestris lybica</i>	MAMMA-LIA	LC	EN	X			2	N/A	PBF	Project not likely to result in species' up-listing to globally CR/EN,
Steppengras-Schwarzfußporling <i>Picipes rhizophilus</i>	Fungus	VU	-	X			3	2,500 - 5,000	PBF	Project not likely to result in species' up-listing to globally CR/EN,
Waved Pincertail <i>Onychogomphus flexuosus</i>	INSECTA	VU	-	X			3	N/A	PBF	EAAA contains less than 0.5% of global population and is not likely to contain ≥ 1% of

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Feature ¹⁴	Higher taxon (CLASS)	IUCN global status	Tajik status ¹⁵	Applicable CH/PBF criterion ¹⁶			EAAA ¹⁷	IUCN Minimum global population estimate ¹⁸	Determination ¹⁹	Rationale
				Threatened/ Vulnerable Species	Range-restricted Species	Migratory/ Congregatory Species				
				CH criterion ii, PBF criterion ii	CH criterion iii, PBF criterion ii	CH criterion iv, PBF criterion ii				
										the global population at any point in species' life cycle
<i>Tulipa praestans</i>	LILIOP-SIDA	VU	-	X			3	N/A	PBF	No surveys
<i>Tulipa subquinquefolia</i>	LILIOP-SIDA	VU	-	X			3	N/A	PBF	No surveys

2.6.1.2 Impact Assessment on identified PBFs

Expected construction and operational phase impacts on PBF are described in the following table.

Table 10 - Construction and operational phase impacts on PBFs

PBF	Potential impacts during construction	Potential impacts during operational stage
Soaring Birds. Griffon vulture, Egyptian vulture and raptors (falcons and eagles).	--	Soaring birds (vultures and raptors) are potentially attracted by the road because of carrion due to road kills. This impact is already existing but might worsen because of increased traffic and vehicle speed with the newly upgraded road. This is however very unlikely because it is not expected that road kills will increase with the upgraded Project Road due to implementation of crossing facilities for domestic and wild animals.
Rare plants. <i>Tulipa praestans</i> and <i>Tulipa subquinquefolia</i>	Loss of habitats of rare plants due to site clearing works within the Right of Way.	--
Reptiles. Tortoise, gecko and agama	Loss of tortoises (<i>Tesdudo horsfieldii</i>) due to site clearance activities. Potential loss of habitat of gecko and agama due to site clearing activities.	No significant impact during operational phase. This is because an already existing road is upgraded and no new impacts on these animal groups arise.

In summary it is not foreseen that “the project could have significant, adverse and irreversible impacts to priority biodiversity features”. This is because the project is a reconstruction of the already existing road and doesn’t introduce new, significant impacts.

On contrary, the upgraded new road includes additional linear barriers and suitable crossing facilities for domestic and wild animals.

The mitigation measures to avoid and mitigate impacts on PBFs are described below.

2.6.1.3 Mitigation Measures

The following table summarizes the mitigation measures which are included in the design and ESMP/BMP:

Table 11 - Mitigation Measures for identified PBFs

PBF	Mitigation during construction	Mitigation in the design against operational impacts
Soaring birds. Griffon vulture and Egyptian vulture.		Implementation of suitable linear barriers and crossing facilities to reduce road kills of small animals. These measures contribute to the reduction of road kills of small animals and avoid that soaring birds are “attracted” by the road.

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PBF	Mitigation during construction	Mitigation in the design against operational impacts
Rare plants. <i>Tulipa praestans</i> and <i>Tulipa subquinquefolia</i>	Delineation and fencing/marketing of identified habitats of rare plants to avoid destruction during construction phase. The priority search area for a suitable camp site location should be outside the hilly area between chainage km 22+000 to km 31+500 and chainage km 38+500 to km 49+000 which corresponds to the purple line in the map in figure 11.	--
Reptiles. Tortoise,	Daily survey of the construction site by the contractor's environmental specialist with the assistance of other person(s) assigned by the Contractor if necessary. Translocation of captured tortoises to a safe habitat according to the description in the BMP.	Implementation of linear barrier structures and crossing facilities to avoid road kills during operational phase.
Reptiles. Gecko and Agama	In order to protect these species from construction impacts 2 habitat areas of 5 ha size need to be fenced and adequately marked as off-limits for any construction activities and purposes. Exact location of these areas will be identified in Spring/Summer 2025 and communicated to CSC. The priority search area for a suitable camp site location should be outside the hilly area between chainage km 22+000 to km 31+500 and chainage km 38+500 to km 49+000 which corresponds to the purple line in the map in figure 11.	Implementation of linear barrier structures to avoid road kills during operational phase.

In order to substantiate the identified impacts and mitigation measures additional surveys and update of the CHA/ PBF assessment is foreseen. This is because the gap analysis comes to the conclusion that for better assessing the Project road's impact in full compliance with EBRD PR6 additional biodiversity surveys are recommended which include, habitat survey for potential exclusion of Gecko and Agama as PBF in September and/or October 2024, mapping of the Tulips *Tulipa praestans* and *Tulipa subquinquefolia* during its blooming period in April 2025, end of March to early May respectively, raptor and vulture nest surveys from March to July 2025 to identify potential nest sites, potential supplemental biodiversity baseline surveys of Gekko and Agama in June 2025 if confirmed to be PBFs with the aim of the field herpetological survey to assess the status of specific reptiles, particularly the Tajikistan Toadhead Agama and the Tajikistan Even-fingered Gecko on the Project site, and survey for identification and calculation of the current road kills of vertebrates. The survey for identification and calculation of road kills of vertebrates will start in September 2024 until August 2025 and will consist of the national ecologist driving the full length of the road slowly in both directions once every two weeks for a full year for identification of road kills. Identification of dead animals will be carried out at dawn, since during the daytime, those animals that died at night will be eaten by daytime birds of prey.

Post construction (during operation) roadkill will be counted and required as part of the operation phase monitoring plan.

In more detail, the supplemental biodiversity baseline surveys will help in identifying species presence, understanding territorial distribution, and evaluating the state of their habitats. Additionally, incidental data on other reptile and amphibian species encountered during the survey will be collected

The main tasks of herpetological survey are following:

- ⇒ field herpetological survey and processing of field data
- ⇒ analysis of any previous herpetological surveys and other available data (publications, reports, etc.)
- ⇒ compilation of the check-list of species recorded within the project site (in particular, threatened species included in the Red Data Book of Tajikistan and/or the IUCN Red List)

A PBF / CH Assessment will be conducted. The preliminary Critical Habitat Assessment (CHA) will be updated following the additional surveys undertaken in spring 2025. Findings of the additional surveys will be reflected in the revised ESMP/ BMP and ESAP.

The biodiversity management plan already includes mitigation measures and will be updated as required as the tasks above are conducted. Any additional measures will be reflected and implemented by the project contractor(s). From previous baseline data collection tortoises were identified and collection and translocation are required to be undertaken in April 2025 as per BMP.

The required ecological field work on biodiversity is seasonally restricted and, with the exception of the proposed “road kill counts”, and the autumn survey on gecko and agama must be done in spring and summer 2025. There is no indication that the results of the additional surveys will pose a risk to the Project and therefore this supplementary ESIA can be finalized with the data already available and the supplemented survey data added next year then.

The surveys will be finalized by August 2025, except the road kill counts which partly must be done after Project finalization in order to have the “ex ante / ex post” situation on road kills.

2.6.2 Additional Crossing Facilities for Wild Animals

The project’s detailed design is updated to enhance safety measures for both livestock and wildlife. A comprehensive plan includes the installation of 25.5 kilometres of fencing along key stretches of the new road. This fencing aims to prevent livestock from crossing unsafely by directing them to designated crossing points, thereby mitigating road safety risks. In addition to fencing, a combination of measures such as guardrails and open deep channels will be implemented in non-urban areas to prevent unauthorized crossings.

Furthermore, the project includes the construction of 48 culverts, which incorporate 9 specific passages for livestock. These facilities, alongside existing culverts and passages, will ensure the

safe transit of domestic and wild animals, meeting the project's requirements for animal safety and road protection.

The below table shows the locations and the dimensions of the 9 crossings for domestic animals.

Table 12 - Animal Crossings

No.	Location, PC+	Dimension of culvert, m	Link to drawing
1	109+99,5	6,0x4,5	Book 8 BC-35
2	150+00,2	4,0x3,0	Book 8 BC-41.1
3	209+28,4	4,0x3,0	Book 18 UP2-02
4	241+06,7	4,0x3,0	Book 8 BC-66
5	279+50,9	4,0x3,0	Book 8 BC-75
6	299+60,9	4,0x3,0	Book 8 BC-82
7	346+59,9	4,0x3,0	Book 8 BC-94
8	369+41,3	4,0x3,0	Book 8 BC-102
9	446+98,4	4,0x3,0	Book 8 BC-111

These crossings can also be used by wild animals.

In addition, in order to allow the safe crossing of the Project road and avoid road kills of tortoises and small animals the culverts within the steppe hills (purple line in the above map in figure 11) which are located between chainage km 22+000 to km 31+500 and chainage km 38+500 to km 49+000 are provided with prefabricated concrete L-shaped guiding elements. This refers to the following culvert numbers: Culvert Number 61, 63, 64, 66, 69, 75, 76, 79, 90, 82, 106, 111, 114 and 115.

The length of the guiding structure is 100 m to each side of the respective culvert.

2.7 Indigenous People (PR 7)

Not applicable. There are no indigenous people in the Project area. Hence the PR 7 is not applicable.

2.8 Cultural Heritage (PR 8)

The PR 8 is complied with. No archaeological artefacts were identified along-side the Project. A suitable chance find procedure is in place in case of chance finds during construction.

2.8.1 Archaeology

The responsible regulator for archaeological artefacts and supervision of the chance find procedure is the Institute of History, Archaeology and Ethnography named after A. Donish National Academy of Sciences of Tajikistan.

Therefore in order to identify archaeological artefacts within the Project area of influence, consultation has been conducted with the responsible Institute. In addition a survey of the Project road was conducted in order to check whether there might be any archaeological artefacts within the Project's impact area.

After the survey, PIURR received a written statement from the institute on the basis of this investigation. As a result of the survey, no archaeological sites were identified along the entire length of the Dangara-Guliston road.

The findings of the Institute of History, Archaeology and Ethnography named after A. Donish National Academy of Sciences of Tajikistan in English and Russian is attached as annex to this report.

2.8.2 Cemeteries

There is 1 cemetery that is affected at 2 locations by the Project road. The location of the cemetery is in Vose district, jamoat Abdi Avaz near village Guliston. Location is shown in the map in figure 13 below. In addition, a photo of the cemetery is shown under number 9 in the alignment sheets (annex 3) of the IEE report.



Figure 13 - Location of Cemetery

205. The cemetery is affected at 2 locations as shown in the below table that is an extract of table 57 of the LARP

Table 13 - Affected Assets alongside Cemetery in Guliston

No	Tenure status of affected assets ²²	Affected Asset	Land in m ²	Compensation
1	Public place (Cemetery) in Guliston Jamoat # 1: From km 489+7,34 to 483+93,39_left side of Project road # 2: From km 488+67,76 to 489+37,48_right side of Project road	Fence	692.6	Cash compensation included in the LARP

2.9 Information Disclosure and Stakeholder Engagement (PR 10)

MOT will make the environmental assessment and other environment-related documents available in accordance with Tajikistan's, EBRD and ADB requirements for disclosure. All environmental safeguards documents are subject to public disclosure, and therefore will be made available to the public.

PIURR is responsible for ensuring that all environmental assessment documentation, including the IEE, the EBRD ESIA package and environmental monitoring reports, are properly and systematically kept as part of PIURR project specific record;

All environmental documents are subject to local public disclosure, and will therefore be made available to public through publication on PIURR/MOT web-site (footnote 3) and posting notices of availability of hard copy to be provided by PIURR on request in affected village communities

- ⇒ PIURR website at which the IEE and the SASMEs will be disclosed is <https://www.mintrans.tj/>. The IEE will be disclosed in Russian and in English Language. Translation of the IEE from English to Russian is done by the CSC. Hardcopies of the IEE will be made available in the respective villages alongside the Project Road if requested by the affected community.
- ⇒ PIURR will ensure that meaningful public consultations, particularly with project affected persons, are undertaken throughout preparation and implementation of the project
- ⇒ PIURR will ensure relevant information and project reports are disclosed in language and form understandable by stakeholders, workers, and local communities

Additional requirements prior to disclosure include the ESIA disclosure meetings to be held b/w disclosure and project board meeting and consultation report prepared/disclosed on

²² Extracted from table 57 of the LARP "Cost for reinstatement of public assets attached to State land"

website etc. PIURR will assign a responsible Community Liaison Officer (CLO) to implement SEP and handle grievances.

2.9.1 Public Consultation

The conducted consultation process is in detail described in chapter 1.4 “Information Disclosure, Consultations and Participation” of the LARP. Overall three rounds of consultation meetings have been conducted for preparation of the LARP according to the ADB SPS. This also meets the requirements of category A Projects according to the EBRD ESP (2019).

First round of consultation meetings was done in November 2021. Second round of consultation meetings was done in spring 2023 (On March 4, 2023, in the meeting hall of Ismat Sharif and on March 7, 2023 in the local hospital also located in town of Ismat Sharif. On April 15, 2023, one more public consultation was conducted in village Vose in the meeting hall of Public school No 35 attended by 23 persons).

On April 6, 2024, Public Consultations were conducted in three sites - Ismat Sharif Jamoat and School #25 of Chorsada village of Dangara district and School #17 of Vose district with participation of representatives of 11 settlements. Detailed information and attachment are given below.

During the entire LARP preparation period in total 229 (152 men, 77 women) persons participated in the public consultations. Besides at least one member of 146 AHs (992 APs 496 men and 496 women) have been individually consulted and provided with the copy of Public Information Booklet during the DMS, SES and inventory of project affected assets subject to compensation under the implementation ready LARP.

Within scope of work of the LARP preparation National and International Social Safeguards in coordination with the PIURR carried out a detailed inventory of all project affected assets and land subject to cash compensation.

All Inventory data were provided to the State Unitary Enterprise for Valuation (SUE) ‘Narkhguzori’, in order to determine compensation amounts (unit rates) per each type of affected asset (structures such as residential houses, supplementary structures, fences, trees etc.).

3 Sensitive Receptors

Sensitive receptors within the study area were identified in the IEE (June 2024) regarding the physical, biological and social environment.

3.1 Physical Environment

For the physical environment the sensitive receptors are the surface waters alongside the Project road. There are in total 19, which are listed according to the road chainage in the annex 1 of the IEE “report of water quality”. During the construction phase these receptors are monitored by regular sampling and instrumental measurements of possible pollutants due to Project activities.

3.2 Biological Environment

Regarding the biological environment, 9 sensitive receptors were identified. They are shown in the annex 4 of the IEE “Biodiversity Survey” in the table and map. The prescribed mitigation measures have been included in the EMP of the IEE.

3.3 Human Environment

Sensitive receptors for the socioeconomic and human environment alongside the project road are shown in the below figure 4 (figure 26 of the IEE). The map shows the locations at which instrumental measurements for air quality and vibration were undertaken in April 2024.

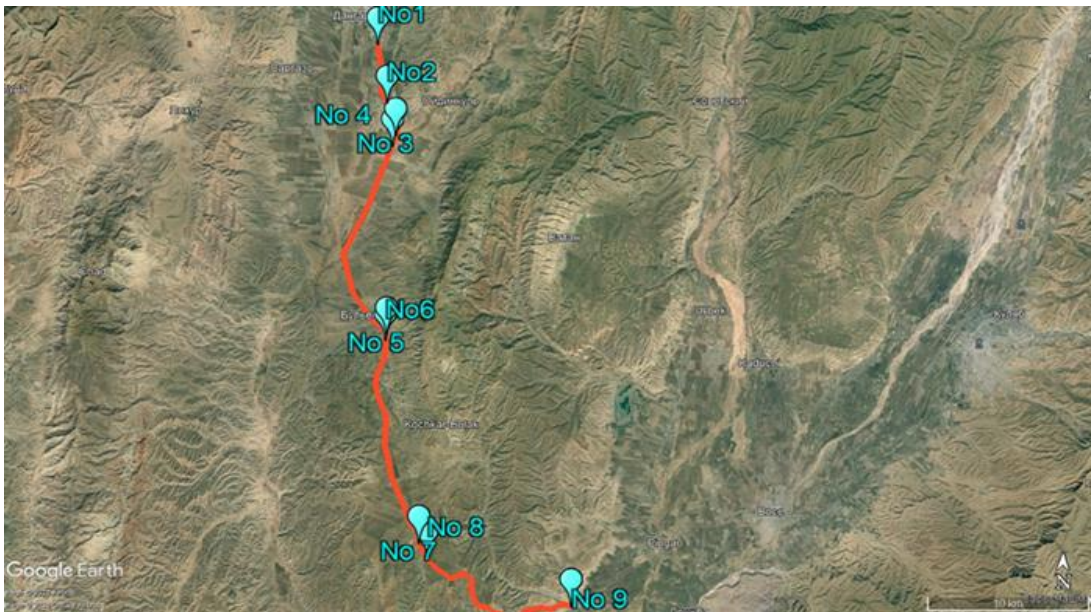


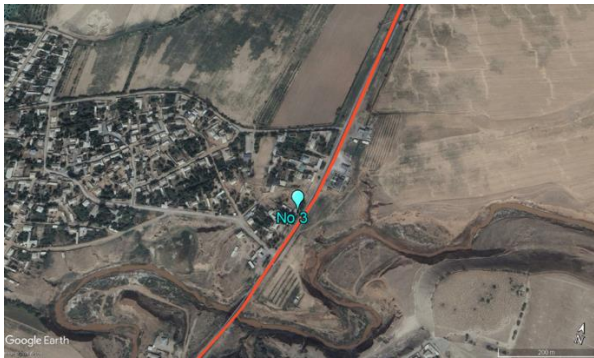
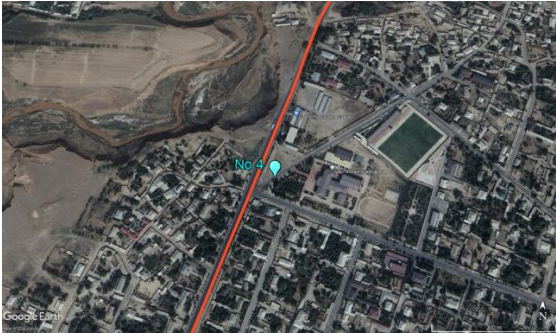













Figure 14 - Map showing sensitive receptors for vibration and air quality measurements

The below table shows the sensitive receptors in more detail:

Table 14 - Sensitive Receptors for Air Quality and Vibration Measurements (April 2024)

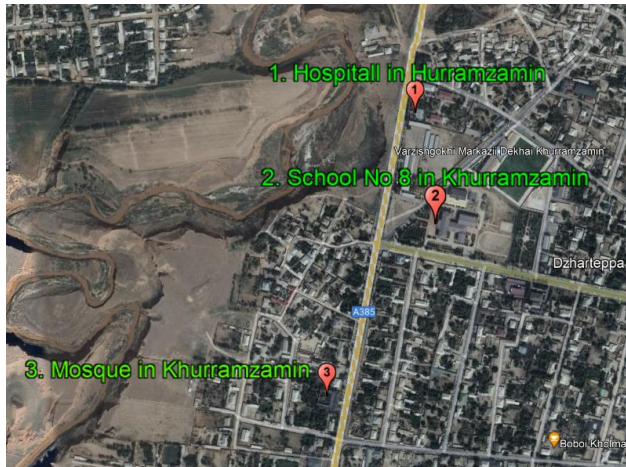
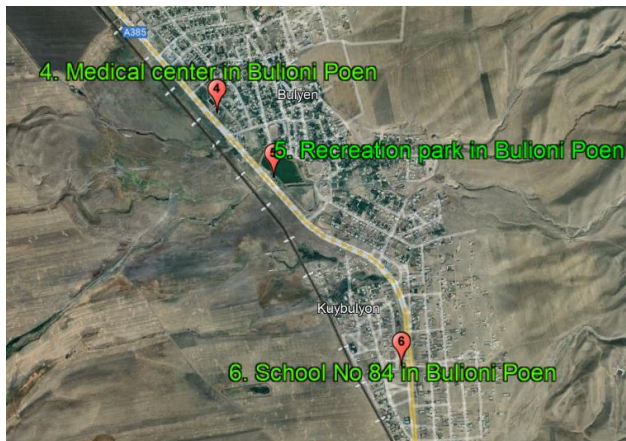

Sensitive receptors at which instrumental measurements for air quality and vibration were undertaken in April 2024	
	
Location of Monitoring Point 1st Km 0+000, “Aziz” dining room. Interchange of the Bokhtar-Dangara highway.	
	
Monitoring Point No. 2. Village I. Sharipov. Near a residential building	
	
Monitoring Point No. 3. Khurramzamin village, near residential buildings	

Sensitive receptors at which instrumental measurements for air quality and vibration were undertaken in April 2024	
	
Monitoring Point No. 4. Khurramzamin village near school No. 8	
	
Monitoring point No. 5 (Residential buildings in the village of Bulyoni Poyon)	
	
Monitoring Point No. 6 (Bulyoni Poyon, School No. 84)	

Sensitive receptors at which instrumental measurements for air quality and vibration were undertaken in April 2024	
	
Monitoring Point No. 7 (Bakhoriston village)	
	
Monitoring point No. 8 (Shukhrater village, 300 m from the traffic police post)	
	
Monitoring Point No. 9. Market square at the end of the project road (At the intersection with the Guliston-Farkhor road).	

In order to complete the list of sensitive receptors alongside the project road an additional survey was undertaken on June 18. The below maps in table show the identified medical centres, schools and mosques.

Table 15 - Medical Centres, Hospitals, Schools and Mosque

Medical centres, hospitals, schools and mosques along the Project road	
<p>Khurramzamin Village</p> <p>Hospital (km 6+800, lhs), school (km 7+100 lhs) and mosque (km 7+450, rhs)</p>	
<p>Buloni Poen village</p> <p>Medical centre (km 19+500 lhs), recreational park (km 19+900, lhs) and school (km 21+400, rhs)</p>	
<p>Medical centre in Bakhoriston (km 35+500 lhs)</p>	

In addition to the suburban area of Dangara and Guliston the project road passes through the following rural villages: Shahbur, Khurramzamin, Buleni poyon, Bakhoriston and Shukhtarar. Consequently, in addition, all residential areas were identified by their chainage, so that the list of the identified sensitive receptors along the project road is complete

To protect the building structures and the human health, baseline measurements were done at sensitive receptors on air quality, noise and vibration. During the construction phase there must be instrumental monitoring which is described in the Monitoring Plan of the IEE and will be also included in the ESMP for EBRD.

Safety risks with regard to the identified sensitive receptors refer particularly to school children and elderly people. The diligent implementation of the traffic management plan will avoid identified risks that could result from construction and operation traffic. All required measures such as speed control, traffic signs, pedestrian movement control measures must be stipulated in the traffic management plan. The project will ensure that free and safe access is provided to all project affected people (PAP) at all time during construction and operation to their properties, including access for their livestock from and to the agricultural fields.

Any type of disruption to PAP activities shall be avoided and/or mitigated in consultation and in line with best international practices

4 Relevant regional and strategic environmental and social assessments or studies that affect the Project

The Dangara-Guliston road reconstruction project perfectly fits with the vision, goals and targets of the National Development Strategy of the Republic of Tajikistan for the period of up to 2030.

It is connected to the Road Network Sustainability Project which consist of the additional two road sections, as shown in the map in figure 15:

- ⇒ Hulbuk-Temurmalik-Kangurt, approximately 59 km in length; and
- ⇒ Bokhtar-Okmazor (40 km), Okmazor-Dangara (approximately 28.7 km)



Figure 15 - Location of the 3 Road Sections of the Road Network Sustainability Project within Tajikistan (Project Road Dangara-Guliston is shown in blue)

The project significantly improves the connectivity of these arterial roads. There are no other relevant regional and strategic environmental and social assessments or studies that affect the Project.

5 Cumulative and Induced Impacts

Cumulative and Induced Impacts are analysed in the chapter “cumulative and induced impacts” of the IEE.

Cumulative impact assessment requires the assessment of the combined effects of the Dangara-Guliston road and other infrastructure Projects connected to it namely the

- ⇒ Hulbuk – Temurmaliq - Kangurt, approximately 59 km in length; and
- ⇒ Bokhtar – Dangara - road, approximately 70 km.

The cumulative impacts are mostly beneficial because the currently bad road network in the affected southern region of Tajikistan will be significantly improved allowing better transport links and access conditions for the population of Dangara, Baljuvan, Khovaling districts with Temurmaliq and Vose district. Supply of agricultural products and industrial raw materials for the population and enterprises of the cities of Dushanbe, Kulyab, Bokhtar, Khorog and other regions of the Republic will improve. Also, in perspective trade with neighbouring countries, and transport connection to the international road corridors “Dushanbe – Dangara - Kulob – Khorog – Kulma- PRC” and

“Dushanbe- Dangara –Guliston- Farkhor - Afgan Border” will significantly improve and bring better economic perspectives to the people living in the Project area.

Induced impacts are indirect effects occurring during construction and also operation phase of the Project road. There will be mostly positive induced impacts, such as the increase of spending capacity in the Project area, due to the influx of work force which will bring opportunities to local business. Negative induced impacts associated with road construction Projects usually entail the spread of uncontrolled development activities and threat to natural resources in previously undisturbed area. As the Project involves the reconstruction and widening of an already existing road no induced negative impacts are anticipated.

6 Compliance with National Environmental Legislation and EU Directives

The prepared IEE fully complies with the national environmental legislation. An indicative list of the permit types which may be required for the Project is provided in the IEE in the chapter “Environmental Permits and Licenses”.

The central National Environmental Permit approves the design and gives clearance for starting the construction is the State Ecological Expertise (SEE) which is provided by the State Committee for Environmental Protection of Tajikistan (CEP). For obtaining the state approval the Russian version of the IEE must be submitted to the CEP.

The review by the Department of the State Ecological Expertise (SEE) of the Committee of Environmental Protection (CEP) may last up to 60 days (Law on EIA, Article 13) for the Projects of Category A. in the case of full EIA is prepared. However, this road project doesn't relate do A category by the National Environmental Categorization System. In practice the review for similar projects normally lasts 1-2 weeks. A public consultation prior to the positive EIA decision is not required by the National Legislation.

The project perfectly fits with the vision, goals and targets of the National Development Strategy of the Republic of Tajikistan for the period of up to 2030.

6.1 EU Directives

The European Union (EU) EIA Legislation is laid down in the DIRECTIVE 2014/52/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 April 2014, amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

The EU directive distinguishes between Projects requiring mandatory EIA and such type of Projects for which the member States shall determine whether an EIA must be carried out based on criteria set by the directive. Projects requiring mandatory EIA according to the EU directive are listed in annex I of the directive. Regarding road projects mandatory EIA is required for the following

- ⇒ Construction of motorways and express roads.
- ⇒ Construction of a new road of four or more lanes, or realignment and/or widening of an existing road of two lanes or less so as to provide four or more lanes, where such new road or realigned and/or widened section of road would be 10 km or more in a continuous length.

The Dangara-Guliston Road reconstruction project falls into the second category (widening of an existing road from two to four lanes over a section of more than 10 km) and therefore, also according to the EU legislation an EIA is required.

The EBRD ESP 2019 is fully aligned with the EU legislation and therefore complies with all EU directives relevant to the Project.

7 Conclusion and Recommendations

This ESIA supplementary report was prepared in order to address the gaps which were identified with regard to EBRD and EU requirements. Main deficiencies were identified for the PR 3, PR 5 and PR 6.

The undertaken noise and air quality modelling for the operation phase show that no additional design or mitigation measures are required with regard to the PR 3 “Resource Efficiency and Pollution Prevention and Control”.

For PR 5 “Land Acquisition, Restrictions on Land Use and Involuntary Resettlement” a livelihood restauration plan has been prepared as addendum to the LARP which is a standalone document.

With regard to the PR 6 Biodiversity Conservation and Sustainable Management of Living Natural Resources additional investigations must be conducted.

The required additional ecological field work on biodiversity is seasonally restricted and, with the exception of the proposed “road kill counts”, must be done in spring and summer 2025. There is no indication that the results of the additional surveys will pose a risk to the Project and therefore this supplementary ESIA can be finalized with the data already available and the supplemented survey data added next year then.

The surveys will be finalized by August 2025, except the road kill counts which partly must be done after Project finalization in order to have the “ex ante / ex post” situation on road kills.

Annex 1. Statement from Institute of Archaeology received 17th July, 2024

National Academy of Sciences of Tajikistan



Institute of History, Archaeology and Ethnography

named after A. Donish

734025 Dushanbe city, Rudaki Avenue, 33. Tel: 221-37-42; E-mail: ihae51@gmail.com; website:

www.taj-history.tj

№34003/23-402

от «16» July 2024

To: Green Corridor Project Management
(GCDP) TAJ 54286

After your request to the Directorate of the Institute of History, Archaeology and Ethnography named after A. Donish NAST, an expertise of the road between the district center of Dangara and Guliston settlement was conducted. The expertise was conducted on the basis of Article 23 of the Law of the Republic of Tajikistan “On Protection and Use of Historical and Cultural Heritage Objects” dated 30.05. 2017 № 1429.

Leading Researcher of the Department of Archaeology, Candidate of Archaeology T.G.Filimonova as a result of studying the data of “Archaeological map of Danghara district” and “Archaeological map of Vosei district”, as well as “Register of Historical and Cultural Monuments of the Republic of Tajikistan”, official publications recording the presence of historical sites on the territory of the Republic and inspection of the road, it was found that there are no archaeological sites along its entire length. Perhaps, as a result of unforeseen expansion of the construction area, the settlement on the north-western outskirts of Guliston settlement will be partially included in it.

Director of the Institute of History,
Archaeology and Ethnography, Professor

N. Ubaydullo

АКАДЕМИЯ ИЛМҲОИ ҶУМҲУРИИ ТОҶИКИСТОН



ИНСТИТУТИ ТАҶРИХ, БОСТОНШИНОСӢ
ВА МАРДУМШИНОСИИ БА НОМИ АҲМАДИ ДОНИШ

734025, ш. Душанбе, кӯчони Рӯдакӣ, 33. Тел.: 221-37-42; E-mail: ihae51@gmail.com site
www.taj-history.tj


№ 34003/23-402

аз «16» 08 2024

Руководству проекта "Зеленый коридор"
(GCDP) TAJ 54286

После Вашего обращения в дирекцию Института истории, археологии и этнографии им.А.Дониша НАНТ, была проведена экспертиза дороги между районным центром Дангара и поселком Гулистон. Экспертиза была проведена на основании Статьи 23 Закона Республики Таджикистан «Об охране и использовании объектов историко-культурного наследия» от 30.05. 2017 г. № 1429.

Ведущим научным сотрудником отдела археологии, к.и.н. Т.Г.Филимоновой в результате изучения данных «Археологической карты Дангаринского района» и «Археологической карты Восейского района», а также «Фехрасти ёдгориҳои таърихӣ фарҳангии Ҷумҳурии Тоҷикистон», официальных изданий фиксирующих наличие исторических объектов на территории Республики и осмотра трассы, было установлено, что на всем ее протяжении археологические объекты отсутствуют. Возможно, в результате непредвиденного расширения зоны строительства, в нее частично попадет городище на северо-западной окраине пос.Гулистон.

Директор Института истории, археологии
и этнографии, профессор  Н.Убайдулло

Annex 2. Noise Modelling Report

TAJ: ROAD NETWORK SUSTAINABILITY PROJECT (DANGARA – GULISTION SECTION)

NOISE ASSESSMENT REPORT

1. Introduction

This noise impact assessment was prepared for the construction of the Dangara – Guliston road section. The noise study will be part of the overall impact assessment process and is part of the supplementary ESIA report.

Some of the most pervasive sources of noise in the environment come from transportation systems. Traffic noise is a dominant noise source in urban and rural environments accounting for about 80 % of total noise pollution.

Traffic noise has a variety of adverse impacts on human health. Community noise, including traffic noise, is already recognised as a serious public health problem by the World Health Organization, WHO.

An increase in traffic volumes, vehicle speeds, or the amount of heavy trucks will increase traffic noise levels. Therefore, an assessment has been undertaken to determine future traffic noise levels at sensitive receptors located adjacent to the project roads.

The purpose of the project noise assessment was to assess potential changes in noise levels due to the Project and to determine if the Project meets relevant noise regulations. The approach for the Project noise assessment was to:

- ⇒ determine the relevant assessment criteria for road traffic noise along project road corridor
- ⇒ predict road traffic noise levels for the Year 2040 at sensitive receptor locations in the study area
- ⇒ recommend practical noise attenuation strategies (if required).

2. Project Description

The Dangara-Guliston Project Road section spans 49 km and is a crucial route of regional significance in the southern region of the Republic. It is part of the Bokhtar-Okmazor-Dangara-Guliston road, a vital trunk road of international importance in Tajikistan. It facilitates key transport links and the supply of agricultural products and industrial raw materials. The road partly traverses hilly terrain, featuring small curves and steep gradients. The Dangara-Guliston road connects the districts of Dangara, Farkhor, and A. Hamadoni, linking the Jamoats of Korez, Ismat Sharif, and

Guliston to the cities of Dangara and Guliston. The map in the following Figure 1 provides an overview of the Project Road.



Figure 16 - Project Location Map of the Dangara-Guliston Road

The existing road is classified as technical category III and comprises one carriageway with two traffic lanes. Traffic volume assessments indicate that the current road category is insufficient for anticipated future traffic volumes. Therefore, an upgrade to two carriageways with four lanes is necessary.

The designed cross-section of the road includes four driving lanes, a central dividing strip, shoulders, and sidewalks within the green zones in settlements. Sidewalks are located on both sides and, in some areas, on one side of the road. According to the Terms of Reference for the design, a bicycle path is provided along the entire length of the road (on the right side). Depending on the terrain, twenty-four types of cross-sections were adopted during the project development, as detailed in Book 1 of the technical project documentation - Typical Drawings. The following figures illustrate the typical cross-sections outside settlements. The width of the cross-section including the bicycle lane and the shoulders is 29 to 30 meters as compared to the approximately 10 meters of the existing road (2 x 3,75 m driving lanes plus shoulders).

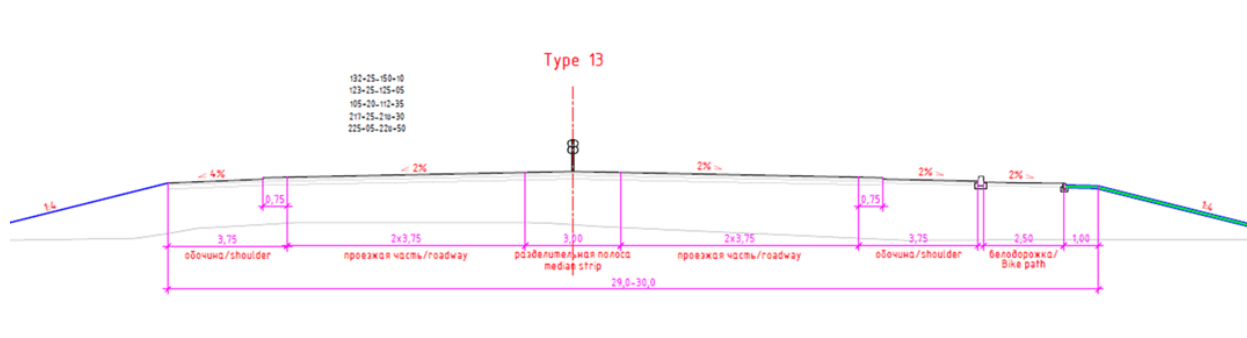


Figure 17 - Typical cross section outside settlements (4-lanes, Technical Category I)

The detailed design road was developed in accordance with the current regulatory documents of the Republic of Tajikistan.

- ⇒ GNiP RT 32-02-2012 "Highways";
- ⇒ GNiP RT 30-01-2018 "Urban planning. Planning and development of settlements";
- ⇒ SNiP 3.06.03-85 Highways.

The design includes the widening of the road to 4-lane standard (technical road category Ib in rough design, construction of interchanges and the improvement of alignment, where necessary.

3. Fundamentals of Traffic Noise

Traffic noise is usually a composite of noises from engine exhaust and tire-road surface interaction. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired. Noise levels near roads depend mainly on following main variables:

- ⇒ Traffic volume
- ⇒ Traffic speed
- ⇒ Amount of heavy trucks (as a percent of total trucks)
- ⇒ Distance from the roadway
- ⇒ Intervening topography

Generally, traffic noise increases with higher traffic volumes (more vehicles means more noise), higher speeds (faster vehicles makes more noise, and more heavy trucks (trucks makes more noise than passenger vehicles).

Sound is the sensation produced in the ear as a result of fluctuations in air pressure, superimposed on the steady atmospheric pressure. The ear responds to these much smaller fluctuations with great sensitivity.

The magnitude of noise is usually described by a ratio of its sound pressure to a reference sound pressure, which is usually twenty micro-Pascals (20 μ Pa). Since the range of sound pressure ratios varies greatly over many orders of magnitude, a base-10 logarithmic scale is used to express sound levels in dimensionless units of decibels (dB). The commonly accepted limits of detectable human hearing sound magnitudes is between the threshold of hearing at 0 decibels and the threshold of pain at 140 decibels.

Sound frequencies are represented in units of Hertz (Hz), which correspond to the number of vibrations per second of a given tone. A cumulative 'sound level' is equivalent to ten times the base-10 logarithm of the ratio of the sum of the sound pressures of all frequencies to the reference

sound pressure. To simplify the mathematical process of determining sound levels, sound frequencies are grouped into ranges, or 'bands.' Sound levels are then calculated by adding the cumulative sound pressure levels within each band, which are typically defined as one 'octave' or '1/3 octave' of the sound frequency spectrum.

The commonly accepted limitation of human hearing to detect sound frequencies is between 20 Hz and 20,000 Hz, and human hearing is most sensitive to the frequencies between 1,000 Hz – 6,000 Hz. Although people are generally not as sensitive to lower-frequency sounds as they are to higher frequencies, most people lose the ability to hear high frequency sounds as they age. To accommodate varying receptor sensitivities, frequency sound levels are commonly adjusted, or 'filtered', before being logarithmically added and reported as a single 'sound level' magnitude of that filtering scale. The 'A-weighted' decibel filtering scale applies numerical adjustments to sound frequencies to emphasize the frequencies at which human hearing is sensitive, and to minimize the frequencies to which human hearing is not as sensitive. When people make judgments of the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. An A-weighted sound level is described as LA dB.

Figure below describes typical A-weighted noise levels for various noise sources and shows levels of noise associated with common activities.

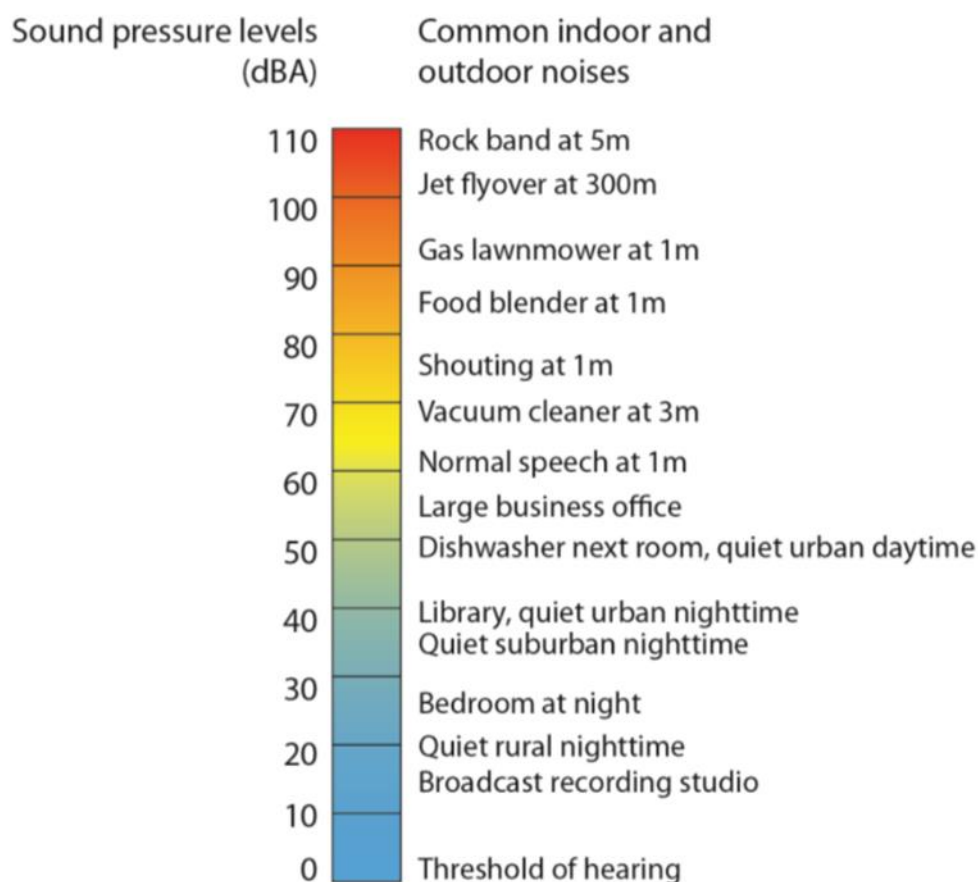


Figure 18 - Decibel levels of Common Noise Sources

Source: A Guide to Noise Control in Minnesota

Decibel Addition

Because decibels are logarithmic units, sound pressure levels cannot be added arithmetically. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions.

Human Response to Changes in Noise Levels

Doubling sound energy results in a 3-dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different than what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of road traffic) that would result in a 3-dB increase in sound would generally be perceived as barely detectable.

Table 16 - Change in Decibel Level and Perceived Changes in Loudness

Change in dB(A)	Perceived Changes in Loudness
± 1 dB(A)	Not Noticeable
± 3 dB(A)	Threshold of Perception
± 5 dB(A)	Noticeable Change
± 10dB(A)	Twice (Half) as Loud
± 20 dB(A)	Four Time (One Fourth) as Loud

Source: A Guide to Noise Control in Minnesota

4. Traffic Noise Criteria

Tajikistan's noise quality standards based on International Sanitary Norms adopted by CIS countries (SanPin 2.2.4/2.1.8.562-96) and in general equivalent to World Bank EHS / IFC standards.

Table 17 - Tajikistan Noise Standards

Area	Day time limits in dBA	Night time limits in dBA
Residential area	55	45
Commercial area	60	50
Hospitals	35	25
Schools, Library	45	45
Hotels, etc.	60	50

In Appendix 2 a synopsis is given on the specific standards for noise emissions in Tajikistan. In addition, the standards are compared with international guidelines and standards. In general, it can be concluded that the Tadjik system of environmental standards is well developed, but the IFC standard for noise is more stringent and therefore the guideline of the International Finance Corporation (IFC) is used for assessing the impacts of noise. This guideline provides criteria and guidance for noise control from a development beyond the property boundaries.

The criteria of the IFC guidelines specifies that noise levels measured at noise receptors must not be 3 dB(A) greater than the background noise levels or exceed 55 dB(A) during the day or 45 dB(A) during the night in residential areas and 70 dB(A) in commercial areas.

Table 18 - Noise Level Guidelines

Receptor	One Hour LAeq (dbA)	
	Day time 07:00 – 22:00	Night time 22:00 – 07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

Note: For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO, 1999

Source: IFC, EHS Guidelines, Noise Management

5. Receptor Selection

In the frame of the baseline measurements for air quality, several locations at sensitive/typical receptors were identified and baseline measurements for air quality were carried out. These selected receptors are also used for the noise modelling. The location of the receptors for noise calculation are presented in the Table below.

The noise measurements were undertaken during daytime only in August 2020. The selected sensitive receptors are within the settlements traversed by the Project Road. Therefore, the measured value is reflecting the noise level at the row of houses which borders the road within the respective settlement. In total there have been measurements at 25 building structures. Distance to road edge is between 5 and 30 meters.

The equipment used is the noise meter TESTO-815.





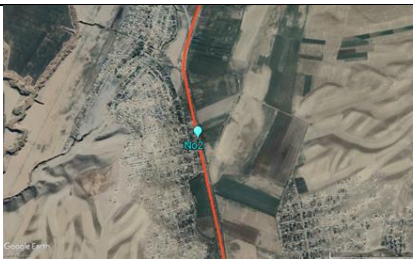

The report on baseline noise measurements is attached to the IEE as annex 2.

It is important to note that as a baseline reference not the measured noise values, but the modelled noise values must be taken. These are accurate and methodologically sound because they are based on the average traffic figures for day and nighttime respectively.

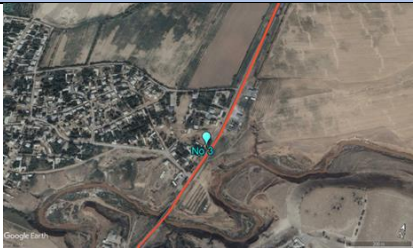

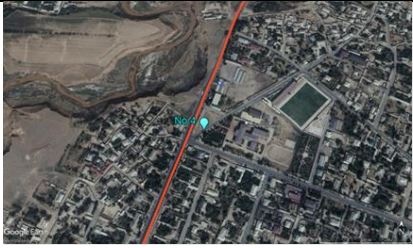
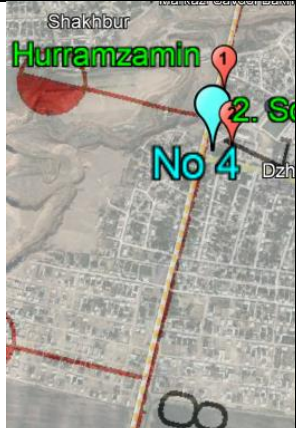




The instrumental noise measurements in the field provide additional evidence for the validity of the modelled baseline values.




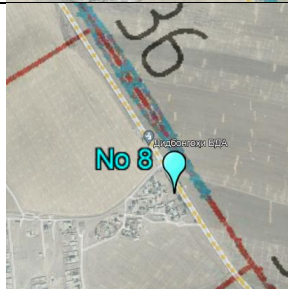


The affected receivers have not officially been informed because no exceedances occurred.

Table 19 - Receptors for Noise Calculation

Nr	Description	Google Image (Source: KMZ)	Road Chainage	Chainage location
1	Location of Monitoring Point 1st Km 0+000, "Aziz" dining room. Interchange of the Bokhtar-Dangara highway.		KM 0+500	
2	Monitoring Point No. 2. Village I. Sharipov. Near a residential building		KM 4 +200	

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Nr	Description	Google Image (Source: KMZ)	Road Chainage	Chainage location
3	Monitoring Point No. 3. Khurramzamin village, near residential buildings		Km 6 + 400	
4	Monitoring Point No. 4. Khurramzamin village near school No. 8		Km 7 + 120	
5	Monitoring point No. 5 (Residential buildings in the village of Bulyoni Poyon)		Km 20 + 900	
6	Monitoring Point No. 6 (Bulyoni Poyon, School No. 84)		Km 21 + 350	

Nr	Description	Google Image (Source: KMZ)	Road Chainage	Chainage location
7	Monitoring Point No. 7 (Bakhoriston village)		Km 35 + 500	
8	Monitoring point No. 8 (Shukhrater village, 300 m from the traffic police post)		KM 36 + 670	
9	Monitoring Point No. 9. Market square at the end of the project road (At the intersection with the Guliston-Farkhor road).		KM 49 + 100	

All receptors are assumed to be one story residential buildings.

6. Road Traffic Noise Calculation and Prediction Model

The noise modelling and planning software SoundPLAN essential, Version 5.1, was used for the development of predictive noise models for the project. SoundPLAN is a widely-used environmental noise modelling and prediction software developed by SoundPLAN GmbH, Germany. The road noise sources and sound propagation model included in the analysis follow German guideline RLS-19 for road traffic noise predictions.

RLS-19 is an effective calculation model, able to determine the noise rating level of road traffic. The RLS-19 model shows a good correlation between the measured and projected noise levels proving to be an adequate tool for road traffic noise prediction. The model requires an input of data regarding the average hourly traffic flow, separated into heavy and light vehicles, the average speed for each group, the dimension, geometry and type of the road and of any natural and artificial obstacles. This model also takes into account the main features which influence the propagation

of noise, such as obstacles, vegetation, air absorption, reflections and diffraction. In particular it makes possible to verify the noise reduction produced by barriers and takes into account also the reflections produced by the opposite screens.

Terrain points from the design drawings are imported into SoundPLAN to create a Digital Terrain Model (DTM). The DGM is a digital representation of the ground surface and used in the calculation of the noise level at any receiver point.

The methodology adopted for the noise prediction is shown briefly summarized in the following Figure 18.

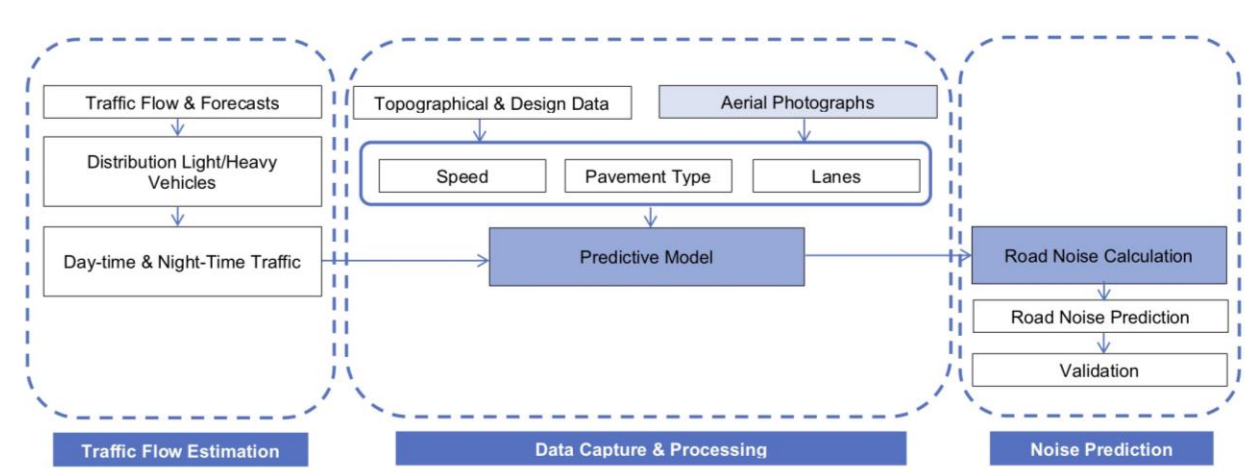


Figure 19 - Methodology Adopted for Traffic Noise Prediction

6.1 Road Traffic Data

Traffic noise increases with traffic volume and the proportion of heavy vehicles. Traffic forecasts for the base year 2024, and future year 2040 were provided for the project road by the Traffic Engineer/Transport Economist. To reduce Greenhouse Gas (GHG) emissions from the transport sector, Tajikistan is promoting the use of E-vehicles. Due to uncertainty of the proportion of E-vehicles in the further vehicle fleet, in the noise calculation the traffic forecast of year 2040 has been used and no provisions for E-vehicles were considered.

The provided traffic data for the project road are shown in Table 20 below.

Table 20 - Traffic Forecast in AADT

Year	Motor-cycle	Car	Utility	Mini-bus	Bus	2-axle truck	3-axle truck	≥4-axle truck	AADT
2024	92	8,784	468	33	10	353	73	65	9,878
2040	143	13,670	728	51	16	549	114	101	15,373

Since the noise impacts are calculated during the one-hour period, the peak hour traffic volumes for day and night time have been deviated from the forecasted traffic volumes based on the hourly distribution of the traffic established during the traffic counts.

The vehicle classes are consolidated to the requirements of RLS-19< into following vehicle classes:

- ⇒ Motorbikes/Motorcycles
- ⇒ Cars and light vehicles u to 3.5 tons overall weight
- ⇒ Truck group 1: trucks without trailer and busses with a total weight over 3.5 tons
- ⇒ Truck group 2: trucks with trailer, articulated trucks with a total weight over 3.5 tons.

According to the IFC Guidelines daytime is defined between 07:00 and 22:00 and nighttime between 22:00 and 07:00. Existing traffic count data from manual classified traffic counts carried out in 2018 have been analyzed to identify the peak hour proportion of the AADT for day-time and nighttime traffic. The same proportion ratio has been used to determine the forecasted peak hour traffic in 2040 based on the predicted AADT. The hourly traffic data used for the noise modelling are shown in Tables 21 and 22.

Table 21 - Traffic Data 2024 per hour

Year: 2024	Day time	Night time
Motorcycles	5	1
Cars and Light Vehicles per hour	534	93
Trucks Group 1 per hour	21	4
Trucks Group 2 per hour	8	1
Total per hour	568	99

Table 22 - Traffic Data 2040 per hour

Year: 2040	Day time	Night time
Motorcycles	8	1
Cars and Light Vehicles per hour	831	145
Trucks Group 1 per hour	32	6
Trucks Group 2 per hour	12	2
Total per hour	884	154

6.2 Vehicle Speed

The lowest traffic noise for a typical traffic mix occurs at about 30 km/h. Increasing average vehicle speed above this increases traffic noise. Estimated operating speeds are used to predict road traffic noise levels and based on the road characteristic of the designed road. The vehicle speeds used in the noise modelling are shown in Table 23.

Table 23 - Vehicle speed

Vehicle speed (km/h)		Remarks
Cars	Trucks	
50	50	Receptors are located in settled areas and therefore a vehicle speed adjusted to build-up areas are considered

6.3 Road Surface

In the noise calculation, an asphalt concrete surface in accordance with ZTV Asphalt-StB 07/13 are considered for the existing (base year 2024) and project road section (year 2040).

6.4 Road Alignments and Terrain Elevation

The road alignment and terrain elevation are imported in SoundPLAN from the topographical survey and road design. Based on the imported terrain and design data a Digital Terrain Model (DTM) were created, which is a representation of the topographical reality. Roads are considered as line elements. For the noise calculation, the place of emission is in the middle of the outer lanes in accordance with RLS-19. The gradient of the project road (rate of climb/decent) is evaluated by SoundPLAN based on the set of coordinates from the road design. The slope of the road influences vehicle noise. As slope increases, engine noise increases because engines need to work harder.

6.5 Limitation

Traffic noise modelling procedures are not applicable in situations where the existing acoustical environment is not dominated by an existing road traffic noise source. Road traffic noise models are not capable of accurately determining existing noise levels where road traffic noise is not the dominant contributing acoustical characteristic. Generally, the procedures are intended for sites that are currently influenced by road traffic noise and will be similarly affected by the proposed road improvement project. In areas dominated by background (non-road) noise sources such as jet, monitored (rather than modelled) noise levels should be used to determine existing worst noise hour levels, thereby accurately representing the existing noise environment.

7. Results and Conclusion of Traffic Noise Predictions

The road noise prediction consists of the project road alignment and forecasted further traffic data. Noise levels for the base year 2024 and future years 2040 (after 16 years from the base year) were calculated and compared to the relevant criteria. The results of the noise prediction at the selected receptors are presented in the Table below. The location of the receptors, predicted noise levels and the corresponding noise contours for residential areas, are presented in Appendix 3 and 4.

Widening of the road for construction of U-turns, construction of interchanges and improvement of alignment leads to different levels of impacts at different receptors.

However, although the traffic noise levels at some receptors exceed the desirable level of 55 dB(A) in daytime and 45 dB(A) in nighttime in accordance to IFC standard, it should be noted that the increase of the noise levels between the base year 2024 and the reference year 2040 will be less than 3 dB(A) and therefore no additional noise abatement measures are required. The 3 dB(A) criteria is applicable as in settled areas the project road alignment will use mainly the right-of-way

of the existing road. The area is pre-polluted due to existing traffic and the increase of the ambient noise level from the anticipated traffic increase is below the threshold of perception.

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Table 24 - Results of Noise Modelling

Point No.	Location (Chainage)	Permissible Noise Level IFC Guidelines dB(A)		Measured Daily Ambient Noise Level in 2020 Maximum dB(A)	Predicted Noise Level 2024 in dB(A)		Predicted Noise Level 2040 in dB(A)		Difference Noise Level 2024 - 2040 in dB(A)		Requirement of additional noise protection measures based on the 3 dB(A) Rule between Base Year and Reference Year 2040
		LAeq day time	LAeq night time		LAeq day time	LAeq night time	LAeq day time	LAeq night time	day	night	
1	CH 0+500	55	45	52.6	52.6	44.9	54.7	47.1	2.1	2.2	no
2	CH 4+200	55	45	55.0*	52.7	45.0	53.1	45.5	0.4	0.5	no
3	CH 6+400	55	45	56.7	53.2	45.6	55.1	47.5	1.9	1.9	no
4	CH 7+120	55	45	57.5	51.1	43.4	53.0	45.4	1.9	2.0	no
5	CH 20+900	55	45	53.2	49.6	41.9	50.9	42.9	1.3	1.0	no
6	CH 21+350	55	45	54.8	50.7	43.0	52.8	44.8	2.1	1.8	no
7	CH 35+500	55	45	53.2	53.6	46.9	56.5	48.9	2.9	2.0	no
8	CH 36+670	55	45	51.4	51.2	43.6	52.7	45.2	1.5	1.6	no
9	CH 49+100	55	45	55.0	51.7	44.1	52.3	44.6	0.6	0.5	no

Note: * Entrance to I.Sharipov village: 48,4 dB, Exit from I.Sharipov village: 55.0 dB

Annex 3. Glossary

Ambient Noise: All-encompassing noise at a given place and time. This is usually a composite of sounds from all sources near and far, including any specific sources of interest.

Amplitude: The strength or magnitude of the pressure of a sound wave.

A-Weighted Sound Level: Expressed in dB(A). Frequency- weighted sound pressure level approximating the frequency response of the human ear. It is defined as the sound level in decibels measured with a sound level meter having the metering characteristics and a frequency weighting specified in the American National Standards Institute Specification for Sound Level Meters, ANSI S 1.4–1983. The A- weighting de-emphasizes lower frequency sound sounds below 1,000 Hz (1 kHz) and higher frequency sounds above 4 kHz. It emphasizes sounds between 1 and 4 kHz. A-weighting is the most commonly used measure for traffic and environmental noise throughout the world.

Best practice environmental management: The management of the activity to achieve a minimization of the activity's environmental harm through cost-effective measures assessed against the current international and national standards applicable to the activity.

dB Decibel, which is 10 times the logarithm (base 10) of the ratio of a given sound pressure to a reference pressure; used as a unit of sound.

dB(A) Unit used to measure 'A– weighted' sound pressure levels.

Emission Level: A measure of the noise output of a single vehicle. It is the maximum noise level, in dB(A), observed during a pass by of the vehicle at 25 m.

LAeq,T: Exposure to noise for the duration of a given time interval T (a 24-hour period, a night, a day, an evening) is expressed as an equivalent sound pressure level (measured in dB(A)) over the interval in question

Loudness: The judgment of intensity of a sound in terms of which sounds may be ranked on a scale from soft to loud. On this scale, a doubling of a reference sound energy is barely perceptible to the human ear, a tripling of the sound energy is readily perceptible, and 10 times the sound energy is about twice as loud. Decreasing the sound by the same factors has a reciprocal effect—reducing the reference sound energy to one-tenth of the original energy the sound is perceived as half as loud. Although loudness depends primarily on the intensity of the sound, it also depends on the sound's frequency and wave form.

Mitigation: Reduction in severity.

Noise: Sound that is loud, unpleasant, unexpected, or otherwise undesirable.

Noise Barrier: A physical obstruction that is constructed between the highway noise source and the noise sensitive receptor(s) for the purpose of lowering the noise level, including stand-alone barrier structures, berms (earth or other materials), and combination berm/barrier structure systems.

Noise Contour: An imaginary line shown on a plan along which all sound levels are equal.

Predicted Existing Traffic Noise Level: The traffic noise level that is determined through the use of the Traffic Noise Model for existing roadway conditions.

Predicted Future Traffic Noise Level: The traffic noise level that is determined through the use of the Traffic Noise Model for the future design year traffic and roadway geometry, including build and no-build alternatives.

Receptor: Most basically defined as any natural or artificial sensor that can perceive, register, or be affected by sound (e.g., human ear, microphone). In the context of a noise analysis a receptor is a single specific dwelling unit or the equivalent of a single dwelling unit.

RLS-19: Guidelines for Noise Protection on Roads (Richtlinien für den Lärmschutz an Straßen), 2019, German Calculation method for Noise Prediction

Sound: A vibratory disturbance created by a moving or vibrating source in the pressure and density of a gaseous, liquid medium or in the elastic strain of a solid that is capable of being detected by hearing organs. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to the ears. The medium of main concern is air.

Traffic noise: The total noise resulting from road traffic, including both light and heavy vehicles, steady and intermittent traffic flow and specific events such as the use of engine brakes.

WHO: World Health Organisation.

Annex 4. Environmental Standards for Noise Emissions

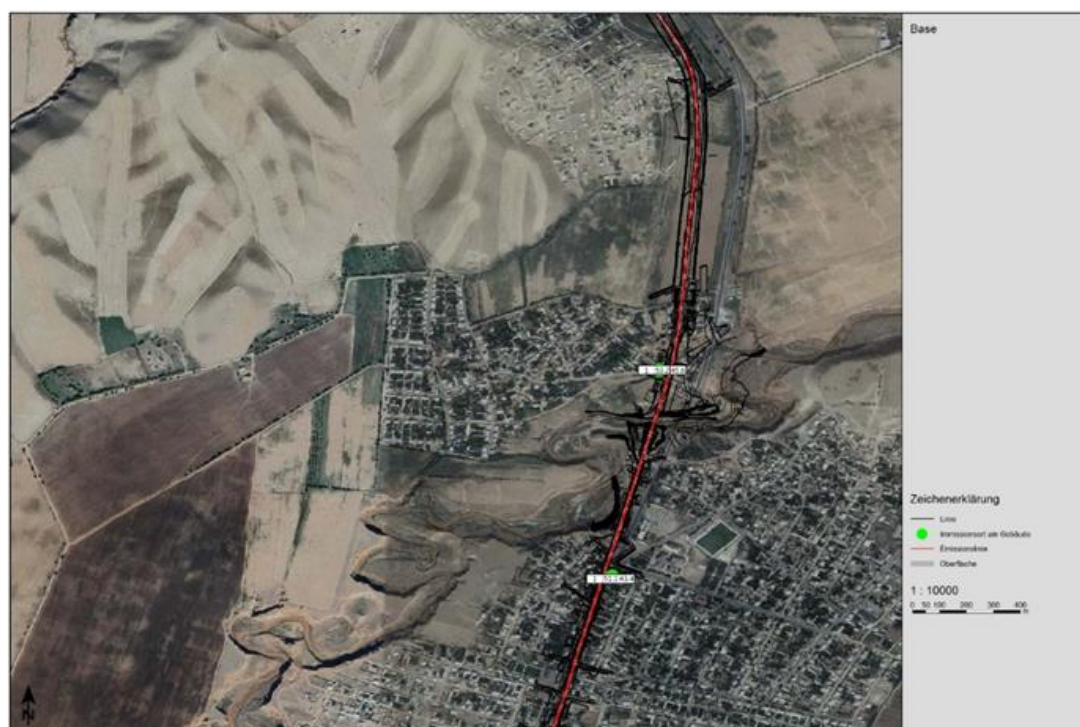
Topic	National Standards / Requirements	International Guidelines / Standards	Adopted Project Standard	Rationale
	Tajikistan ²³	IFC Environmental, Health, and Safety General Guidelines		
Night time noise limits for human protection	<p>Noise emissions at the night time (23:00-07:00) should not exceed the following levels (SanPin 2.2.4/2.1.8.562-96):</p> <ul style="list-style-type: none"> • Inside residential and public buildings: <ul style="list-style-type: none"> – Hospital and sanatorium's wards, and operating rooms: 25 dB(A); – Residential rooms in apartments, rest houses, boarding houses, houses for the elderly and disabled, sleeping rooms in kindergartens, and residential schools: 30 dB(A); – Rooms in hotels and hostels: 35 dB(A); • In residential and other areas: <ul style="list-style-type: none"> – Recreational areas immediately adjoining hospital buildings and health centres: 35 dB(A) – Areas immediately adjoining residential buildings, polyclinics, dispensary, rest houses, homes for the elderly and disabled, kindergartens, schools and other educational institutions, libraries; 45 dB(A); – Areas immediately adjoining hotel and dormitory's buildings: 50 dB (A) 	<p>Noise emissions should not exceed the following levels or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site:</p> <p>Outdoor:</p> <p>Residential; institutional, educational: Night time (22:00-07:00): 45 dB(A)</p> <p>Industrial, commercial: Night time (22:00-07:00): 70 dB(A)</p>	<p>Tajik standards apply with night time defined as 22:00 – 07:00 in line with IFC EHS General Guidelines.</p> <p>Exception 1: IFC standard will prevail from 22.00 to 23.00</p> <p>Exception 2: areas adjoining hotels and dorms where IFC standard is more stringent 45 dB (A)</p> <p>The 3 dB criteria in IFC Guideline for increase in background levels applies also to rehabilitation / upgrading projects.</p>	<p>Most stringent and provides more comprehensive measurement criteria</p>

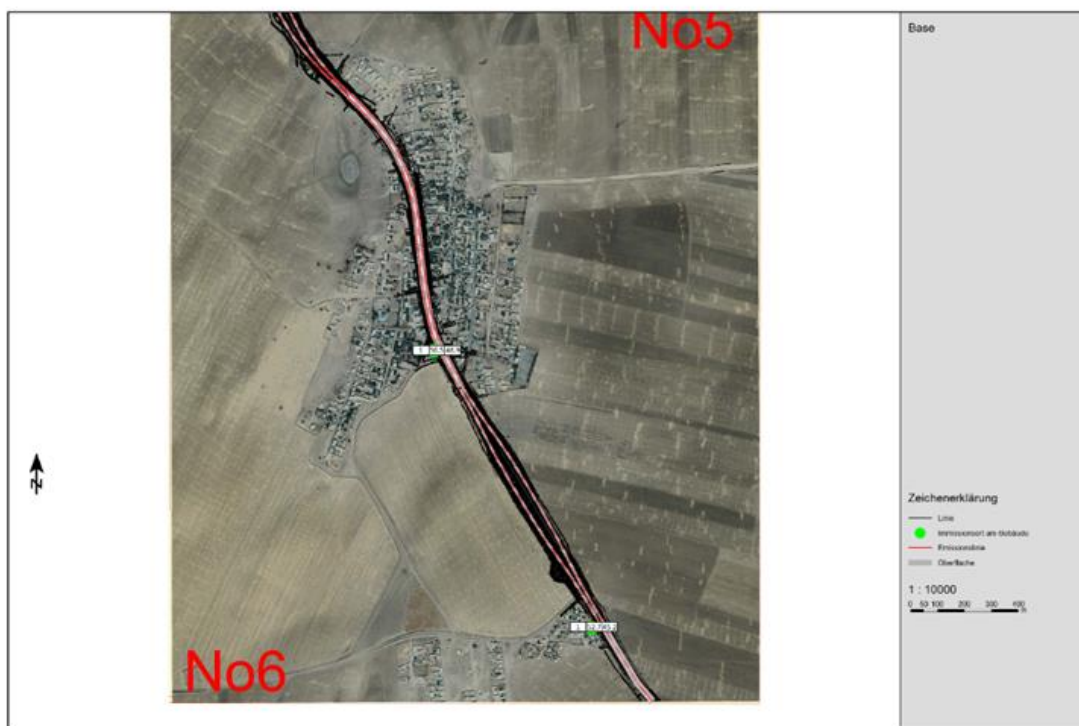
²³ According to International Sanitary Norms adopted by CIS countries (SanPin 2.2.4/2.1.8.562-96)

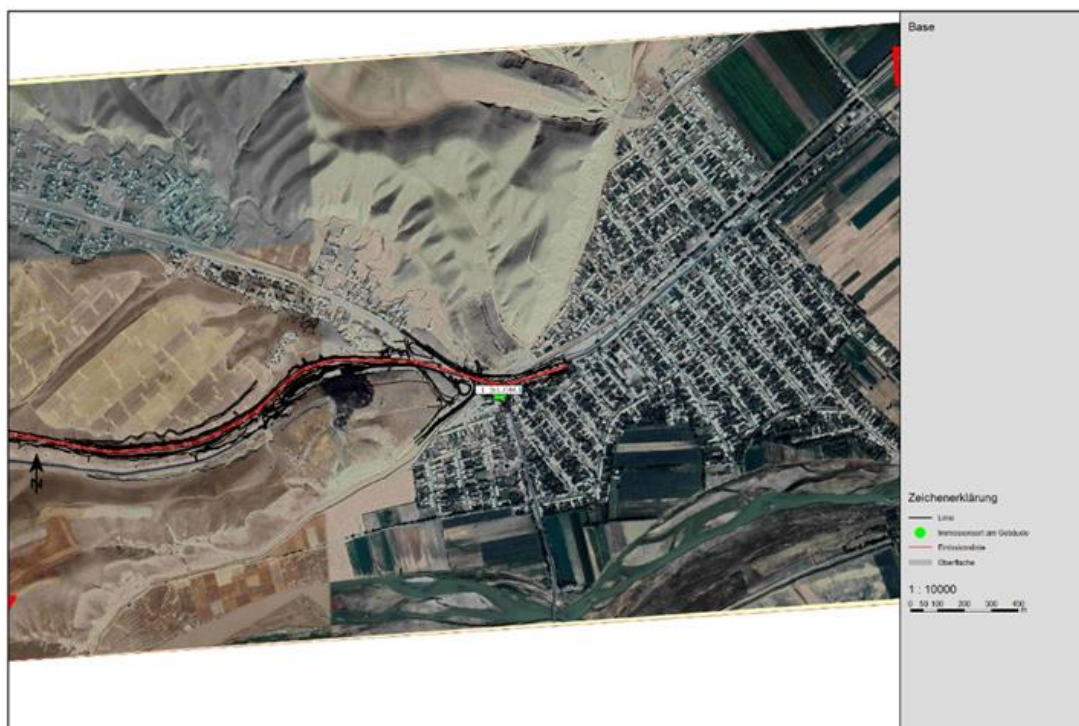
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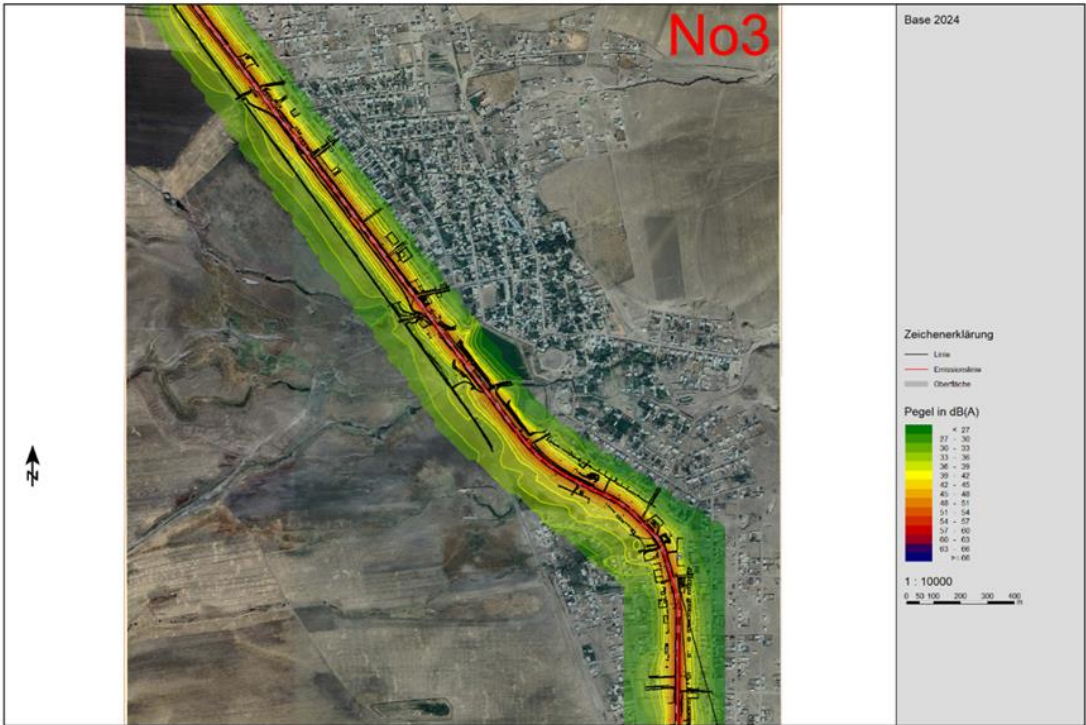
Topic	National Standards / Requirements	International Guidelines / Standards	Adopted Project Standard	Rationale
	Tajikistan ²³	IFC Environmental, Health, and Safety General Guidelines		
Day time noise limits for human protection	<p>Noise emissions at the day time (07:00-23.00) should not exceed the following levels (SanPin 2.2.4/2.1.8.562-96):</p> <ul style="list-style-type: none"> • Inside residential and public buildings: <ul style="list-style-type: none"> – Hospital and sanatorium's wards, and operating rooms: 35 dB(A); – Consultation rooms of polyclinics, ambulant clinics, dispensers, hospitals, and sanatoria 35 dB(A). – Classrooms, teachers' common room, school and other educational organization's auditoriums conference halls, and public reading rooms 40 dB(A). – Residential rooms in apartments, rest houses, boarding houses, houses for the elderly and disabled, sleeping rooms in kindergartens, and residential schools: 40 dB(A); – Rooms in hotels and hostels: 45 dB(A); – Halls of cafes, restaurants, eating rooms: 55 dB(A); – Shops trade halls, passenger halls in airports and stations, consumer services centres: 60 dB(A); • In residential and other areas: <ul style="list-style-type: none"> – Recreational areas immediately adjoining hospital buildings and health centres: 45 dB(A) – Areas immediately adjoining residential buildings, polyclinics, dispensary, rest houses, homes for the elderly and disabled, kindergartens, schools and other educational institutions, libraries: 55 dB(A); – Areas immediately adjoining hotel and dormitory's buildings: 60 dB (A) – Rest areas at the territory of hospitals and sanatoria 35 dB (A) – Recreation areas at the territory of micro-districts, and residential areas, rest houses, houses for the elderly and disabled, children's playgrounds in kindergartens, schools and other educational institutions: 45 dB (A) 	<p>Noise emissions should not exceed the following levels or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site:</p> <p>Outdoor Residential.; institutional, educational.: Daytime (07:00-22:00): 55 dB(A) Industrial, commercial: Night time (22:00-07:00): 70 dB(A).</p>	<p>Tajik standards with daytime defined as 07:00 – 22:00 in line with IFC EHS General guidelines. Exception: areas adjoining hotels and dorms where IFC standard is more stringent 55 dB (A) The 3 dB criteria in IFC Guideline for increase in background levels applies also to rehabilitation / upgrading projects.</p>	<p>Most stringent and provides more comprehensive measurement criteria</p>

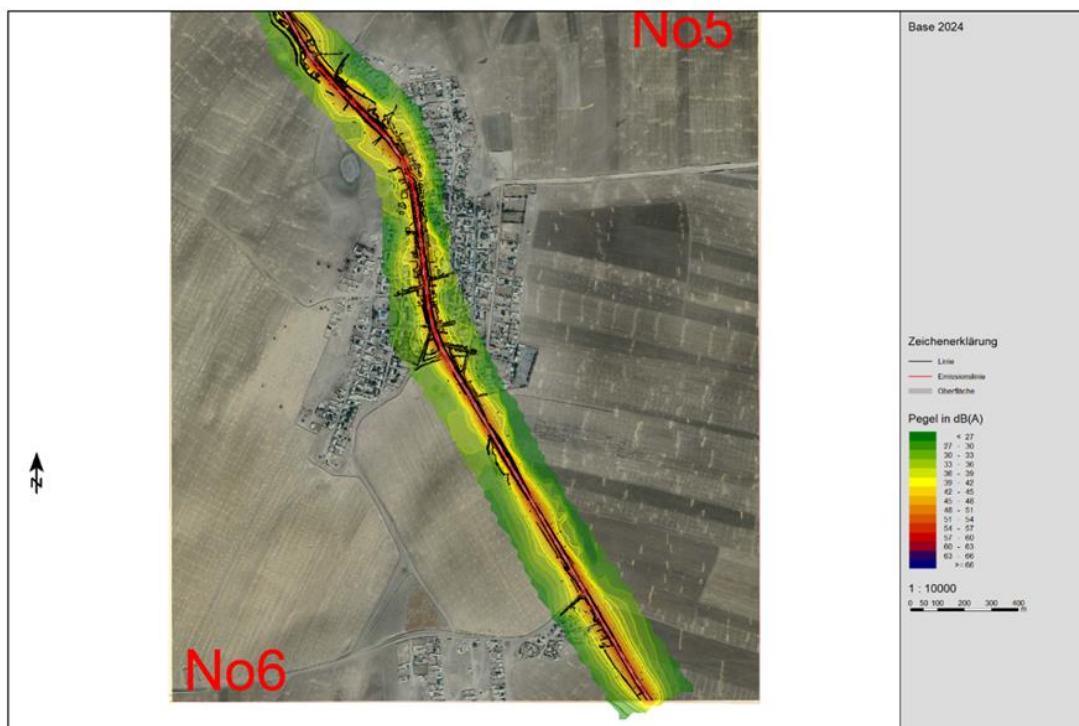
Annex 5. Receptor Location and Predicted Noise Levels for Year 2024



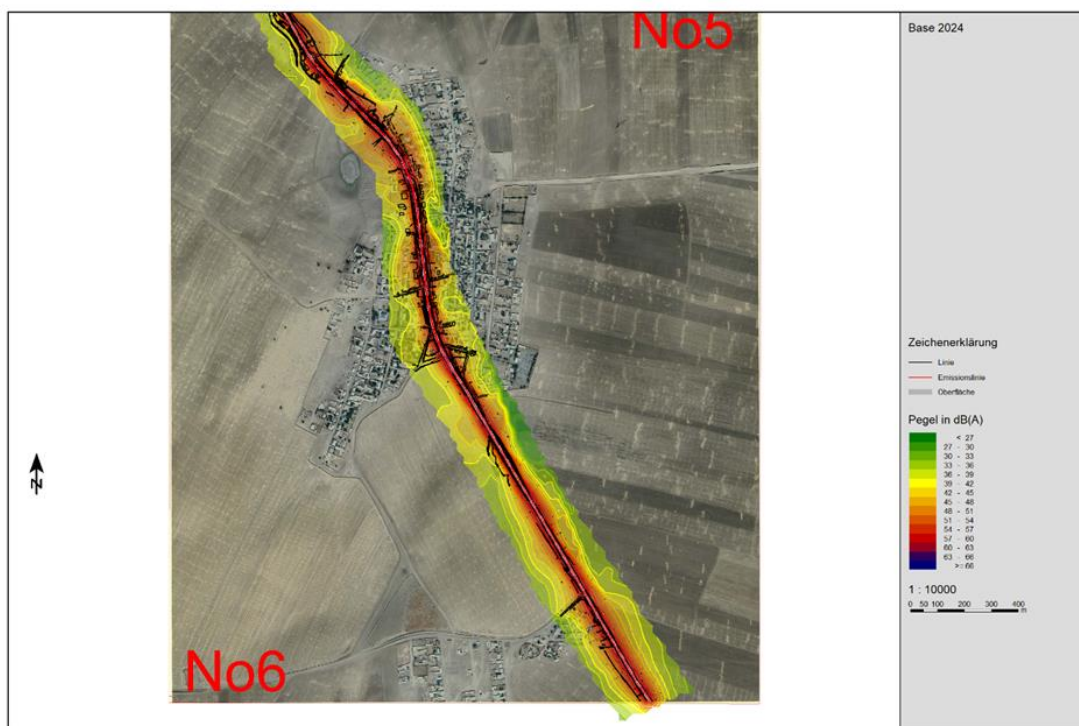
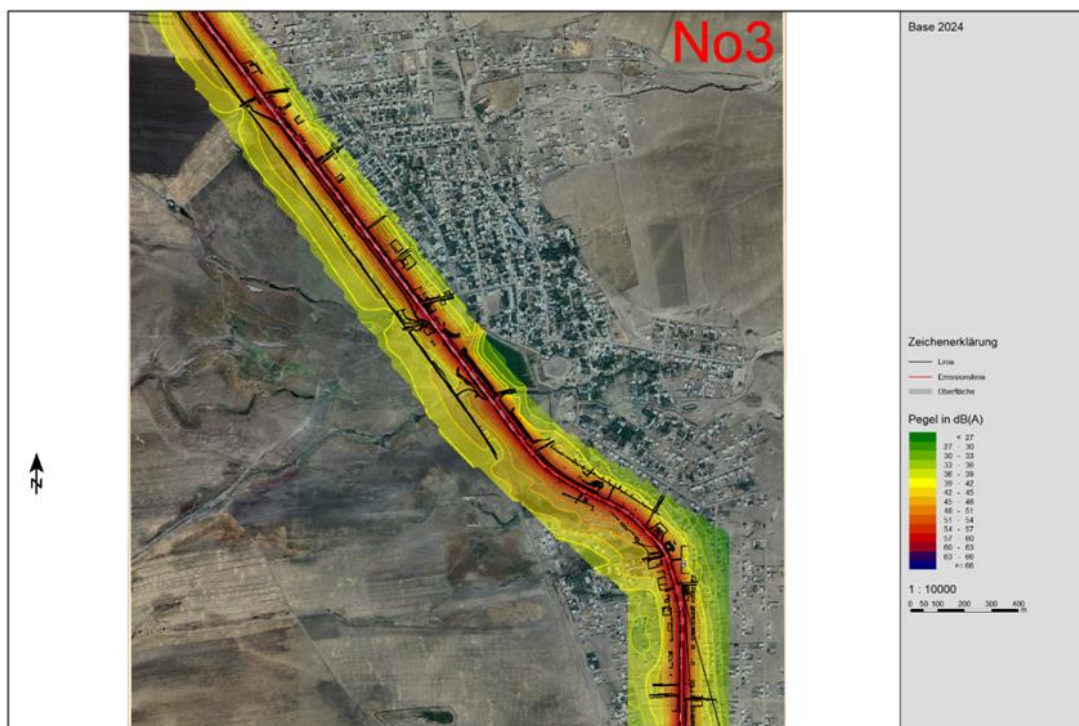












Annex 6. Receptor Location and Predicted Noise Levels for Year 2040



