MONGOLIA TRANSPORT CONNECTIVITY AND LOGISTICS IMPROVEMENT PROJECT
(MTCLIP, P174806)

# PROJECT ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (P-ESMP)

## for

## LOT 2-1: A0301 ULAANBAATAR–ARVAIKHEER 105 KM ROAD MAINTENANCE WORKS

**Client:**
Ministry of Road and Transport of Mongolia

**Implementing Entity / Submitted by:**
Integrated Project Implementation Unit (IPIU)

**Financing Institution:**
World Bank

**Supervision Consultant:**
Soosung Engineering Co., Ltd and Dasan Co., Ltd Joint Venture, in association with Geo Zuraglal LLC

**Civil Works Contractor:**
China Road and Bridge Corporation (CRBC)

**Environmental and Social Consultant:**
S.E.C LLC

**Project Period:**
2025–2027 (Construction Phase)
2027–2028 (Defects Notification Period – DNP)

**Environmental and Social Risk Classification:**
**Substantial**

Ulaanbaatar, Mongolia
2026

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| Abbreviation | Description |
|---|---|
| C-ESMP | Contractor's Environmental and Social Management Plan |
| CoC | Code of Conduct |
| E&S | Environmental and Social |
| EHS | Environmental, Health and Safety |
| EHS Guidelines | Environmental, Health, and Safety Guidelines |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| ERP | Emergency Response Plan |
| ESCP | Environmental and Social Commitment Plan |
| ESF | Environmental and Social Framework |
| ESHS | Environmental, Social, Health and Safety |
| ESS | Environmental and Social Standards |
| ESMP | Environmental and Social Management Plan |
| ESMF | Environmental and Social Management Framework |
| FIDIC | International Federation of Consulting Engineers |
| GBV | Gender-Based Violence |
| GRM | Grievance Redress Mechanism |
| IPIU | Integrated Project Implementation Unit |
| JSEA | Job Safety/Environmental Analysis |
| LMP | Labor Management Procedures |
| MECC | Ministry of Environment and Climate Change |
| MNS | Mongolian National Standard |
| MRT | Ministry of Road and Transport |
| OHS | Occupational Health and Safety |
| PA | Protected Area |
| PAP | Project Affected Person/People |
| PM | Particulate Matter (PM10, PM2.5) |
| PPE | Personal Protective Equipment |
| RAP | Resettlement Action Plan |
| RPF | Resettlement Policy Framework |
| SEA/SH | Sexual Exploitation and Abuse / Sexual Harassment |
| SMP | Social Management Plan |
| SEP | Stakeholder Engagement Plan |
| TMP | Traffic Management Plan |
| VAC | Violence Against Children |
| WB | World Bank |

# ABSTRACT

This Project Environmental and Social Management Plan (P-ESMP) has been prepared for the subproject covering a 105 km section of the A0301 state road along the Ulaanbaatar–Arvaikheer route, including 33 km of rehabilitation and 72 km of periodic maintenance, under the Mongolia Transport Connectivity and Logistics Improvement Project (MTCLIP, P174806). The purpose of the P-ESMP is to identify, assess, mitigate, monitor, and manage the environmental and social risks and impacts associated with the subproject during pre-construction, construction, rehabilitation, demobilization, and early operation.

The P-ESMP has been developed in accordance with the World Bank Environmental and Social Framework (ESF), the Project Environmental and Social Management Framework (ESMF), and applicable Mongolian legislation. It addresses the main environmental and social issues related to the project, including air pollution, dust, noise, soil and water protection, waste and hazardous materials management, biodiversity, protected areas, labour and working conditions, occupational health and safety, community health and safety, traffic risks, stakeholder engagement, grievance management, cultural heritage, and rehabilitation of temporary and disturbed sites.

The overall environmental and social risk of the subproject is assessed as Substantial**,** reflecting the scale and complexity of the works, the use of ancillary facilities, the exposure of workers and nearby communities, the need to manage traffic and road safety, the sensitivity of local livelihoods, and the requirement for effective rehabilitation and close-out of disturbed areas.

The P-ESMP confirms that overall responsibility for environmental and social management lies with the Integrated Project Implementation Unit (IPIU)**,** while the Contractor is responsible for implementing construction-phase measures under the approved C-ESMP and contract requirements, and the Supervision Engineer is responsible for compliance verification and reporting.

This P-ESMP therefore serves as the primary project-level instrument for managing environmental and social performance and provides the basis for implementation, supervision, monitoring, reporting, and corrective action throughout the subproject life cycle.

# INTRODUCTION

The Mongolia Transport Connectivity and Logistics Improvement Project (MTCLIP, P174806), financed by the Government of Mongolia and the World Bank, supports investments aimed at improving the connectivity, resilience, safety, and efficiency of Mongolia's transport network. Within this framework, the present subproject comprises rehabilitation and periodic maintenance works along a 105 km section of the A0301 state road on the Ulaanbaatar–Arvaikheer corridor. The corridor is an important component of the national and regional road network and plays a significant role in facilitating passenger mobility, access to markets and services, and the movement of goods between Ulaanbaatar and central and western regions of the country.

The subproject is expected to generate important public benefits by improving pavement condition, restoring damaged road sections, enhancing road safety, reducing vehicle operating costs, and improving travel reliability and year-round accessibility. In addition to its transport function, the corridor supports local livelihoods, access to health and education services, movement of agricultural and livestock products, and broader regional economic activity. The subproject is therefore designed not only as an infrastructure intervention, but also as a measure that contributes to local development outcomes and improved service access for communities located within the project area of influence.

The total subproject length is 105 km. Within this overall scope, rehabilitation works will be undertaken on defined road sections totaling 33.0 km, while the remaining 72.0 km will be subject to periodic maintenance. This distinction is important for purposes of technical planning, environmental and social risk management, impact assessment, monitoring, and implementation responsibility. Accordingly, this P-ESMP consistently distinguishes between the total subproject scope and the specific sections subject to rehabilitation .

The P-ESMP addresses risks and impacts that may arise during the pre-construction, construction, and operation phases of the subproject. These include, but are not limited to, impacts related to air quality, dust, noise, water resources, soil, erosion, vegetation, fauna, biodiversity, protected areas, waste generation and disposal, hazardous materials, labor and working conditions, occupational health and safety, community health and safety, traffic and road user safety, access restrictions, stakeholder engagement, grievance management, and cultural heritage, including chance finds. The document also establishes the management principles, institutional arrangements, monitoring requirements, reporting obligations, and corrective action processes necessary to ensure that environmental and social risks are managed in a manner consistent with the ESF and good international industry practice.

This P-ESMP is a project-level instrument and, accordingly, overall responsibility for its implementation rests with the Integrated Project Implementation Unit (IPIU). The IPIU is responsible for overall environmental and social oversight, coordination, supervision, disclosure, stakeholder engagement, grievance management, monitoring, reporting, and follow-up of corrective actions. The contractor, by contrast, is responsible for implementing the construction-phase measures assigned to it under this P-ESMP, the contract documents, the Contractor's Environmental and Social Management Plan (C-ESMP), and the related thematic management

plans and site-specific procedures. This division of responsibility is fundamental to the structure of the ESMP and shall be applied consistently throughout the document.

The P-ESMP is supported by a suite of contractor-level implementation instruments, including but not limited to the C-ESMP, Traffic Management Plan, Labor management plan, Occupational Health and Safety Plan, Waste Management Plan, Hazardous materials management plan, Biodiversity management plan, Camp Management Procedures, Quarry/Borrow Area Management and Rehabilitation Plans, SEA/SH Prevention and Response Plan, Chance Find Procedure, Emergency Preparedness and Response Plan, and other relevant management procedures required for site-specific.

# CHAPTER 1. SUBPROJECT OVERVIEW

## 1.1. BRIEF INFORMATION OF THE PROJECT

Within the framework of the “Mongolia Transport Connectivity and Logistics Improvement Project” (MTCLIP, P174806) financed by the Government of Mongolia and the World Bank, rehabilitation works will be implemented on a 105 km section (km 138+000-km 350+400) of the A0301 state road network along the Ulaanbaatar-Arvaikheer route. This project aims to improve the accessibility, safety, and transport efficiency of the western regional road network of Mongolia, as well as to support economic development and the livelihoods of local communities.

Within the framework of the Mongolia Transport Connectivity and Logistics Improvement Project (MTCLIP, P174806), financed by the Government of Mongolia and the World Bank, the subproject will implement rehabilitation and periodic maintenance works along a 105 km section of the A0301 state road on the Ulaanbaatar–Arvaikheer corridor. The total subproject scope comprises rehabilitation works on selected sections and periodic maintenance works on the remaining sections. The objective of the subproject is to improve road condition and traffic safety, strengthen regional connectivity, enhance transport efficiency, and support local economic development and access to services for communities within the project area of influence.
The project client is the Ministry of Road and Transport of Mongolia. The subproject is implemented by the Integrated Project Implementation Unit (IPIU) under MTCLIP, which retains overall responsibility for environmental and social management and implementation oversight of this Project Environmental and Social Management Plan (P-ESMP). Civil works are undertaken by China Road and Bridge Corporation (CRBC) under the applicable contract arrangements. Depending on seasonal conditions and work sequencing, the workforce is expected to range from 7 to 181 workers during implementation.

To inform preparation of this P-ESMP, three rounds of environmental and social baseline surveys were carried out within the project area covering Erdenesant and Undurshireet soums of Tuv Province, Rashaant soum of Bulgan Province, Khashaat soum of Arkhangai Province, and Burd and Yesunzuil soums of Uvurkhangai Province. The surveys included field observations, environmental measurements, sampling, and questionnaires administered to households and business entities in or near the project area, with the aim of capturing project-specific baseline conditions. The surveys were undertaken during the following periods:

- From August 29, 2025 to September 03, 2025
- From November 28, 2025 to November 30, 2025
- From March 19, 2026 to March 20, 2026

***Table 1. Project summary information***

| Item | Information |
|---|---|
| **Project name** | Mongolian Transport Connectivity and Logistics Improvement Project (Mongolian Transport Connectivity and Logistics Improvement Project) |
| **Subproject name** | Project for rehabilitation works on a 105 km section of the A0301 state road network along the UlaanbaatarArvaikheer route |
| **Client** | Ministry of Road and Transport (MRT) |
| **Financing** | World Bank, State Budget of Mongolia |
| **Scope** | 105 km section (km 138+000-km 350+400) of the A0301 road |
| **Objectives** | - Rehabilitation of the A0301 state road along the Ulaanbaatar-Arvaikheer route- |

| | |
|---|---|
| | Improvement of connectivity and accessibility of the western regional road network- Enhancement of road traffic safety and transport efficiency- Support for regional economic development and livelihoods of local communities |

## 1.2. IMPORTANCE OF THE SUBPROJECT

The main objective of the project is to improve transport accessibility by enhancing the operational condition and road traffic safety of a 105 km section of the A0301 state road along the Ulaanbaatar-Arvaikheer route, thereby supporting regional economic development.

The objectives and significance of the project are defined in the following key directions:

- **Improvement of road traffic safety:** Road deterioration and increased load capacity negatively affect road traffic safety and increase the risk of accidents and injuries. Within the project framework, repairing and improving damaged road sections will enhance road safety and create conditions to reduce the number of accidents and injuries.
- **Transport and logistics efficiency:** The project-affected area is predominantly characterized by agriculture and livestock activities, and a reliable and safe road network is essential for reducing transportation time and costs, increasing economic circulation, and supporting local business operations.
- **Social development and quality of life:** The rehabilitated road will have positive impacts such as improving the quality of life of local residents, ensuring traffic safety, and providing faster access to services such as hospitals, schools, and commercial facilities. Improved road conditions will also result in time savings.
- **Environmental protection:** Damaged roads cause negative environmental impacts such as soil degradation, water pollution, and air dust pollution. Through the implementation of road rehabilitation works under this project, it will be possible to prevent and mitigate these adverse impacts.

### 1.2.1. Rationale for Subproject Implementation

This Project Environmental and Social Management Plan (P-ESMP) has been prepared as the principal project-level instrument for identifying, assessing, mitigating, monitoring, reporting on, and managing the environmental and social risks and impacts that may arise during the pre-construction, construction, and operation phases of the subproject. The P-ESMP provides the framework for integrating environmental and social considerations into project planning, implementation, supervision, and follow-up actions.

The P-ESMP has been developed on the basis of project-specific baseline studies, engineering planning information, stakeholder consultations, applicable legal and regulatory requirements, and the environmental and social management requirements of the MTCLIP project. It is intended to support sustainable project implementation by defining mitigation measures, monitoring requirements, institutional responsibilities, reporting arrangements, and corrective action procedures.

### 1.2.2. Methodology for Developing the Environmental and Social Management Plan of the Subproject

In developing this Environmental and Social Management Plan (ESMP), the specific characteristics, scope, and location of the project, as well as the baseline environmental and

social conditions within the project's area of influence, were comprehensively considered. The plan has been prepared in accordance with the World Bank Environmental and Social Framework (ESF, 2021), particularly the requirements of ESS1 (Assessment and Management of Environmental and Social Risks and Impacts), ESS4 (Community Health and Safety), and ESS10 (Stakeholder Engagement and Information Disclosure), as well as the Environmental and Social Management Framework (ESMF) of the MTCLIP project.

The ESMP is based on the principles of ensuring effective stakeholder engagement, promoting transparency, and strengthening evidence-based decision-making, and serves as a comprehensive tool for identifying, mitigating, monitoring, and managing environmental and social risks and impacts throughout all stages of project implementation.

The ESMP aims to systematically manage environmental and social risks and impacts arising during subproject implementation, enhance positive outcomes, prevent and mitigate adverse impacts, and define corrective measures where necessary. Accordingly, the ESMP consists of the following main components:

- Environmental and social baseline study - Identifies the baseline environmental and social conditions of the project.
- Impact assessment - Identifies adverse impacts arising from project activities, evaluates them by risk level, and prepares relevant documentation.
- Mitigation measures - Defines measures to prevent, reduce, and correct potential adverse impacts from project activities, and specifies their implementation timeline, frequency, and responsible parties.
- Monitoring and evaluation - Conducts supervision and monitoring of environmental and social activities in accordance with environmental and social management plans and legal and regulatory requirements.

## 1.3. TECHNICAL SOLUTIONS AND ENGINEERING PLANNING OF THE SUBPROJECT

### 1.3.1. Project scope

Within the framework of the project, major and periodic maintenance works on the road pavement will be implemented in a phased manner, divided into 10 sections. Rehabilitation works will be carried out in specific sections passing through "Uyanga" of Bag 3 in Erdenesant soum of Tuv province, "Ikh Borigdoi" of Bag 2 in Burd soum of Uvurkhangai province, "Ongon" of Bag 5 in the same soum, and "Ereen" of Bag 4 in Yesunzuil soum of Uvurkhangai province. Periodic maintenance works will be carried out in the remaining sections.

- Road Length: 105 km (km 138+000-km 350+400).
- Road Type: Asphalt-paved state road.
- Implementation Period: 24 months.
- Workforce: 7-181 workers depending on seasonal conditions.
- Material Supply: 8 existing quarries will be used.
- Technical Works:
    - Rehabilitation of road pavement
    - Partial renewal of base layers

- Repair of road embankment and shoulders
- Rehabilitation of drainage pipes, channels, and ditches
- Installation and improvement of road signs and markings
- Improvement of access roads, exits, and intersections

Material will be sourced from 8 existing quarry and borrow source sites: 2 stone quarries (for crushed aggregate and base course material) and 6 soil quarry/borrow areas (for earthworks, sub-base, and fill material). For the purposes of this ESMP and its annexes, "borrow pit" and "soil quarry" are used interchangeably to refer to the 6 soft-material sites. No additional borrow pit locations separate from these 8 sites are planned. All 8 sites are treated as associated facilities and are within the scope of the ESMP, Annex 6-1 (Quarry and Borrow Area Restoration Plan), and the social mitigation plan. Each quarry/borrow area will be subject to: (i) pre-use screening against the checklist in Annex 6-1; (ii) a site-specific closure and restoration plan; and (iii) verification of restoration by the Supervision Engineer before the Performance Certificate is issued. The terms "quarry" and "borrow pit" should be read as referring to these 8 sites throughout this ESMP unless otherwise stated.

Of the total 105 km:

- **33.0 km will be subject to rehabilitation works**
- **72.0 km will be subject to periodic maintenance works**

Accordingly, the total subproject length and the length of rehabilitation sections shall be clearly distinguished and consistently presented throughout the report.

***Table 2. Type of maintenance works***

| No. | Location | Chainage (PK) | Length (km) | Type of Maintenance |
|---|---|---|---|---|
| 1 | Tuv province, Undurshireet soum, Uyanga bag | 165+200-178+200 | 13.0 | Rehabilitation |
| 2 | Tuv province, Undurshireet soum, Uyanga bag | 178+200-187+300 | 9.1 | Periodic maintenance |
| 3 | Tuv province, Erdenesant soum, Ulaan Khudag, Bargilt, Bayan-Uul bags | 219+900-232+200 | 12.3 | Periodic maintenance |
| 4 | Bulgan province, Rashaant soum, Argal-Khairkhan, Ulaan Shiveet bags | 241+900-248+000 | 6.1 | Periodic maintenance |
| 5 | Bulgan province, Rashaant soum, Khugnu-Khan bag | 248+000-256+000 | 8.0 | Periodic maintenance |
| 6 | Bulgan province, Rashaant soum | 264+900-279+400 | 14.5 | Periodic maintenance |
| 7 | Arkhangai province, Khashaat soum, Jargalant bag | 284+000-294+000 | 10.0 | Periodic maintenance |
| 8 | Uvurkhangai province, Burd soum, Ikh Borigdoi bag | 294+000-306+000 | 12.0 | Rehabilitation |
| 9 | Uvurkhangai province, Burd soum | 306+000-318+000 | 12.0 | Periodic maintenance |
| 10 | Uvurkhangai province, Burd soum, Ar Khoshoot bag, Yesunzuil soum, Ereen bag | 326+000-334+000 | 8.0 | Rehabilitation |

### 1.3.2. Traffic volume level

Traffic Volume Level (TVL) is a criterion used to assess road utilization and safety based on traffic intensity, speed, and congestion for single-lane and multi-lane roads. The classification of TVL is defined in six levels ranging from “Very High” to “Very Low,” and is used to determine traffic characteristics, as well as to support planning for traffic management, temporary road use, and maintenance operations.

*Table 3. Traffic volume level*

| TVL | Level | Intensity (vehicles/hour/lane) | Density (vehicles/km/lane) | Traffic description |
|---|---|---|---|---|
| A | Very low traffic | <200 | ≤7 | Free flow, full driver control, high speed, overtaking is unrestricted |
| B | Low | 200-400 | 7-11 | Stable flow, slightly dense, overtaking still possible |
| C | Moderate | 400-800 | 11-16 | Steady flow, restrictions on movement begin to be felt |
| D | High | 800-1200 | 16-22 | Unstable flow begins, difficult maneuvering |
| E | Very high | 1200-2000 | 22-28 | At capacity, minor disruptions significantly affect flow |
| F | Over capacity | >2000 | >28 | Congestion, stoppages, and interrupted flow |
| Source: Based on the Highway Capacity Manual (Transportation Research Board). | | | | |

**Traffic Volume Level of the Project Area**

The traffic volume level along the 105 km project road section varies unevenly along the alignment, based on the Highway Capacity Manual. In sections designated for rehabilitation , where road deterioration and operational impacts are more significant, the traffic volume level is assessed as D-E (high to very high), while in the remaining sections it is assessed as C-D (moderate to high).

The traffic volume level is highly seasonal, therefore, traffic management measures are required during national holidays and peak travel periods. July represents the peak tourism and holiday season, during which traffic volume typically increases by 2-3 times, with a sharp rise in traffic flow from Ulaanbaatar toward rural destinations.

### 1.3.3. Project Technical Solution

The major and periodic maintenance works to be implemented under the project will be carried out based on defined phases, technological sequences, and engineering solutions. It is necessary to provide a consolidated definition of the scope, types, and quantities of these works.

The following table presents the main and auxiliary activities of the project, temporary facilities and services, as well as the technical resources required for implementation.

*Table 4. Main work types and quantities of the project*

| Subsection | Activity | Quantity / Volume | Additional information |
|---|---|---|---|
| Major road rehabilitation | Removal of existing pavement | Upper layer: 23,732.99 m³<br>Base layer: 74,239 m³ | The subproject has a total length of 105 km, including 33.0 km of rehabilitation sections and 72.0 km of periodic maintenance |
| | Subgrade processing | 1,933.22 m³ | 30 cm thickness, 5% cement |
| | Cement stabilized base layer | 319,267.4 m² | 20 cm thickness |
| | Asphalt pavement | 3 cm: 458,733.3 m²<br>4 cm: 293,533 m² | - |
| | Asphalt sealing | 92,597 m | - |
| Other road rehabilitation-related activities | Shoulder rehabilitation | 27,252.75 m³ | - |
| | Corrugated steel beam guardrails | 4,670 m | - |
| | Road signs | 15,750 m | - |
| | Temporary road | 106,791 m | 7 m width |

| | | | |
|---|---|---|---|
| Temporary facilities and services | Construction of project office, asphalt plant, and crushing plant | - | Temporary facilities |
| | Temporary traffic management | - | - |
| | Rehabilitation and strengthening of existing structures | - | Damaged culverts, drainage pipes, etc. |
| | Site restoration of asphalt plant, crusher plant, quarries, and camp areas | - | At project closure stage |

### Road pavement structure

The road pavement is designed as a multi-layer structure. The subgrade is planned to be stabilized with 5% cement at a thickness of 30 cm, followed by a 20 cm cement-stabilized base layer. Above this, a 3-4 cm asphalt surface layer will be placed, and asphalt sealing will be applied to improve surface compaction and waterproofing.

***Table 5. Road pavement structure specification***

| No. | Layer Name | Thickness | Material / Composition | Function / Purpose |
|---|---|---|---|---|
| 1 | Asphalt surface layer | 3-4 cm | Asphalt concrete | Provides surface strength, wear resistance, and smoothness |
| 2 | Asphalt sealing | - | Bituminous material | Ensures water impermeability and improves pavement compaction |
| 3 | Cement-stabilized base layer | 20 cm | Cement + crushed material | Transfers load and increases bearing capacity |
| 4 | Subgrade treatment | 30 cm | Soil stabilized with 5% cement | Enhances subgrade strength and reduces settlement |

### Drainage structures

The location, type, and dimensions of drainage structures have been planned in accordance with applicable standards, laws, and regulations of Mongolia, using topographic mapping and empirical methods. At locations of bridges and culverts with large catchment areas, hydraulic structures have been designed and constructed based on hydrological calculations. Surface water will be drained through a 2.0% cross slope of the pavement and collected via roadside ditches and hillside (intercepting) ditches for protection and controlled discharge.



***Figure 1. Current condition of drainage culvert, Section 4***

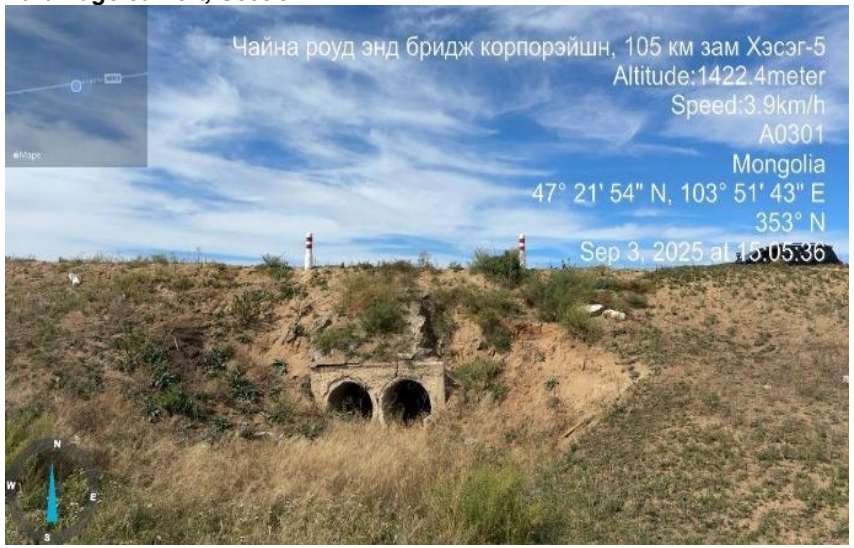




***Figure 2. Current condition of drainage culvert, Section 5***



***Figure 3. Current condition of drainage culvert, Section 6***

***Table 6. Drainage culvert and replacement culvert specifications***

| № | Actual location (km) | Project км /design location/ | Difference | Angle | Location | | Culvert type and size | Culvert length (m), quantity |
|---|---|---|---|---|---|---|---|---|
| | | | | | Longitude | Latitude | | |
| 1 | K165+500 | K165+497 | -3.14 | 93.00 | 104.943263 | 47.664067 | circular, Ø1.0 | 15m 1 unit |
| 2 | K166+450 | K166+459 | 8.91 | 98.00 | 104.933609 | 47.658397 | circular, Ø1.0 | 16m 1unit |
| 3 | K168+100 | K168+137 | 36.92 | 90.00 | 104.916191 | 47.648938 | circular, Ø1.0 | 16m 1unit |
| 4 | K169+450 | K169+484 | 34.13 | 56.00 | 104.902352 | 47.641313 | circular, Ø1.0 | 22m 1unit |
| 5 | K170+250 | K170+315 | 64.60 | 88.00 | 104.89367 | 47.636579 | circular, Ø1.0 | 15m 1unit |
| 6 | K172+000 | K172+113 | 112.84 | 95.00 | 104.875122 | 47.626301 | circular, Ø1.0 | 16m 1unit |
| 7 | K172+400 | K172+561 | 161.44 | 98.00 | 104.870731 | 47.623607 | circular, Ø1.0 | 16m 1unit |
| 8 | K172+800 | K172+865 | 64.75 | 73.00 | 104.867765 | 47.621796 | circular, Ø1.0 | 19m 1unit |
| 9 | K174+300 | K174+405 | 104.64 | 88.00 | 104.851332 | 47.613579 | circular, Ø1.0 | 18m 1unit |
| 10 | K174+900 | K174+981 | 81.05 | 91.00 | 104.844674 | 47.610987 | circular, Ø1.0 | 21m 1unit |
| 11 | K175+150 | K175+330 | 179.83 | 91.00 | 104.840425 | 47.609733 | circular, Ø1.0 | 16m 1unit |
| 12 | K175+900 | K176+032 | 131.64 | 92.00 | 104.831569 | 47.607655 | circular, Ø1.0 | 21m 1unit |
| 13 | K176+070 | K176+250 | 179.74 | 80.00 | 104.828864 | 47.607015 | circular, Ø1.0 | 21m 1unit |
| 14 | K176+900 | K177+039 | 138.63 | 86.00 | 104.818971 | 47.604677 | circular, Ø1.0 | 21m 1unit |
| 15 | K177+800 | K177+986 | 186.39 | 93.00 | 104.807056 | 47.601797 | circular, Ø1.0 | 15m 1unit |
| 16 | K179+300 | K179+547 | 246.50 | 95.00 | 104.787612 | 47.596835 | circular, Ø1.0 | 14.5m 1unit |
| 17 | K180+250 | K180+505 | 254.70 | 99.00 | 104.775716 | 47.593766 | circular, Ø1.0 | 18m 1unit |
| 18 | K180+400 | K180+638 | 238.24 | 94.00 | 104.77404 | 47.593351 | circular, Ø1.0 | 18m 1unit |
| 19 | K181+800 | K182+084 | 284.15 | 92.00 | 104.75606 | 47.588773 | circular, Ø1.0 | 15m 1unit |
| 20 | K184+250 | K184+564 | 313.55 | 98.00 | 104.725418 | 47.580604 | circular, Ø1.0 | 16m 1unit |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 21 | K184+600 | K184+904 | 303.57 | 108.00 | 104.433140 | 47.345033 | circular, Ø1.0 | 16m 1unit |
| 22 | K220+500 | K220+495 | -4.67 | 91.00 | 104.444775 | 47.335117 | circular, Ø1.0 | 16m 1unit |
| 23 | K222+750 | K222+815 | 64.64 | 86.00 | 104.414349 | 47.333844 | circular, Ø1.0 | 14m 1unit |
| 24 | K223+010 | K223+099 | 88.55 | 92.00 | 104.410615 | 47.334118 | circular, Ø1.0 | 14m 1unit |
| 25 | K224+700 | K224+826 | 125.85 | 92.00 | 104.388828 | 47.338793 | circular, Ø1.0 | 15m 1unit |
| 26 | K226+600 | K226+716 | 115.81 | 73.00 | 104.365094 | 47.344081 | circular, Ø1.0 | 18m 1unit |
| 27 | K228+800 | K228+955 | 154.84 | 91.00 | 104.33697 | 47.350486 | circular, Ø1.0 | 20m 1unit |
| 28 | K229+250 | K229+447 | 197.42 | 90.00 | 104.330777 | 47.351899 | circular, Ø1.0 | 22m 1unit |
| 29 | K230+500 | K230+732 | 231.78 | 91.00 | 104.314229 | 47.351274 | Rectangular, width 410cm X 254cm height | 16.5m 1unit |
| 30 | K231+700 | K231+945 | 245.12 | 108.00 | 104.298591 | 47.3490059 | circular, Ø1.0 | 18m 1unit |
| 31 | K242+150 | K242+127 | -23.41 | 80.00 | 104.15885 | 47.356438 | circular, Ø1.0 | 22m 2sets |
| 32 | K243+070 | K243+197 | 126.55 | 105.00 | 104.144737 | 47.3570349 | circular, Ø1.0 | 22m 1unit |
| 33 | K244+900 | K245+050 | 149.57 | 90.00 | 104.120263 | 47.3583059 | circular, Ø1.0 | 14m 1unit |
| 34 | K250+700 | K251+378 | 677.51 | 84.00 | 104.03697 | 47.364 | Rectangular, height 150 X 400 width | 9m 1unit |
| 35 | K250+800 | K251+547 | 747.36 | 91.00 | 104.034795 | 47.3643579 | circular, Ø1.0 | 18m 1unit |
| 36 | K253+100 | K253+916 | 816.24 | 94.00 | 104.004245 | 47.3692974 | circular, Ø1.0 | 18m 3 sets |
| 37 | K253+800 | K254+615 | 815.25 | 100.00 | 103.995228 | 47.3707306 | circular, Ø1.0 | 18m 3 sets |
| 38 | K254+150 | K255+007 | 857.39 | 88.00 | 103.990165 | 47.3715435 | Rectangular, height 300 X width 150 | 9m 1unit |
| 39 | K254+600 | K255+478 | 878.10 | 87.00 | 103.59278 | 47.222064 | circular, Ø1.0 | 16m 2sets |
| 40 | K265+100 | K265+178 | 77.79 | 93.00 | 103.839088 | 47.363544 | circular, Ø1.0 | 16m 2sets |
| 41 | K266+350 | K266+413 | 63.32 | 93.00 | 103.819919 | 47.365195 | circular, Ø1.0 | 15.6m 1unit |
| 42 | K267+550 | K267+719 | 168.79 | 121.00 | 103.803117 | 47.362823 | circular, Ø1.0 | 18m 2sets |
| 43 | K269+600 | K269+918 | 317.50 | 90.00 | 103.77642 | 47.355075 | circular, Ø1.0 | 16m 2xoc |
| 44 | K271+600 | K271+879 | 278.88 | 80.00 | 103.752511 | 47.348174 | circular, Ø1.0 | 14m 1unit |
| 45 | K285+800 | K285+809 | 9.29 | 91.00 | 103.630359 | 47.295410 | circular, Ø1.0 | 17m 1unit |
| 46 | K287+990 | K288+126 | 135.82 | 98.00 | 103.613644 | 47.278004 | circular, Ø1.0 | 14m 1unit |
| 47 | K289+500 | K289+690 | 189.97 | 108.00 | 103.604954 | 47.265351 | circular, Ø1.0 | 14m 1unit |
| 48 | K291+900 | K292+085 | 184.78 | 104.00 | 103.608335 | 47.243916 | circular, Ø1.0 | 14m 1unit |
| 49 | K293+500 | K293+696 | 196.20 | 82.00 | 103.619201 | 47.232094 | circular, Ø1.0 | 16m 1unit |
| 50 | K296+200 | K296+462 | 262.17 | 98.00 | 103.630833 | 47.210041 | circular, Ø1.0 | 15.m 1unit |
| 51 | K300+550 | K300+910 | 359.86 | 89.00 | 103.624436 | 47.170253 | circular, Ø1.0 | 15.6m 1unit |
| 52 | K300+940 | K301+286 | 346.37 | 105.00 | 103.623639 | 47.166856 | circular, Ø1.0 | 14m 1unit |
| 53 | K305+015 | K305+336 | 321.06 | 101.00 | 103.615993 | 47.130833 | circular, Ø1.0 | 16m 1unit |
| 54 | K305+800 | K306+087 | 286.97 | 94.00 | 103.615745 | 47.124135 | circular, Ø1.0 | 16m 1unit |
| 55 | K307+800 | K308+482 | 682.04 | 61.00 | 103.612376 | 47.103377 | circular, Ø1.0 | 25m 2sets |
| 56 | K308+300 | K308+993 | 692.61 | 44.00 | 103.607715 | 47.100133 | circular, Ø1.0 | 19m 1unit |
| 57 | K308+500 | K309+356 | 855.52 | 64.00 | 103.603553 | 47.098598 | circular, Ø1.0 | 39m 1unit |
| 58 | K308+800 | K309+744 | 944.24 | 65.00 | 103.600664 | 47.095817 | Rectangular | 32m 1unit |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 200x150 | |
| 59 | K309+750 | K310+817 | 1066.74 | 77.00 | 103.605264 | 47.087341 | circular, Ø1.0 | 32m 1unit |
| 60 | K310+400 | K311+461 | 1061.42 | 135.00 | 103.602235 | 47.081858 | Rectangular 110x160 | 30.2m 1 unit |
| 61 | K310+900 | K311+999 | 1099.02 | 123.00 | 103.599719 | 47.077219 | circular, Ø1.0 | 15m 1unit |
| 62 | K311+850 | K313+034 | 1183.79 | 114.00 | 103.594927 | 47.068595 | circular, Ø1.0 | 17m 1unit |
| 63 | K313+100 | K314+312 | 1212.13 | 92.00 | 103.589034 | 47.057902 | circular, Ø1.0 | 16m 1unit |
| 64 | K314+100 | K315+409 | 1309.10 | 94.00 | 103.583889 | 47.048676 | circular, Ø1.0 | 17.7m 1unit |
| 65 | K315+200 | K316+308 | 1108.18 | 82.00 | 103.579368 | 47.041148 | circular, Ø1.0 | 16m 1unit |
| 66 | K316+900 | K318+305 | 1405.44 | 83.00 | 103.574207 | 47.023618 | circular, Ø1.0 | 16m 2sets |
| 67 | K326+400 | K327+460 | 1059.95 | 78.00 | 103.53697 | 46.93095 | circular, Ø1.0 | 18m 1unit |
| 68 | K327+400 | K327+687 | 287.39 | 72.00 | 103.53514 | 46.92937 | circular, Ø1.0 | 14.5m 1unit |
| 69 | K328+050 | K328+436 | 385.67 | 84.00 | 103.52826 | 46.92462 | circular, Ø1.0 | 15.8m 1unit |
| 70 | K328+800 | K329+166 | 365.55 | 46.00 | 103.51938 | 46.92203 | circular, Ø1.0 | 17m 1unit |
| 71 | K329+300 | K329+635 | 335.23 | 105.00 | 103.51382 | 46.92042 | circular, Ø1.0 | 14m 2sets |
| 72 | K330+450 | K330+532 | 81.65 | 84.00 | 103.50272 | 46.91755 | circular, Ø1.0 | 16m 1unit |
| 73 | K330+700 | K330+764 | 64.48 | 104.00 | 103.49981 | 46.91701 | circular, Ø1.0 | 16m 1unit |
| 74 | K330+900 | K330+903 | 2.59 | 78.00 | 103.49809 | 46.91657 | circular, Ø1.0 | 16m 2sets |
| 75 | K331+030 | K331+033 | 3.44 | 91.00 | 103.49677 | 46.9159 | circular, Ø1.0 | 14m 1unit |
| 76 | K331+400 | K331+431 | 30.56 | 72.00 | 103.49223 | 46.9142 | circular, Ø1.0 | 15m 2sets |
| 77 | K332+150 | K332+130 | -20.10 | 71.00 | 103.48356 | 46.9121 | circular, Ø1.0 | 15 |
| 78 | K333+700 | K333+663 | -36.66 | 92.00 | 103.47005 | 46.90438 | circular, Ø1.0 | 15 |

The planning of culvert rehabilitation was carried out by assessing the hydraulic capacity of existing culverts based on hydrological calculations and in coordination with the Traffic Volume Level (TVL) study.

### 1.3.3. Workforce composition

During project implementation, a total of up to 181 workers will be employed, of which 30% will be local residents. The works will be divided into 10 sections. The project implementation will be overseen by a qualified chief engineer from the road management organization. The following table presents the workforce plan of the contractor organization.

***Table 7. Workforce planning***

| № | Position | Number of personnel | Main responsibilities | Duration of employment |
|---|---|---|---|---|
| **Design and planning department** | | | | |
| 1 | Chief engineer | 1 | Project management, supervision of team, quality and safety control | 14 month |
| 2 | Design manager | 1 | Lead design team and ensure compliance with standards | 14 month |
| 3 | Design engineer | 1 | Prepare technical drawings and engineering solutions | 14 month |
| 4 | Geotechnical design specialist | 1 | Conduct soil and ground stability assessments | 14 month |
| 5 | Material engineer | 1 | Control quality and standards of construction materials | 14 month |
| 6 | Survey engineer | 1 | Conduct site surveys and data collection | 14 month |

| | | | | |
|---|---|---|---|---|
| 7 | Quantity surveyor | 1 | Prepare quantity take-offs, budgeting, and planning | 14 month |
| **Project implementation department** | | | | |
| 8 | Project manager | 1 | Manage the project and coordinate daily operations | 14 month |
| 9 | Project admin | 1 | Manage documentation and reporting | 14 month |
| 10 | Translator | 3 | Provide interpretation for documents and meetings | 14 month |
| 11 | Project coordinator | 1 | Coordinate daily operations and team communication | 12 month |
| 12 | Project HR manager | 1 | Personnel registration, recruitment, and training organization | 12 month |
| 13 | Environmental impact assessment specialist | 1 | Monitor and report environmental impacts | 12 month |
| 14 | Social impact assessment specialist | 1 | Assess social impacts and coordinate community relations | 12 month |
| 15 | Health and safety specialist | 1 | Ensure occupational health and safety compliance and accident prevention | 12 month |
| 16 | Biodiversity, air quality, nose, etc specialists | 2 | Monitor biodiversity, environmental conditions, and air quality, prepare reports | 12 month |
| 17 | Environmental specialist | 1 | Ensure compliance with environmental standards and regulations | 12 month |
| 18 | Health and safety specialist | 1 | Monitor occupational health and safety and conduct training | 12 month |
| 19 | Social specialist | 1 | Assess social impacts and engage with local communities | 12 month |
| 20 | Survey manager | 1 | Conduct field surveys, data collection, and analysis | 12 month |
| 21 | Sexual exploitation, abuse and harassment expert | 1 | Identify SEAH risks, develop and implement prevention measures, conduct training and awareness programs, | 12 month |
| 22 | Senior site engineer | 2 | Manage and organize site construction activities | 12 month |
| 23 | Material engineer | 1 | Monitor material quality, compliance, and testing | 12 month |
| 24 | Survey engineer | 1 | Conduct field surveys, data collection, and analysis | 12 month |
| 25 | Quantity surveyor | 1 | Calculate material quantities, prepare and control budgets | 12 month |
| 26 | Highway engineer | 6 | Prepare road design and technical solutions, supervise quality | 20 month |
| 27 | Survey assistant worker | 20 | Support material handling, logistics, and site organization | 20 month |
| 28 | Pavement engineer | 1 | Develop pavement mix design and ensure quality control | 10 month |
| 29 | Pavement foremen | 1 | | 10 month |
| 30 | Paver assistant operator | 1 | Assist in operation of paving machinery | 10 month |
| 31 | Survey technician | 1 | Conduct surveying and coordinate data collection | 10 month |
| 32 | Survey assistant worker | 2 | Support surveying and engineering teams in field measurements | 10 month |
| 33 | Senior laborant | 1 | Lead laboratory testing and analysis activities | 10 month |
| 34 | Laborant | 1 | Conduct testing, analysis, and data collection | 10 month |
| 35 | Material assistant worker | 2 | Handle, store, and prepare construction materials at site and production areas | 10 month |
| **Camp** | | | | |
| 36 | Camp manager | 1 | Manage and organize daily camp operations and supervise team activities | 12 month |
| 37 | Camp electrician | 1 | Maintain camp electrical systems, operate equipment, and ensure electrical safety | 12 month |
| 38 | Head chef | 1 | Plan menus, manage kitchen staff, and ensure food quality and hygiene standards | 12 month |
| 39 | Assistant chef | 1 | Assist the head chef in food preparation and kitchen cleaning duties | 12 month |
| 40 | Guard | 2 | Ensure camp security, monitor access control, and prevent unauthorized entry | 12 month |
| **Financial division** | | | | |

| | | | | |
|---|---|---|---|---|
| 41 | Treasurer | 1 | | 10 month |
| | | | **Industrial Facility and Quarry** | |
| 42 | Asphalt concrete plant engineer | 1 | Supervise asphalt concrete production operations, ensure process control, technology compliance, and quality assurance | 9 month |
| 43 | Asphalt concrete plant operator | 2 | Operate and monitor asphalt production plant equipmen | 9 month |
| 44 | Emulsion mixer operator | 1 | Operate and control equipment for asphalt emulsion production (bitumen and water mixing) | 9 month |
| 45 | Asphalt plant weider | 1 | Measure and control raw material quantities and ensure accurate batching for asphalt production | 9 month |
| 46 | Asphalt plant assistant worker | 6 | Provide general support in asphalt plant operations and material handling | 10 month |
| 47 | Crusher plant engineer | 1 | Manage and supervise crusher plant operations and ensure technical and engineering compliance | 11 month |
| 48 | Crusher plant operator | 2 | Operate and monitor crushing equipment for aggregates production | 11 month |
| 50 | Crusher plant assistant worker | 8 | Support crushing plant operations and material handling activities | 11 month |
| | | | **Drivers and operators** | |
| 51 | Motor grader operator | 3 | Operate motor graders to level, grade, and prepare roads and work sites in accordance with technical specifications | 22 month |
| 52 | Excavator operator | 5 | Operate excavators for digging, loading, and executing earthworks at the site | 10 month |
| 53 | Wheel loader operator | 7 | Operate wheel loaders to load and transport materials and manage material movement within the work site | 22 month |
| 54 | Vibratory roller operator | 7 | Operate rollers for compaction of soil, pavement, and asphalt to achieve required density and smoothness | 10 month |
| 55 | Pneumatictyre roller operator | 2 | Operate pneumatic tire rollers for compaction of asphalt and subgrade materials using air-pressure rolling system | 10 month |
| 56 | Asphalt paver operator | 4 | Operate asphalt paving machines for laying asphalt layers in accordance with technical requirements | 9 month |
| 57 | Bitumen distributor operator | 1 | Operate bitumen spraying equipment to ensure uniform distribution of bitumen on road surfaces | 9 month |
| 58 | Dump truck driver | 45 | Operate dump trucks for transporting and unloading construction materials within and outside the site | 9 month |
| 59 | Trailer truck driver | 4 | Operate heavy-duty trucks for long-distance transportation of construction materials and equipment | 22 month |
| 60 | Fuel truck driver | 1 | Operate fuel transport vehicles to safely supply fuel to construction sites | 12 month |
| 61 | Water truck driver | 5 | Operate water trucks to supply water for construction, compaction, and dust suppression | 10 month |
| 62 | Service vehicle driver | 4 | Operate service vehicles to provide logistical, technical, and operational support within project sites | 12 month |
| 63 | Crane operator | 1 | Operate lifting equipment for safe handling, lifting, and movement of heavy materials | 12 month |
| | **Total workforce** | 181 | Total number of personnel engaged in project implementation | |

### Machinery, Equipment, and Technical Resources

All necessary machinery, technical resources, and equipment will be utilized to carry out the road construction work in a phased manner throughout the project. The duration of equipment usage will be aligned with the project implementation schedule, ensuring that foundation preparation, asphalt paving, and material transportation activities are performed with high quality, safety, and within the specified timeframe.

***Table 8. Machinery and Equipment***

| No. | Equipment Name | Quantity | Description | Duration of Use |
|---|---|---|---|---|
| 1 | Motor Grader | 3 | Leveling roads and sites, base preparation | 22 months |
| 2 | Excavator | 5 | Excavation, loading, and material handling for base and road works | 10 months |
| 3 | Wheel Loader | 7 | Loading and transporting materials | 22 months |
| 4 | Vibratory Roller | 7 | Compaction of road and pavement materials | 10 months |
| 5 | Heavy-Duty Truck | 45 | Loading, transporting, and unloading materials | 22 months |
| 6 | Road Reclaimer | 1 | Recycling old pavement to prepare new surfacing | 9 months |
| 7 | Asphalt Paver | 2 | Laying asphalt pavement | 9 months |
| 8 | Pneumatic Tire Roller | 2 | Compaction and leveling of asphalt pavement | 9 months |
| 9 | Drum Roller | 2 | Compaction of asphalt and road materials | 9 months |
| 10 | Bitumen Distributor | 1 | Even distribution of bitumen on the road surface | 9 months |
| 11 | Water Truck | 5 | Watering roads and sites, dust suppression | 10 months |
| 12 | Fuel Truck | 1 | Supplying fuel to machinery and equipment | 12 months |
| 13 | 30-ton Crane | 1 | Lifting loads and placing equipment | 12 months |
| 14 | Road Construction Machine | 1 | Used for base and pavement preparation works | 6 months |
| 15 | Guardrail Installation Machine | 1 | Installing road safety barriers | 6 months |
| | **Total** | **84** | | |

The contractor responsible for the road repair works may increase the workforce and the quantity of equipment as necessary.

## 1.4. PROJECT IMPLEMENTING ENTITY INTRODUCTION

China Road and Bridge Corporation (CRBC) is a state-owned enterprise of the People's Republic of China and a globally leading infrastructure construction company. CRBC is one of the leading participants in the international engineering market, undertaking large-scale projects such as roads, bridges, ports, railways, airports, tunnels, buildings, and industrial parks, while providing investment, construction, and operational management services.

**Global presence**: CRBC operates in more than 60 countries across Asia, Africa, Europe, and the Americas, serving as the primary overseas platform of CCCC, a Global Fortune 500 company.

**Strategic objective**: The company has expanded its business scope and strengthened its competitiveness under China's "Going Global" strategy and the "Belt and Road" Initiative.

**Business model:** CRBC successfully implements major projects using Engineering, Procurement, and Construction (EPC) and Public-Private Partnership (PPP) models.

**Major projects implemented**:

- Tajikistan-Uzbekistan Highway

- Karakoram Highway Rehabilitation Project in Pakistan
- Nouakchott Friendship Port in Mauritania
- Zemun-Borča Bridge in Serbia
- Mombasa-Nairobi and Naivasha-Kisumu-Malaba Standard Gauge Railway in Kenya
- Hungary-Serbia Railway
- Pointe-Noire Port in the Republic of the Congo

**Company vision**: "We build a better and more connected world. We make cities more livable. We create a better life for people."

**Business areas**:

- Infrastructure development
- Railway value chain
- Infrastructure and industrial investment
- Urban and industrial park development
- Landmark overseas construction projects

**Code of ethics**: The company aspires to become a globally respected enterprise by operating in compliance with local cultures and regulations, contributing to social well-being, and adhering to high standards of business ethics.

## 1.5. PROJECT LOCATION INFORMATION

This project will be implemented along a 105 km section (km 138+000 to km 350+400) of the A0301 state highway on the Ulaanbaatar-Arvaikheer route. The project involves rehabilitation works within the existing road corridor.

***Table 9. Project road alignment location***

| Province | Soum | Road Section (km) | Geographic Characteristics |
|---|---|---|---|
| Tuv | Undurshireet | 138-185 km | Steppe and low mountains (1,200-1,600 m) |
| | Erdenesant | 185-220 km | Flat terrain, gravel and sand deposits |
| Bulgan | Rashaant | 220-260 km | Hilly steppe (1,400-1,800 m) |
| Arkhangai | Khashaat | 260-300 km | Mountainous area, Khangai Range (1,600-2,000 m) |
| Uvurkhangai | Burd | 300-335 km | Steppe and river valley (1,500-1,800 m) |
| | Yesunzuil | 335+000 km - 350+400 km | Flat terrain, Arvaikhee r plateau |

**PROJECT LOCATION MAP FOR THE MAJOR REHABILITATION AND PARTIAL REPAIR WORKS ON THE 105 KM SECTION OF THE A0301 NATIONAL ROAD ON THE ULAANBAATAR–ARVAIKHEER ROUTE**

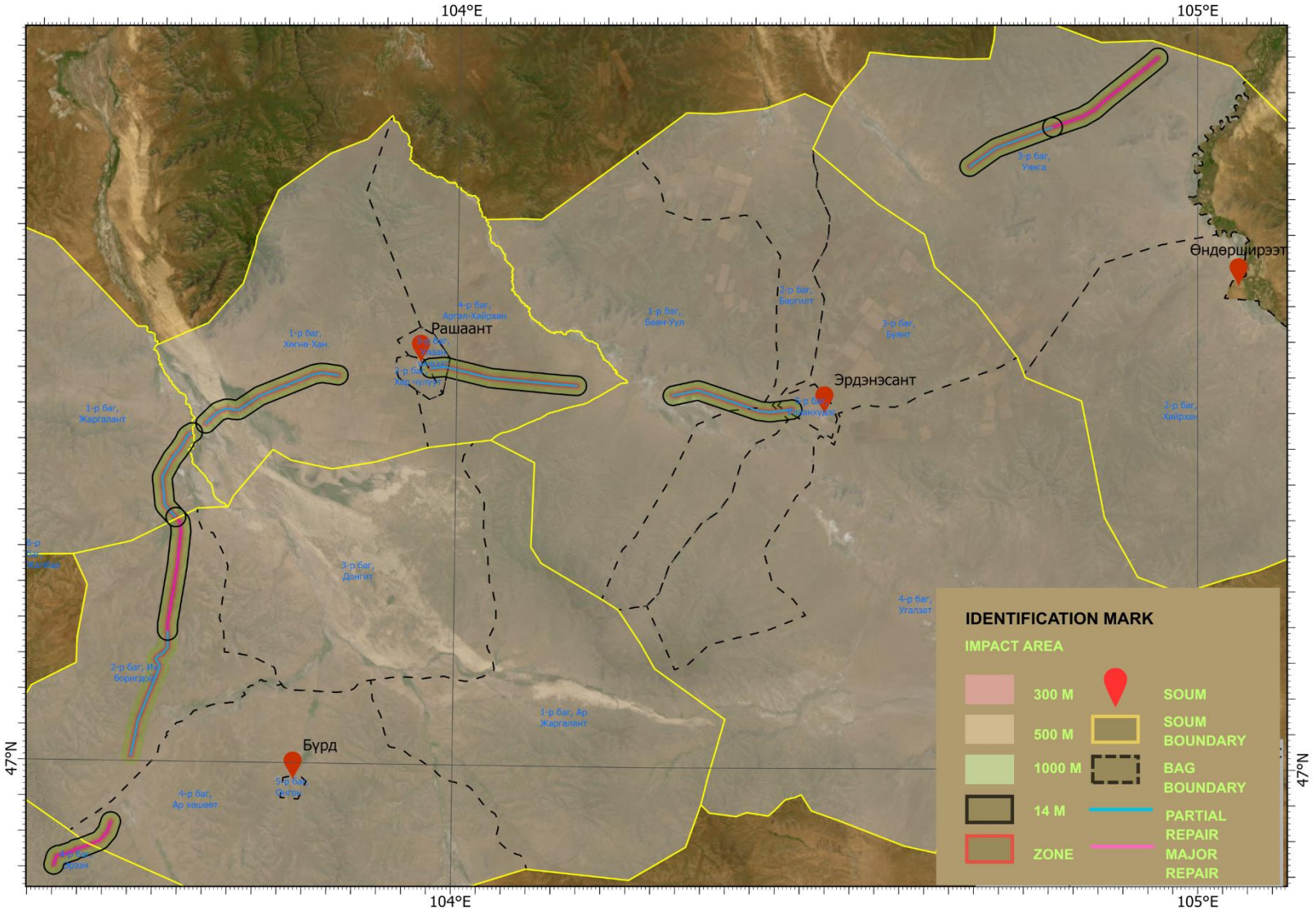



***Figure 4. Project site location map***

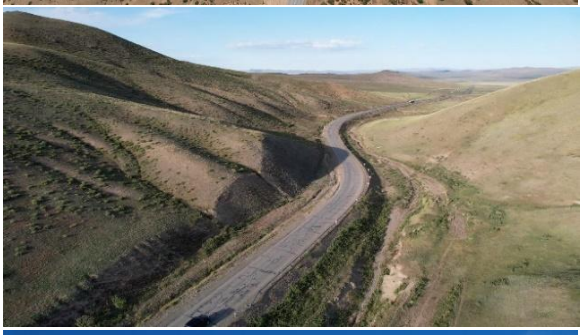
***Table 10. Consolidated Project Location Information***

| Type of fields | Point number | Coordinates | | Location | Duration of usage |
|---|---|---|---|---|---|
| | | X | Y | | |
| Road route | - | km 138+000-km350+400 | | Tuv province (Erdenesant, Undurshireet), Bulgan province (Rashaant), Arkhangai province (Khashaat), Uvurkhangai province (Burd, Yesunzuil) | During construction period (11month) |
| Worker's camp | 1 | 442918.89 | 5244861.28 | Distance from soum center: 34.9 km<br>From road route: 0.14 m | |
| | 2 | 442835.27 | 5244892.96 | | |
| | 3 | 442917.99 | 5244768.67 | | |
| | 4 | 442827.78 | 5244796.14 | | |
| Sone crushing and mixing plant | 1 | 442274.33 | 5245454.16 | Distance from soum center: 34.9 km<br>From road route: 0.14 m | |
| | 2 | 442294.70 | 5245392.21 | | |
| | 3 | 442231.47 | 5245361.96 | | |
| | 4 | 442207.30 | 5245427.72 | | |
| Borrow pit -1 | 1 | 490719.28 | 5275811.54 | Soum: Undurshireet<br>Distance from soum center : 29 km<br>From road route: 0.7 km | Duting the material extraction period /6-8 month/ |
| | 2 | 490799.36 | 5275799.45 | | |
| | 3 | 490786.21 | 5275705.77 | | |
| | 4 | 490697.32 | 5275712.83 | | |
| Borrow pit -2 | 1 | 454839.43 | 5243411.13 | Soum: Erdenesant<br>Distance from soum center: 8.2 km<br>From road route: 0.742 km | |
| | 2 | 454925.91 | 5243444.37 | | |
| | 3 | 454949.65 | 5243376.74 | | |
| | 4 | 454885.21 | 5243346.46 | | |
| Borrow pit -3 | 1 | 442187.11 | 5245343.46 | Soum: Erdenesant<br>Distance from soum center: 25 km<br>From road route: 0.67 km | |
| | 2 | 442224.53 | 5245340.29 | | |
| | 3 | 442217.33 | 5245305.00 | | |
| | 4 | 442183.42 | 5245314.86 | | |
| Borrow pit -4 | 1 | 442138.73 | 5245482.25 | Soum: Erdenesant<br>Distance from soum center: 25 km<br>From road route: 0.67 km | |
| | 2 | 442113.00 | 5245439.47 | | |
| | 3 | 442128.17 | 5245417.34 | | |
| | 4 | 442305.29 | 5245543.88 | | |
| | 5 | 442261.64 | 5245586.36 | | |
| Borrow pit -5 | 1 | 427803.16 | 5246355.53 | Soum: Rashaant<br>Distance from soum center: 8 km<br>From road route: 0.4 km | |
| | 2 | 427863.28 | 5246335.46 | | |
| | 3 | 427854.22 | 5246289.66 | | |
| | 4 | 427789.34 | 5246309.85 | | |
| Borrow pit -6 | 1 | 405508.85 | 5244097.47 | Soum: Rashaant<br>Distance from soum center: 18 km<br>From road route: 0.385 km | |
| | 2 | 405562.34 | 5244128.73 | | |
| | 3 | 405590.33 | 5244071.94 | | |
| | 4 | 405532.27 | 5244038.62 | | |
| Borrow pit -7 | 1 | 397108.12 | 5230281.46 | Soum: Burd<br>Distance from soum center: 30 km<br>From road route: 0.8 km | |
| | 2 | 397168.38 | 5230247.00 | | |
| | 3 | 397149.00 | 5230150.42 | | |
| | 4 | 397055.39 | 5230192.06 | | |
| Borrow pit -8 | 1 | 393856.68 | 5217051.42 | Soum: Burd<br>Distance from soum center: 21 km<br>From road route: 0.04 km | |
| | 2 | 393950.25 | 5217036.08 | | |
| | 3 | 393866.51 | 5216919.77 | | |
| | 4 | 393838.29 | 5216930.79 | | |
| Note: Distance measurements were taken starting from the edge of the roadway. | | | | | |









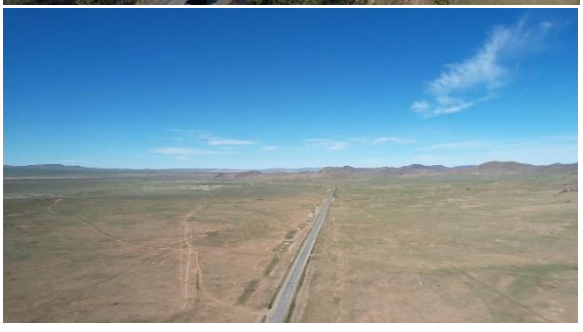



***Figure 5. Current Condition of A0301 Highway***

# CHAPTER 2. ENVIRONMENTAL AND SOCIO-ECONOMIC BASELINE OF THE PROJECT AREA

## 2.0. ENVIRONMENTAL BASELINE

The environmental assessment is primarily aimed at identifying the baseline environmental conditions of the project implementation area at the early stage of developing this sub-project and its related development policies, programs, and plans. This includes a comprehensive evaluation of geographical conditions, geological structure, climate, air quality, surface and groundwater resources, soil composition, vegetation cover, and wildlife. It also covers the current socio-economic conditions of local residents, their development level, public health status, and cultural and historical heritage. This assessment is carried out by qualified professionals, researchers, and relevant organizations using scientific methodologies.

The rod maintenance project of the A0301 state highway on the “Ulaanbaatar-Arvaikheer” route covers a 105 km section (km 138+000 to km 350+400) passing through six soums across Tuv, Bulgan, Arkhangai, and Uvurkhangai provinces. This section is located in the middle segment of the total 430 km highway connecting Ulaanbaatar city to Arvaikheer soum of Uvurkhangai Province. The physical and geographical conditions of the project alignment are described in detail below in a professional context. This information is based on the National Geographic Information Database of Mongolia, geological surveys, JICA road sector reports, Google Maps, and other official sources.

## 2.1. PHYSICAL GEOGRAPHICAL CONDITIONS

Geographical Location and Administrative Division: The 105 km road mainteancne project section (km 138+000 to km 350+400) covers the administrative territories of Undurshireet and Erdenesant soums in Tuv Province, Rashaant soum in Bulgan Province, Khashaat soum in Arkhangai Province, and Burd and Yesunzuil soums in Uvurkhangai Province.

**Natural zones:** Mongolia’s vast territory, extending approximately 1,200 km from north to south, is generally classified into four natural zones and two altitudinal belts. The Ulaanbaatar-Arvaikheer highway lies entirely within the steppe zone of Mongolia. The steppe zone is further divided into meadow steppe, typical steppe, and dry steppe sub-zones. These ecological variations are distinctly observed from the eastern part of Mongolia westward to the eastern end of the Khangai Mountain range. Further westward, up to the Khan Khukhii Mountain range, meadow steppe disappears entirely and dry steppe becomes dominant.

**Physical geographic zoning:** The area falls within the Tuul-Tarna River Basin sub-region of the Khangai Mountain macro-region, which covers approximately 6.5% of Mongolia’s total territory, or 102.2 thousand km². The Orkhon-Tuul basin of low mountains is located between the Khangai and Khentii mountain ranges and is divided into three sub-regions: Orkhon-Khanu, Orkhon-Yeroo, and Tuul-Tarna basins. The 105 km road rehabilitation section of the Ulaanbaatar-Arvaikheer route is entirely located within the Tuul-Tarna River Basin.

In terms of topography, the area is characterized by medium to low mountains with elevations of 1,400-1,800 m, river valleys and depressions at 600-1,100 m. The Tuul River flows around the Zaamar Range in this section and changes its course due to tectonic fault

influences. The river valley is 0.6-2.5 km wide, with a box-shaped cross-section, and is dominated by accumulation and erosion-accumulation landforms.

The landscape is typical of the northern dry steppe, consisting of low mountains, hills, and uneven valley terrain with terraces. Meadow landscapes are discontinuously distributed along river channels. Vegetation is dominated by willow groves in river valleys, mixed forb-grass communities, reed-tussock formations, and grass-forb associations.

Downstream from the Zaamar Bridge, long-term gold mining activities have significantly altered the natural floodplain environment. In particular, around the “Shijir Alt” LLC mining area, the previous meadow steppe landscape has been destroyed, and mining activities have resulted in the formation of artificial landscapes.

**Relief and Landform characteristics**

The A0301 highway passes through the steppe and semi-mountainous regions of central and southwestern Mongolia. The relief along the route is characterized as follows by soum:

Tuv province (Undurshireet, Erdenesant soum)

- Relief: Steppe plains and low mountains (1,200-1,600 m)
- Characteristics: Predominantly flat terrain with low hills. Some areas contain gravel and sand deposits. Due to the presence of former quarry sites, there is a risk of dust generation and surface erosion.
- Geomorphology: Valley deposits, accumulation plains, and a small network of streams and gullies. The area is located within a seismic zone of intensity 7.

Bulgan province (Rashaant soum)

- Relief: Semi-mountainous steppe (1,400-1,800 m).
- Characteristics: Presence of small rivers and streams, including the Rashaant River.
- Geomorphology: Accumulation plains, mountain foothills, and small valleys.

Arkhangai province (Khashaat soum)

- Relief: Mountainous to semi-mountainous terrain (1,600-2,000 m).
- Characteristics: The relief is more dissected under the influence of the Khangai Mountain range, with predominantly rocky soils
- Geomorphology: Mountain foothills, valley deposits, and river and stream valleys.

Uvurkhangai province (Burd, Yesunzuil soum)

- Relief: Steppe plains and low mountains (1,500-1,800 m)
- Characteristics: In Burd soum, river valleys and accumulation plains are prevalent, while flat terrain dominates in Yesunzuil soum.
- Geomorphology: Valley deposits, accumulation plains, and small river valleys.

**Geological conditions:** The geological conditions along the road alignment correspond to the geological characteristics of central and southwestern Mongolia.

The 105 km section of the A0301 Ulaanbaatar-Arvaikheer highway passes through six soums (Undurshireet, Erdenesant, Rashaant, Khashaat, Burd, and Yesunzuil) across Tuv, Bulgan, Arkhangai, and Uvurkhangai provinces. The physical geographical environment is characterized by steppe and semi-mountainous terrain, gravelly and sandy soils, small river valleys, a harsh continental climate, and steppe vegetation cover.

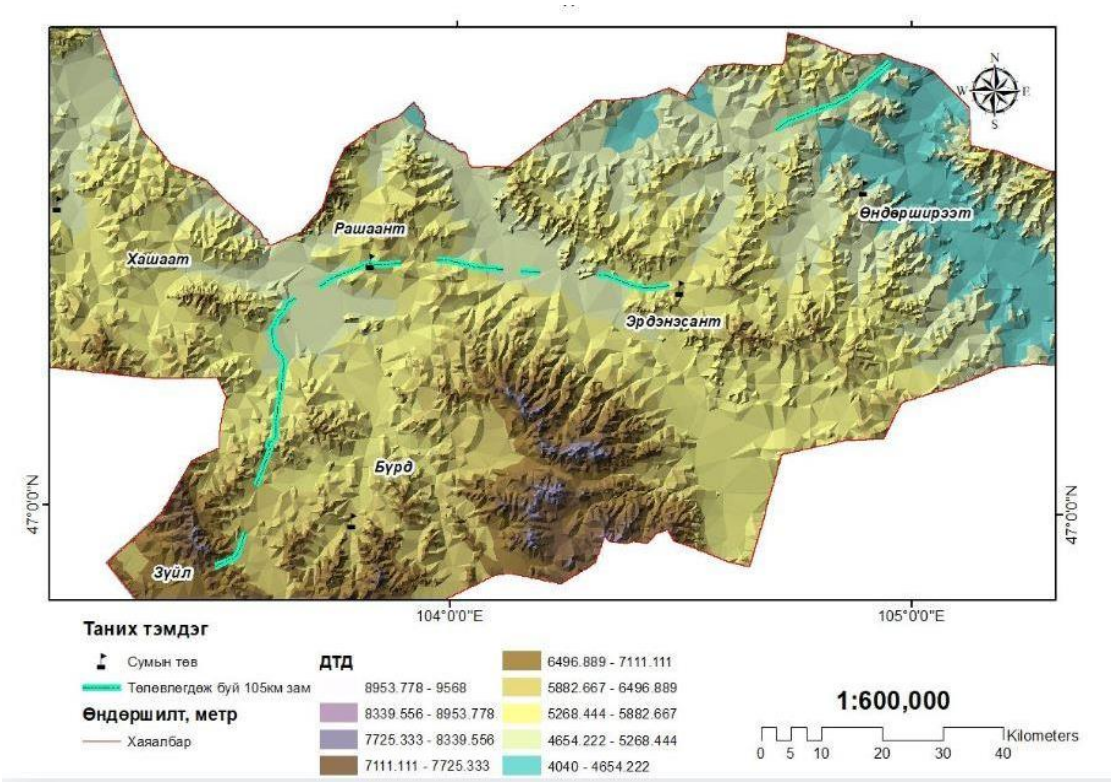



*Figure 6. Elevation Map of the Project Area*

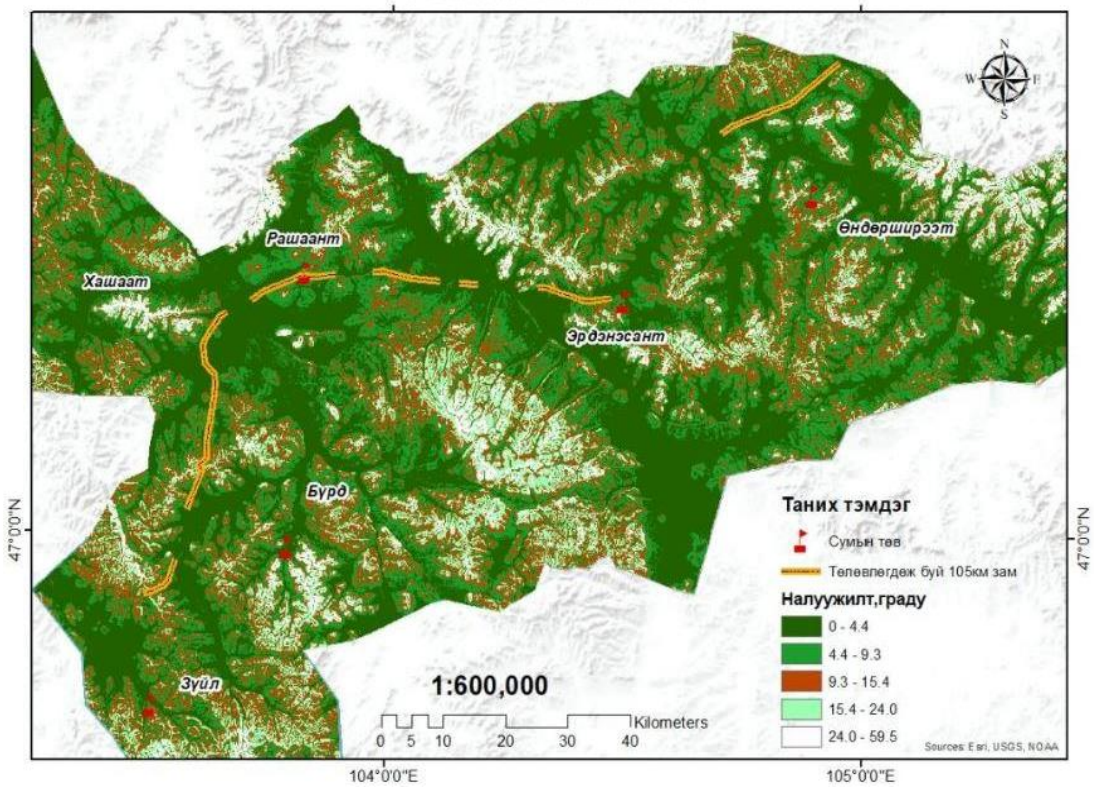



*Figure 7. Slope map the project area*

## 2.2. CLIMATE

### Climate regime of Tuv province

Erdenesant soum is located in a steppe zone at an elevation of 1,200-1,500 meters above sea level and is characterized by a dry climate with frequent winds and dust storms. Based on meteorological data from 2020-2025, the temperature shows a consistent warming trend, with an average annual increase of +0.5°C. The year 2024 was the warmest (+1.9°C), while

2021 was the coldest. Seasonally, winter temperatures range between -24°C and -12°C, with a warming trend observed in 2023-2024. During spring and summer, temperatures are 1.5-3°C higher than the long-term average, and the number of hot days (≥25-30°C) has increased by 12-20%.

Annual precipitation ranges from 260 to 390 mm, with most years recording 10-20% above the long-term average. The year 2024 recorded the highest precipitation (385 mm), while 2022 had the lowest (290 mm). Approximately 60-65% of annual precipitation occurs during summer, and heavy rainfall and hail events occur 1-3 times per year.

The average annual wind speed is 3.3-3.6 m/s, reaching its peak in spring (4.6-4.8 m/s). From 2020 to 2025, wind speeds were on average 0.3 m/s higher than the long-term average, and the frequency of dust storms increased by 10-15%.

Snow cover thickness is generally 1-10 cm, while in some years (2021 and 2023) snowfall exceeded the long-term average by 20-30%, creating severe winter conditions. Between 2020 and 2025, hazardous weather events occurred regularly, including 12-20 dust and windstorms annually, and 3-5 flood events caused by heavy summer rainfall. Hail was observed 1-2 times per year during July and August, which affected construction activities to some extent. During this period, weather related damages amounted to approximately 120 million MNT.

**Climate regime of Bulgan province**

Rashaant soum is located on the southern slope of the Khangai Mountains within the steppe zone, at an elevation of 1,100-1,300 meters above sea level. The area is characterized by a dry climate with cold winters and cool summers. Diurnal temperature fluctuations are significant, and wind and dust storms are frequently observed during spring. This assessment is based on 2020-2025 data and WMO standards (long-term average 1991-2020).

During 2020-2025, the average annual air temperature increased by approximately +0.5°C, with the most pronounced warming observed in 2023-2024 (+1.0 to +1.8°C above the long-term average). The year 2024 was the warmest (+1.6°C), while 2021 was the coldest (-0.1°C). Seasonal winter temperatures range from -22°C to -12.5°C, with extreme minimum temperatures reaching -39.2°C (2021). In spring, summer, and autumn, warming trends are more evident, and the number of hot days (≥20-30°C) has increased by 8-15%.Annual precipitation ranges between 310 and 370 mm. The highest recorded precipitation was in 2024 (370 mm). Approximately 70-80% of total annual precipitation occurs between June and August, during which the frequency of heavy rainfall and hail events has increased. In 2023-2024, autumn precipitation in September increased by 20-30%.

The average wind speed during 2020-2025 ranges from 2.9 to 3.6 m/s, with the strongest winds occurring in spring (4.2-5.2 m/s). Prevailing wind directions are west and northwest in winter, and southwest in spring. Dust storm frequency ranges from 15 to 22 events per year, with increased intensity and frequency in 2023-2024. The strongest recorded storm occurred in April 2024, with wind speeds reaching 15-18 m/s.

**Climate regime of Arkhangai province**

Khashaat soum is located in the northern part of Arkhangai Province on the southern slope of the Khangai Mountains, at an elevation of 1,800-2,200 meters above sea level. The climate is characterized as cold with long winters, short and cool summers, and

predominantly dry conditions. Significant diurnal temperature variation is observed, and wind and dust storms are frequent during the spring season.

During 2020-2025, the average annual air temperature increased by approximately +0.4°C, with the most significant warming observed in 2023-2024 (+1.2°C above the long-term average). The coldest year was 2021, with an average temperature of -0.3°C, while 2024 was recorded as the warmest year.

Annual precipitation ranges between 300 and 330 mm, with approximately 70-75% of total rainfall occurring during the summer months (June-August). In 2020, 2023, and 2024, short duration heavy rainfall and hail events occurred 2-4 times per year, with total precipitation exceeding the long-term average by 15-35%. Although spring and autumn precipitation is generally low, increased rainfall was recorded in September of 2023 and 2024.

The average wind speed during 2020-2025 ranges from 3.1 to 3.6 m/s, with the strongest winds occurring in spring (4.6-5.2 m/s). The prevailing wind directions across the province are from the west and southwest. Dust storm frequency ranges from 15 to 20 events per year. However, this increased to 18-22 events in 2023-2024. The strongest recorded storm occurred in April 2024, with wind speeds reaching 15-18 m/s.

**Climate regime of Uvurkhangai province**

Burd soum is located in the northwestern part of Uvurkhangai Province, in a transitional zone between the Khangai mountainous region and the Gobi arid zone, at an elevation of 1,500-1,800 meters above sea level. The climate is characterized by a combination of cool Khangai and arid Gobi features, and is defined as an extreme continental climate with strong seasonal and temperature fluctuations, low precipitation, and high evaporation. Due to significant spring aridity, dust storms are regularly observed.

During 2020-2025, the average annual temperature in Burd soum ranged between -0.8°C and +0.2°C, showing a warming trend. The coldest year was 2021 (-0.8°C), while the warmest year was 2024 (+0.2°C). In terms of seasonal variation, winter temperatures ranged between -17.5°C and -18.5°C, with temperatures dropping to -35.8°C in January 2021. In 2023-2024, winter temperatures were +0.5 to +1.0°C warmer compared to the long-term average.

Annual precipitation in Burd soum during 2020-2025 ranged between 220 and 260 mm, with 70-80% of total precipitation occurring in summer. In 2023 and 2024, short duration heavy rainfall events exceeded the long-term average by 15-30%. In contrast, winter and spring precipitation is very low (0.5-12 mm), resulting in rapid soil moisture loss and increased spring dryness and wind activity.During 2020-2025, the average wind speed ranged from 3.2 to 5.0 m/s, with the strongest winds occurring in spring (4.8-6.0 m/s). Dust storms were recorded 18-25 times annually. In 2023-2024, the frequency increased to 20-25 events, with the strongest storm occurring in April 2024, reaching wind speeds of 16-20 m/s.

## 2.3. AIR QUALITY

The air quality assessment of the project was conducted based on field survey results carried out on August 31 and September 4, 2025. The evaluation was performed in accordance with the Mongolian national standard MNS 3384:1982 (General requirements for sampling), using a single cross-sectional sampling approach under site-specific conditions. At selected geographic coordinates, measurements of total dust and particulate matter in

ambient air were taken using a DustTrak device, while noise levels were measured using an Environment Meter N09AQ. In total, measurements were conducted at six monitoring points.

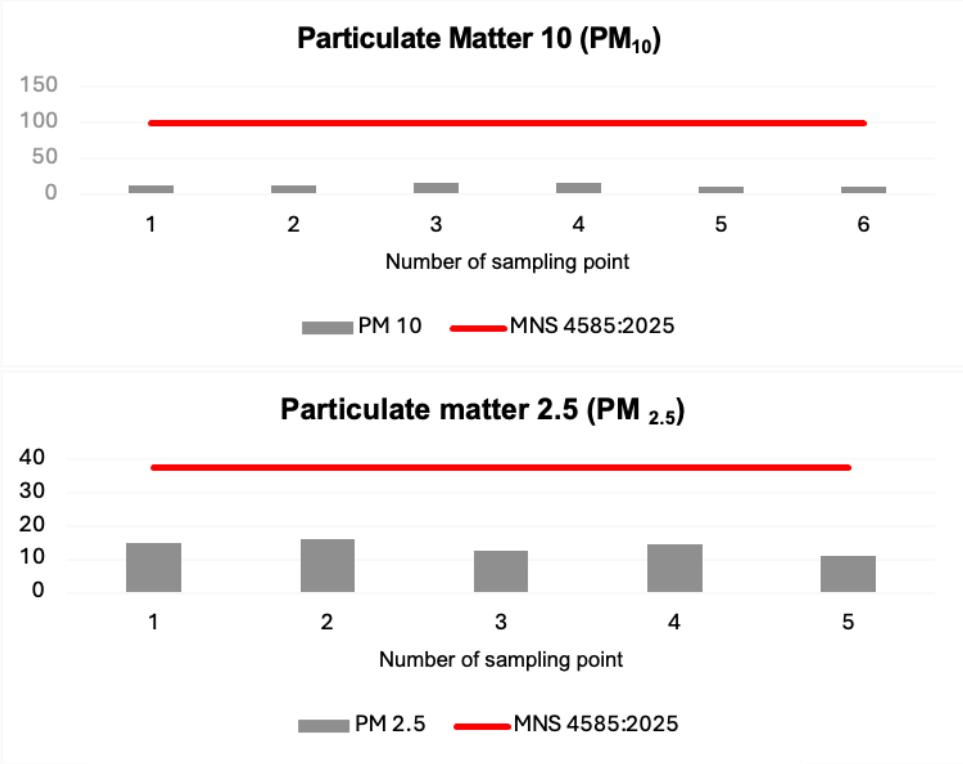
***Table 11. Air quality monitoring points***

| Point | Longitude | Latitude |
|---|---|---|
| 1 | 104°55′48″ | 47°39′35″ |
| 2 | 104°21′29″ | 47°20′46″, |
| 3 | 104°2′9″ | 47°21′52″ |
| 4 | 103°45′16″ | 47°20'56" |
| 5 | 104°11'7" | 47°21'19" |
| 6 | 103°32'13" | 46°55'52" |

### 2.3.1. Dust

To determine particulate matter levels in the project area, an Aeroqual Series 500 device was used to directly measure both indoor and outdoor air quality.

The PM10 (≤10 μm particulate matter) measurement results indicate that there were no exceedances of the MNS 4585:2025 standard, and the observed values are approximately 90 times lower than the standard limit. For PM2.5 (≤2.5 μm fine particulate matter), the results also show no exceedance of the MNS 4585:2025 standard. However, at Monitoring Point 4, a relatively higher value of up to 10 μg/m³ was recorded compared to the other locations.




***Graph 1. PM10 and PM2.5 particulate matter measurements***

## 2.4. PHYSICAL POLLUTION

### 2.4.1. Noise

Baseline noise monitoring was undertaken in order to characterize the existing physical environment within the subproject area of influence and to identify locations that may require enhanced management during construction. The noise survey formed part of the broader physical pollution assessment, which also included measurements of common air pollutants and ambient radiation along the road corridor.

The survey was conducted in 2025 at six monitoring points located in Undurshireet and Erdenesant soums of Tuv Province, Rashaant soum of Bulgan Province, Khashaat soum of Arkhangai Province, and Burd and Yesunzuil soums of Uvurkhangai Province. Measurements were taken in the field using portable monitoring equipment, including a sound level meter, to establish indicative pre-construction baseline conditions.

The currently available noise dataset provides indicative baseline sound levels at the monitoring points, however, it does not reliably support a day-time versus night-time compliance assessment in its present form. This is because the source record does not clearly specify whether each monitored value represents a daytime measurement, a night-time measurement, or a combined average, and the cited day/night standard values require verification against the applicable national standard before any formal compliance conclusion is presented.

Accordingly, the table below presents the baseline noise results as indicative existing conditions only. A formal compliance comparison against daytime or night-time standards should be undertaken only after the monitoring period for each value has been verified from the field records and matched with the corresponding applicable standard. Pending that verification, the baseline results show that noise exposure varies across the corridor, with some monitoring points exhibiting relatively higher existing levels than others. These locations should be prioritized for construction-phase noise monitoring and mitigation, particularly where sensitive receptors may be present.

***Table 12. Indicative Baseline Noise Levels at Monitoring Points***

| Monitoring Point | Measured Value (dBA) | Baseline Interpretation |
|---|---|---|
| **Point 1** | 68.1 | Relatively high baseline noise level compared with other monitoring points, should be treated as a priority location for construction-phase monitoring. |
| **Point 2** | 45.6 | Moderate baseline noise level. |
| **Point 3** | 60.2 | Elevated baseline noise level, monitoring and control during construction should be prioritized. |
| **Point 4** | 31.1 | Low baseline noise level. |
| **Point 5** | 56.7 | Moderately elevated baseline noise level. |
| **Point 6** | 31.1 | Low baseline noise level. |

**Note:** A formal comparison with daytime and night-time standards is not presented here because the measurement period associated with each recorded value has not been clearly identified in the available source record, and the cited day/night standard values require verification before finalization. Once field records are confirmed, the final noise compliance table shall present, for each monitoring point, the date and time of measurement, the applicable time period, the corresponding standard, and the compliance result.

### 2.4.2. Waste management

Waste management activities at the project site shall be implemented in accordance with Annex of Order No. A/443 dated November 17, 2018, issued by the Minister of Environment and Tourism, titled “General Requirements for the Classification, Collection, Transportation, Recycling, Recovery, Disposal, and Landfilling of Non-Hazardous Waste.”

Waste shall be segregated into three categories:

- Non-hazardous (general) waste
- Recyclable waste
- Hazardous waste

*Table 13. Waste categories for segregation*

| Non-hazardous (General) Waste | Recyclable Waste | Hazardous Waste |
|---|---|---|
| – **Food waste**<br>– **Fruit and vegetable peels and residues**<br>– **Bones**<br>– **Used cooking oil**<br>– **Other waste excluding hazardous and recyclable waste** | – Paper (clean or lightly contaminated newspapers, magazines, notebooks, office paper, packaging paper, cardboard, milk and juice tetra packs)<br>– Plastics (various beverage bottles, plastic bags thicker than 0.025 mm, packaging such as ketchup and vegetable oil containers, shampoo and detergent bottles, etc.)<br>– Aluminum, iron, metals, copper, brass, and related products<br>– Glass (all types of glass containers and products)<br>– Cans<br>– Wood and wooden materials<br>– Clothing and textiles<br>– Rubber and similar materials<br>– Grass and wood waste | Hazardous waste refers to waste that is toxic, corrosive, oxidizing, flammable, or explosive, and may cause harm to humans, animals, plants, their reproduction, or negatively impact environmental stability. |

The Contractor is responsible for planning and implementing further waste management measures, ensuring on-site waste segregation conditions, and providing instructions and training to all employees. Waste generated from the project shall be classified according to its source.

*Table 14. Types of waste generated during project phase*

| № | Type of waste | Source | Management | Regulation |
|---|---|---|---|---|
| **CONSTRUCTION PHASE** | | | | |
| 1 | Construction waste | Residual construction materials | Contract with the local Governor's Office for disposal at designated sites | Law on Waste and related procedures for collection, sorting, transport, recycling, reuse, disposal, and landfilling |
| 2 | Domestic solid waste | Workers' daily activities | | General requirements for non-hazardous waste management |
| 3 | Domestic liquid waste | Wastewater from workers | Contract with specialized service providers for collection and removal | Standards for wastewater discharge and containment systems |
| 4 | Hazardous waste | Oils, fuels, and contaminated materials from machinery | Contract with licensed hazardous waste handlers | Procedures for temporary storage, collection, transport, recycling, disposal, and reportin |
| **OPERATIONAL PHASE** | | | | |
| 3 | General waste from site, camp, and facilities | After construction phase | Site cleaning and disposal at designated municipal waste points under agreement with local authorities | Managed in accordance with applicable hazardous waste regulations |
| 7 | Hazardous waste | | | |

### 2.4.3. Waste segregation

During project implementation, solid waste shall be sorted, processed, and transported using waste containers that meet the following requirements:

- Classification of waste bins
- Color coding standards
- Design and type
- Placement location
- Space requirements
- Occupational health and safety

Waste bins must, at minimum, support segregation into:

- Recyclable waste
- Non-recyclable waste
- Organic food waste

***Table 15. Color coding for waste segregation***

| № | Waste type | Color | Color code (CMYK) |
|---|---|---|---|
| 1 | Plastics and plastic bags | | C-84, M-11, Y-98, K-1 |
| 2 | Metal, aluminum cans, glass | | C-0, M-60, Y-100, K-0 |
| 3 | Paper | | C-88, M-52, Y-0, K-0 |
| 4 | Organic food waste | | C-42, M-68, Y-94, K-46 |
| 5 | Other waste | | C-0, M-0, Y-0, K-85 |
| 6 | Household hazardous waste | | C-2, M-0, Y-94, K-0 |

Portable containers for the collection of general and recyclable waste shall meet the following general requirements:

- Waste bins shall be made of durable, fire-resistant materials and be protected against corrosion.
- The waste collection compartments of the bins shall be clearly marked with standardized labels and color codes indicating the type of recyclable waste.
- Waste bins shall be compatible with waste segregation, collection, loading, and transportation technologies.
- Bins shall be equipped with lids or covers to prevent waste from being dispersed by wind, accumulation of rainwater, and leakage.
- For organic waste, adequate ventilation shall be provided. Ventilation may be mechanical or natural, with a minimum air exchange rate of 0.8 m³/hour.

***Waste segregation at source:*** During project implementation, domestic solid waste generated shall be segregated at the source, its volume minimized, and stored in designated waste containers with appropriate labels and markings. The waste shall then be delivered to the nearest recycling collection points or recycling facilities.

***Examples of waste generated include:***

- Plastic beverage bottles and single-use plastic items
- Tetra pack containers and packaging for beverages
- Food waste and leftovers from catering services
- Paper, cardboard boxes, paper packaging, and printed materials
- Cleaning product containers
- Heavily contaminated sanitary solid waste
- Worn-out, damaged, or unusable clothing

## 2.5. GEOOGICAL STRUCTURE AND GEOMORPHOLOGY

### Geology of Erdenesant soum, Tuv province

Erdenesant soum is located in the southwestern part of Tuv Province, within the transitional zone of the Orkhon-Tuul river basin and bordering Uvurkhangai Province. Geologically, the area belongs to the boundary zone between the Paleozoic mountain belt and the Meso-Cenozoic basin depression.

The soum area is mainly composed of Devonian-Carboniferous volcanic and sedimentary rocks, including andesite, tuff, sandstone, and argillaceous shale. In some areas, intrusive bodies such as granite, granodiorite, and diorite are also present. Due to its proximity to the Orkhon-Tuul basin, Quaternary alluvial deposits such as gravel, sand, and clay are widely

distributed. In lowland and depression areas, lacustrine clay and sandy sediment layers are also common.

In terms of mineral resources, construction materials such as limestone, sand, and gravel are widely available. In addition, small-scale coal occurrences, clay and shale deposits have been identified. Furthermore, placer gold occurrences have been reported in areas close to the Orkhon-Tuul basin.

**Geology of Undurshireet Soum, Tuv province**

Undurshireet soum is located in the southwestern part of Tuv Province, bordering Uvurkhangai Province. Geologically, it lies in the transitional zone between the eastern foothills of the Khangai Mountain range and the Orkhon-Tuul river basin.

The bedrock of the soum consists mainly of Devonian and Carboniferous sedimentary-volcanogenic rocks, including sandstone, shale, tuff, and andesite. In addition, intrusive bodies of granite, diorite, and granodiorite are locally present. Precambrian crystalline basement rocks such as gneiss and amphibolite are also distributed in certain areas.

During the Cenozoic era, alluvial and proluvial deposits of gravel, sand, and clay accumulated in valleys and depressions. Thick sedimentary layers are present along the upper reaches of the Tuul River and its tributaries.

In terms of mineral resources, construction materials are predominant. Small-scale coal occurrences have been identified, and placer gold occurrences have been reported along rivers in the upper Tuul basin area.

**Geology of Rashaant soum, Bulgan Province**

Rashaant soum is located in the southeastern part of Bulgan Province, bordering Tuv Province. It lies within the southwestern foothills of the Khentii Mountain range and belongs to the transitional zone between the Khentii mountainous region and the Orkhon-Selenge river basin.

The geology of the area is characterized by widespread distribution of Precambrian and Paleozoic crystalline rocks, including gneiss, amphibolite, and granitic gneiss. Devonian-Carboniferous sedimentary and volcanogenic rocks such as sandstone, shale, tuff, and andesite-dacite are also dominant. In addition, Jurassic lacustrine deposits consisting of clay shale and sandstone are locally present, along with intrusive igneous rocks such as granite, granodiorite, and diorite.

Quaternary alluvial deposits of gravel, sand, and clay are extensively accumulated in river valleys and depressions. In terms of mineral resources, fluorspar deposits, placer gold occurrences, and construction raw materials are commonly found in the area.

**Geology of Khashaat soum, Arkhangai province**

Khashaat soum is located in the eastern part of Arkhangai Province, in a low-elevation transitional zone toward the Orkhon-Selenge basin. Geologically, it belongs to the boundary area between the eastern foothills of the Khangai Mountain range and the Orkhon-Selenge river basin.The bedrock of the soum consists mainly of Devonian-Carboniferous sedimentary and volcanogenic rocks, including sandstone, shale, tuff, and andesite. Jurassic lacustrine deposits such as clay shale and sandstone are also present in the area. Intrusive igneous bodies, including granite and granodiorite, are locally distributed.During the Quaternary

period, large amounts of alluvial and proluvial deposits such as gravel, sand, and clay accumulated in river valleys and depressions.In terms of mineral resources, construction raw materials are predominant, and small-scale placer gold occurrences have been identified within river alluvial deposits.

**Geology of Burd soum, Uvurkhangai province**

Burd soum is located in the northwestern part of the Central Khalkh uplift in Mongolia. Geologically, it belongs to a zone where Paleozoic sedimentary and igneous rocks are overlain by Cretaceous and Quaternary deposits. The area is predominantly composed of Devonian, Carboniferous, and Permian sandstone, shale, and limestone formations, with occurrences of volcanic rocks such as andesite and basalt. Quaternary sediments, including sandy, clayey, gravelly, and weathered rock deposits, are widely distributed. In lake depressions, clay and in some cases saline sediments have formed. Organic-rich lacustrine deposits are commonly found around small lakes and springs. In terms of mineral resources, deposits of sand, gravel, construction stone, limestone, and clay are widespread. Occurrences of fluorspar, iron, and copper have also been identified, however, they are of relatively low economic significance.

**Geology of Yesunzuil soum, Uvurkhangai province**

Yesunzuil soum is located in the southeastern part of Uvurkhangai Province, in the transitional zone between the steppe and Gobi regions. Geologically, it belongs to an area where Paleozoic sedimentary and volcanic rocks are overlain by thick Cretaceous and Quaternary deposits. The bedrock consists mainly of Devonian, Carboniferous, and Permian sandstone, shale, and limestone formations, along with volcanic rocks such as andesite and basalt. During the Cretaceous and Quaternary periods, extensive deposits of sandy, clayey, gravelly, and sandstone materials accumulated, resulting in widely distributed sandy soils characteristic of Gobi environments. In terms of mineral resources, construction raw materials are predominant, and occurrences of fluorspar and copper have been recorded in some areas.

## 2.6. SURFACE AND GROUNDWATER

### 2.6.1. Surface water

The highway alignment lies within the Arctic Ocean basin and the Tuul River basin. Due to low precipitation and high evaporation in the region, surface water flow is generally weak, and rivers and streams are mostly seasonal with significant temporal variability. The project corridor passes through the southwestern steppe area of the Tuul River basin and intersects the Tarnai River.

In Undurshireet and Erdenesant soums of Tuv Province, small intermittent and ephemeral streams are dominant, along with numerous springs of medium and low discharge. There are no permanent lakes, and temporary surface water accumulations formed after rainfall are common.

In Rashaant soum of Bulgan Province, small perennial streams fed by highland sources and relatively high-discharge springs are distributed. In Khashaat soum of Arkhangai Province, seasonally flowing rivers and stable medium-discharge springs are prevalent. In Burd soum of Uvurkhangai Province, large permanent rivers are rare, and the main surface water resources include the Khuisiin Naiman Nuur lake system, other small lakes, springs, and ponds.

### Surface water survey along the road corridor

As part of the study, one water sample was collected from the Tarnai River in September 2025 and analyzed in an accredited laboratory in accordance with MNS 5667-6:2001. During the field survey, one unnamed river was observed to have dried up, the flow of the Tarnai River had decreased, while the Bad River was flowing normally, which is considered to be influenced by the dry summer conditions of that year. According to the laboratory results, all analyzed parameters were within the permissible limits of MNS 0900:2018, indicating that the water quality of the Tarnai River meets the required standards.

***Table 16. Chemical analysis results of Tarnai River water***

| No. | Test Parameters (Unit) | Test Method | Requirement (MNS 9020:2018) | Test Result |
|---|---|---|---|---|
| 1 | pH | MNS ISO 10523:2001 | 6.5-8.5 | 7.54 |
| 2 | Total hardness (mg-eq/L) | MNS ISO 6059:2005 | 7.0 | 4.78 |
| 3 | Calcium (mg/L) | MNS 1097:2023 | 100.0 | 72.1 |
| 4 | Magnesium (mg/L) | MNS 1097:2023 | 30.0 | 14.3 |
| 5 | Chloride (mg/L) | MNS ISO 9297:2005 | 350 | 83.4 |
| 6 | Hydrocarbonate (mg/L) | MNS 6831:2020 | - | 170.8 |
| 7 | Permanganate oxidation (mgO/L) | MNS 6833:2020 | 5-15 | 1.1 |
| 8 | Electrical conductivity (mS/cm) | MNS ISO 7888:1999 | 1.0 | 0.513 |
| 9 | Dry residue (mg/L) | MNS 4423:1997 | 1000 | 93.0 |
| 10 | Nitrite (mg/L) | MNS 6779:2019 | 1.0 | 0.00 |
| 11 | Nitrate (mg/L) | MNS ISO 7890-3:2005 | 50.0 | 0.03 |
| 12 | Iron (mg/L) | MNS 4430:2005 | 0.3 | 0.04 |
| 13 | Ammonium (mg/L) | MNS 4428:1997 | 1.5 | 0.03 |

## 2.7. SOIL COVER

### 2.7.1. Field study

Soil field surveys were conducted along the highway alignment from August 29 to September 3, 2025, using a pre-planned route. In order to identify the dominant soil types, a total of six complete soil profiles were excavated, and samples were collected from each soil horizon for laboratory analysis. Soil morphological descriptions were carried out under field conditions, and the samples were properly packaged in accordance with relevant standards. The samples were then analyzed at the accredited laboratory of “Green Lab” LLC to determine their chemical and physical properties as well as heavy metal concentrations.

***Table 17. Information on soil survey sampling points***

| Points | Longitude | Latitude |
|---|---|---|
| 1 | 104°55′48″ | 47°39′35″ |
| 2 | 104°21′29″ | 47°20′46″, |
| 3 | 104°2′9″ | 47°21′52″ |
| 4 | 103°45′16″ | 47°20'56" |
| 5 | 104°11'7" | 47°21'19" |
| 6 | 103°32'13" | 46°55'52" |

In September 2025, six soil profiles were excavated at distances of 50-200 m from the main axis of the project road. Soil samples were collected from each profile and analyzed at an accredited laboratory. The results of the sampling indicate that no heavy metal contamination was detected.

*Table 18. Soil profile-1*

| Soil profile: Section 1 | Project: Road rehabilitation |
|---|---|
| **Soil type**: Brown soil | |
| **Location**: Unndurshireet soum, Tuv province |  |
| **Coordinates:** N 47°39′35″, E 104°55′48″ | |
| **Elevation a.s.l /m/:** 1152 m | |
| **Land use**: Pasture | |
| **General site characteristics:** Gentle mountain foothills and relatively flat valley terrain with grass-covered steppe vegetation. | |
| **Stoniness:** 5-10% (moderate) | |
| **Vegetation cover:** 35-40%, dominated by Artemisia frigida and Anabasis elatior | |
| **Disturbance factor:** Livestock grazing and dust from nearby roads | |
| **Soil erosion**: Slight wind erosion and minor water erosion observed | |
| **Soil photograph:** | **0-15 cm ($A_0$-$A_1$ horizon):** Brown in color, with a loose granular structure and low density. Abundant plant roots are present, and the layer is moderately rich in organic matter. **15-30 cm ($B_1$ horizon):** Brown in color with a more compact granular structure. Hardness is slightly increased, and root density is reduced. |
|  | **Soil contamination**: No visible contamination or evidence of overgrazing degradation was observed. |
| | **Landscape:** Low mountain foothills and hills within the steppe zone. |
| | **Parent material soil:** Formed from sandstone and weathered sedimentary deposits. |

*Table 19. Soil profile-2*

| Soil profile: Section 2 | Project: Road rehabilitation |
|---|---|
| **Soil type**: Brwn soil | |
| **Location**: Erdenesant soum, Tuv province |  |
| **Coordinate:** 47°20'46" 104°21'29" | |
| **Elevation a.s.l /m/:** 1150 m | |
| **Land use**: Pasture | |
| **General site characteristics:** Steppe zone flat terrain with sparse vegetation and a slightly light-colored soil surface. | |
| **Stoniness:** 0-5% (low stoniness) | |
| **Vegetation cover:** 20-25%, dominated by Salsola passerina, Artemisia species, and shrub vegetation (Caragana microphylla) | |
| **Disturbance factors:** Livestock grazing and wind erosion | |
| **Soil erosion:** Noticeable wind erosion resulting in a loose, fine-textured soil surface | |
| **Soil photograph:** | **0-12 cm ($A_0$-$A_1$ horizon):** |

| Soil profile: Section 2 | Project: Road rehabilitation |
|---|---|
|  | Light brown in color, with a loose granular structure and sandy loam texture. Low density, slight presence of plant roots, and low organic matter content.<br>**12-28 cm ($B_1$ horizon):**<br>Brown in color with a more compact granular structure. Sandy loam texture with slightly increased hardness, very few roots, and very low organic matter content. |
| | **Soil contamination**: No visible contamination or signs of soil compaction/degradation were observed. |
| | **Landscape**: Flat steppe terrain with characteristics of dry steppe |
| | **Parent material:** Formed from sandy loam and weathered sedimentary deposits. |

***Table 20. Soil profile-3***

| Soil profile: Section-3 | Project: Road rehabilitation |
|---|---|
| **Soil type**: Brown soil | |
| **Location**: Erdenesant soum, Tuv province |  |
| **Coordinates:** N 47°21′52″, E 104°2′9″ | |
| **Elevation a.s.l /m/:** 1315.5 m | |
| **Land use**: Pasture | |
| **General site characteristics:** Slightly undulating plain with steppe grassland vegetation and relatively dry soil conditions. | |
| **Stoniness:** 5-7% (moderate stoniness) | |
| **Vegetation cover:** 25-30%, dominated by Anabasis elatior and shrub species (Caragana microphylla) | |
| **Disturbance factors:** Livestock trampling and dust from nearby roads | |
| **Soil erosion**: Moderate wind erosion observed, with loose surface soil structure in the upper layer. | |
| **Soil photograph:** | **0-14 cm ($A_0$-$A_1$ horizon):**<br>Brown in color, with a loose granular structure and sandy loam texture. Low density, abundant plant roots, and moderate organic matter content.<br>**14-30 cm ($B_1$ horizon):**<br>Brown in color with a more compact granular structure. Loam-dominant texture with slight compaction, reduced root presence, and low organic matter content. |
|  | **Soil contamination**: No visible contamination or signs of soil compaction/degradation were observed. |
| | **Landscape**: Dry steppe area located at the foothills of low mountains. |
| | **Parent material:** Formed from sandstone and weathered sedimentary deposits. |

*Table 21. Soil profile-4*

| Soil profile: Section-4 | Project: Road rehabilitation |
|---|---|
| **Soil type**: Brown soil | |
| **Location**: Erdenesant soum, Tuv province |  |
| **Coordinate:** N 47°21′52″, E 104°2′9″ | |
| **Elevation a.s.l /m/:** 1315.5 m | |
| **Land use**: Pasture | |
| **General site characteristics:** Slightly undulating plain with steppe grassland vegetation and relatively dry soil conditions. | |
| **Stoniness:** 5-7% (moderate stoniness) | |
| **Vegetation cover:** 25-30%, dominated by Anabasis elatior, Stipa spp., and shrub vegetation (Caragana microphylla) | |
| **Disturbance factors:** Livestock trampling and dust from nearby roads | |
| **Soil erosion**: Moderate wind erosion observed, with loose surface soil structure in the upper horizon | |
| **Soil photograph:** | **0-14 cm ($A_0$-$A_1$ horizon):** Brown in color, with a loose granular structure and sandy loam texture. Low density, abundant plant roots, and moderate organic matter content. **14-30 cm ($B_1$ horizon):** Brown in color with a more compact granular structure. Loam-dominant texture, slight compaction, reduced root presence, and low organic matter content |
|   | **Soil contamination**: No visible contamination or signs of soil compaction or degradation were observed. |
| | **Landscape**: Dry steppe area located at the foothills of low mountains. |
| | Parent material: Formed from sandstone and weathered sedimentary deposits. |

*Table 22. Soil profile-5*

| Soil profile: Section-5 | Project: Road rehabilitation |
|---|---|
| **Soil type**: Brown soil | |
| **Location**: Erdenesant soum, Tuv province |  |
| **Coordinates:** N 47°16′42″, E 103°36′49″ | |
| **Elevation a.s.l /m/:** 1315.5 m | |
| **Land use**: Pasture | |
| **General site characteristics:** Slightly undulating plain with steppe grassland vegetation and relatively dry soil conditions. | |
| **Stoniness:** 5-7% (moderate stoniness) | |
| **Vegetation cover:** 25-30%, dominated by Anabasis elatior, Stipa spp., and shrub species (Caragana microphylla) | |
| **Disturbance factors:** Livestock trampling and dust from nearby roads | |
| **Soil erosion**: Moderate wind erosion observed, with loose surface soil structure in the upper horizon | |
| **Soil photograph:** | **0-14 cm ($A_0$-$A_1$ horizon):** Brown in color, with a loose granular structure and sandy loam texture. Low density, abundant plant roots, and moderate organic matter content. **14-30 cm ($B_1$ horizon):** Brown in color with a more compact granular structure. |

| Soil profile: Section-5 | Project: Road rehabilitation |
|---|---|
|  | Clay loam-dominant texture, slightly compacted, reduced root presence, and low organic matter content.<br>**Soil contamibation**: No visible contamination or signs of soil compaction or degradation were observed.<br>**Landscape**: Dry steppe area located at the foothills of low mountains.<br>**Parent material:** Formed from sandstone and weathered sedimentary deposits. |

***Table 23. Soil profile-6***

| Soil profile: Profile-6 | Project: Road rehabilitation |
|---|---|
| **Soil type**: Brown soil | |
| **Location**: Erdenesant soum, Tuv province |  |
| **Coordinates:** N 47°21′52″, E 103°32′13″ | |
| **Elevation a.s.l /m/:** 1315.5 m | |
| **Land use**: Pasture | |
| **General site characteristics:** Slightly undulating plain with steppe grassland vegetation and relatively dry soil conditions. | |
| **Stoniness:** 5-7% (moderate stoniness) | |
| **Vegetation cover:** 25-30%, dominated by Anabasis elatior, Stipa krylovii L., and shrub vegetation (Caragana microphylla) | |
| **Disturbance factor: Livestock trampling and dust from nearby roads** | |
| **Soil erosion:**<br>Moderate wind erosion observed, with loose surface soil structure in the upper horizon | |
| **Soil photograph:** | **0-14 cm ($A_0$-$A_1$ horizon):**<br>Brown in color, with a loose granular structure and sandy loam texture. Low density, abundant plant roots, and moderate organic matter content.<br>**14-30 cm ($B_1$ horizon):**<br>Brown in color with a more compact granular structure. Loam-dominant texture, slightly compacted, reduced root presence, and low organic matter content. |
|  | **Soil contamination:** No visible contamination or signs of soil compaction or degradation were observed. |
| | **Landscape**: Dry steppe area located at the foothills of low mountains. |
| | **Parent material:** Formed from sandstone and weathered sedimentary deposits. |

In addition, based on the results of six soil samples collected from within 50-200 m of the project area in September 2025, no heavy metal contamination was detected in the study area.

### 2.7.2. Survey results

According to the survey results, the dominant soil types distributed along the highway alignment include mountain dark brown soils, mountain brown soils, dark brown soils, meadow brown soils, and light brown soils. These correspond to typical soil classifications such as ordinary dark brown soils, ordinary brown soils, meadow-marsh soils, meadow saline soils, mountain ordinary dark brown soils, mountain ordinary black soils, fixed sandy soils, and residual meadow dark brown and meadow saline soils.

In general, these soils are characterized by moderate fertility and a mechanical composition predominantly consisting of loamy and sandy loam textures.

**Morphological characteristics of surface and soil horizons of dominant soils**

**Mountain dark brown soil:** Mountain dark brown soils are distributed on mountain foothills and lower slopes over eluvial-deluvial deposits. The humus horizon is approximately 20-25 cm thick, with a humus content of around 3-4%. The soil reaction is close to neutral, and the mechanical composition is light loam. These soils are relatively fertile and can be used for year round pasture as well as hay production and limited cultivation.

**Mountain brown soil:** Mountain brown soils are formed on eluvial deposits of low and small mountains and are characterized by a stony composition, with relatively thin soil horizons. The humus horizon is on average about 14 cm thick, with a humus content of 2-3%. The mechanical composition is light loam to sandy loam. Natural fertility is moderate, and vegetation cover reaches 30-50%, making these soils suitable for use as pastureland.

**Meadow brown soil:** Meadow brown soils are formed in valleys between mountains and in low-lying depressions. Due to the influence of spring meltwater and summer rainfall, salts and nutrients tend to accumulate in these soils. They exhibit meadow and semi-hydromorphic characteristics and are sensitive to moisture conditions. However, it considers as good vegetation productivity and are considered high-quality pastureland in terms of agricultural use.

**Dark brown soil:** Dark brown soils are distributed in wide intermontane valleys under conditions of moderately developed vegetation cover. The humus horizon is approximately 15-20 cm thick, with a light loamy and stony mechanical composition. Natural fertility is moderate, and the soil is primarily used for pasture purposes.

**Saline light brown soil:** Saline light brown soils develop in depressions and uneven terrain where conditions favor the accumulation of salts and soluble compounds. These soils are characterized by low humus content and a weakly alkaline reaction. Their moisture regime is highly variable and dependent on precipitation. Agricultural use is limited, and they are mainly utilized as rangeland.

**Stony loam light brown soil:** Typical stony light brown soils are distributed in intermontane valleys within steppe-desert transition zones. They have a stony and sandy loam texture, with a thin humus horizon (generally less than 20 cm) and low humus content of approximately 1%. The soil reaction is weakly alkaline. Due to low fertility, these soils are not suitable for crop production and are primarily used for livestock grazing.

### 2.7.3. Soil analysis results

Soil fertility and chemical properties: The main indicators used to assess soil fertility include humus, available phosphorus, and potassium, while chemical characteristics are defined by pH, carbonate content, and electrical conductivity (EC). The results show that soil pH ranges from 7.8 to 8.9, indicating neutral to strongly alkaline conditions. Carbonate content ranges from 0 to 1.98%, indicating weak carbonation. Humus content varies between 0 and 2.1%, with higher values observed in the upper soil horizons. Electrical conductivity (EC) is very low, ranging from 0.03 to 0.08 dS/m.

Soil mechanical composition: The soils are predominantly characterized by fine sand-dominated loamy textures. The upper horizons are relatively uniform and fine-grained, while the lower horizons show an increase in sandy fractions. Water-holding capacity is moderate, with a relatively high proportion of fine sand and silt particles.

Heavy metals: All six soil samples analyzed showed heavy metal concentrations below the permissible limits defined by MNS 5850:2019. No evidence of heavy metal contamination was detected within the study area soils.

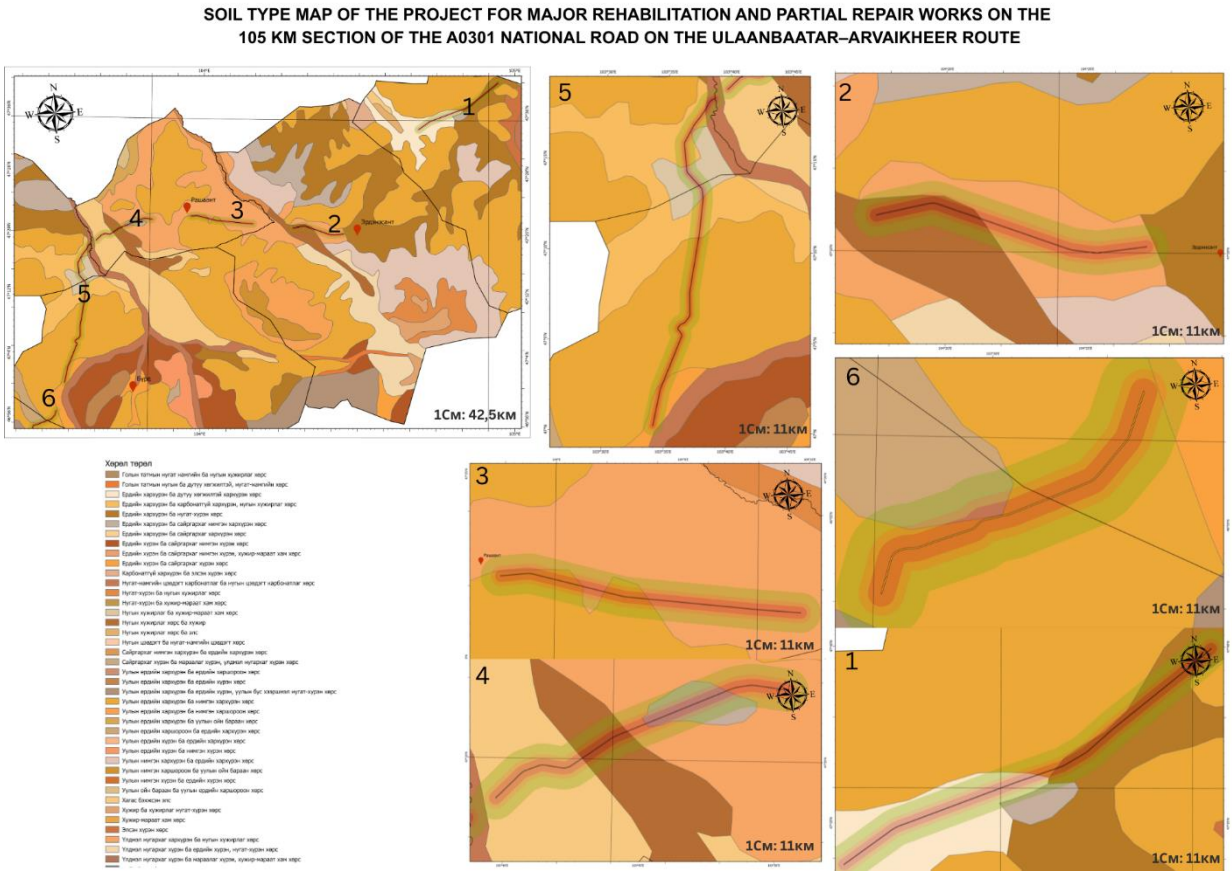



***Figure 8.Figure 9Soil Type Map of the Project Area and Surroundings***

### 2.8. VEGETATION COVER

This section of the “Ulaanbaatar-Arvaikheer” A0302 road alignment falls within the Khangaï Mountain Steppe phytogeographical region. The following vegetation communities have been identified in the study area.

***Table 24. Vegetation species identified in the study area***

| Life form | Representative species | Ecological and biological function |
|---|---|---|
| Perennial grasses | *Stipa krylovii*, *Koeleria cristata*, *Leymus chinensis*, *Cleistogenes squarrosa*, *Poa pratensis* | Dominant component of vegetation cover, primary contributor to pasture yield, soil stabilization |
| Shrubs and subshrubs | *Caragana leucophloea*, *Hippophae rhamnoides*, *Salix* spp. | Soil protection, wind reduction, provision of habitat for wildlife |
| Perennial forbs | *Allium mongolicum*, *Thymus gobicus* | Increase species diversity, medicinal and edible value |
| Annual herbs | *Chenopodium album*, *Salsola collina*, *Bassia dasyphylla*, Brassicaceae spp. | Rapid colonization of disturbed soils, indicators of land degradation |
| Disturbance indicator plants | *Artemisia frigida*, *Artemisia dracunculus*, *Artemisia sieversiana*, *Urtica cannabina* | Indicators of grazing pressure and human disturbance |
| Hygrophytic plants | *Calamagrostis epigeios*, *Poa pratensis* | Found in moist depressions and along water bodies, contribute to stabilization of local wa |

### 2.8.1. Ecological groups

The classification of ecological groups follows the approach of N. Ulziikhutag (1989). Plant species are categorized according to their moisture requirements and habitat conditions into 19 ecological groups, including xerophytic, mesoxerophytic-xerophytic, mesophytic, mesohygrophytic, hygrophytic, peat-bog hygrophytic, xerohygrophytic, aquatic (hydrophytic), cold-tolerant (cryophytic), mesohygro-cryophytic, hygrohygro-cryophytic, xerolithophytic, mesohygro-lithophytic, cryolithophytic, halophytic, mesohygro-halophytic, xerohygro-halophytic, sandy-halophytic, and psammophytic ecological groups.

***Table 25. Ecological groups identified in the study area***

| Ecological group | Representative species | Ecological and biological function |
|---|---|---|
| Grasses (Poaceae) | *Stipa krylovii*, *Koeleria cristata*, *Leymus chinensis*, *Cleistogenes squarrosa*, *Poa pratensis* | Dominant vegetation component, primary source of pasture productivity, soil stabilization |
| Wormwood communities (*Artemisia* spp.) | *Artemisia frigida*, *A. dracunculus*, *A. sieversiana*, *A. adamsii* | Indicators of land degradation, representative of overgrazed pastures |
| Goosefoot and related xerophytic group (Chenopodiaceae, Amaranthaceae) | *Chenopodium album*, *Salsola collina*, *Bassia dasyphylla* | Occur in dry and degraded soils, indicators of land disturbance |
| Shrub vegetation | *Juniperus sabina*, *Caragana leucophloea*, *Hippophae rhamnoides*, *Salix* spp. | Found in river valleys, gullies, and rocky areas, soil protection and wildlife habitat formation |
| Forbs (perennial herbs) | *Allium mongolicum*, *Thymus gobicus*, *Glycyrrhiza uralensis* | Increase biodiversity, medicinal and nutritional value |
| Disturbance indicator plants | Brassicaceae spp., *Urtica cannabina* | Indicators of human activity, livestock pressure, and nutrient changes in soil |

### 2.8.2. Vegetation cover characteristics

The survey indicates that the study area is predominantly represented by a steppe vegetation community, specifically a Stipa-forb assemblage, which is a key indicator of the ecological conditions and rangeland carrying capacity of the region. Within the community, Stipa krylovii and Leymus chinensis are dominant species, jointly accounting for more than half of the total vegetation cover. Indicator species of land degradation, such as Artemisia spp. and Salsola spp., comprise up to 15% of the cover, indicating grazing pressure and soil aridity.

The proportion of bare ground is relatively high (25-30%), which reflects soil degradation and moisture deficiency in the area. Aboveground biomass yield is slightly reduced, estimated at 3.5-4.0 c/ha, which corresponds to the average productivity level of dry steppe ecosystems.

**Dominant species:** Stipa krylovii , Leymus chinensis and Koeleria cristata form the main structure of the steppe vegetation community, representing the core characteristic of the regional grassland ecosystem.

**Sub-dominant species:** Cleistogenes squarrosa, Poa pratensis, Carex spp., Agropyron cristatum, and Thymus gobicus contribute to increased species diversity and ecological stability of the grassland system.

**Disturbance indicator species:** Artemisia frigida, Chenopodium album, Salsola collina, and other weedy species reflect grazing pressure, land degradation, and soil disturbance intensity.

**Shrub layer species:** uniperus sabina, Hippophae rhamnoides (sea buckthorn), and Salix spp. occur sporadically in rocky slopes and moist microhabitats, particularly near road corridors.

**LC (Least Concern):** Widely distributed species not currently requiring conservation measures.

**NT (Near Threatened):** Species that may become threatened without proper management and therefore require monitoring (e.g., Allium mongolicum, Thymus gobicus, Glycyrrhiza uralensis).

In cases where discrepancies exist between IUCN and the Mongolian Red List classifications, the Mongolian national classification is prioritized for assessment purposes

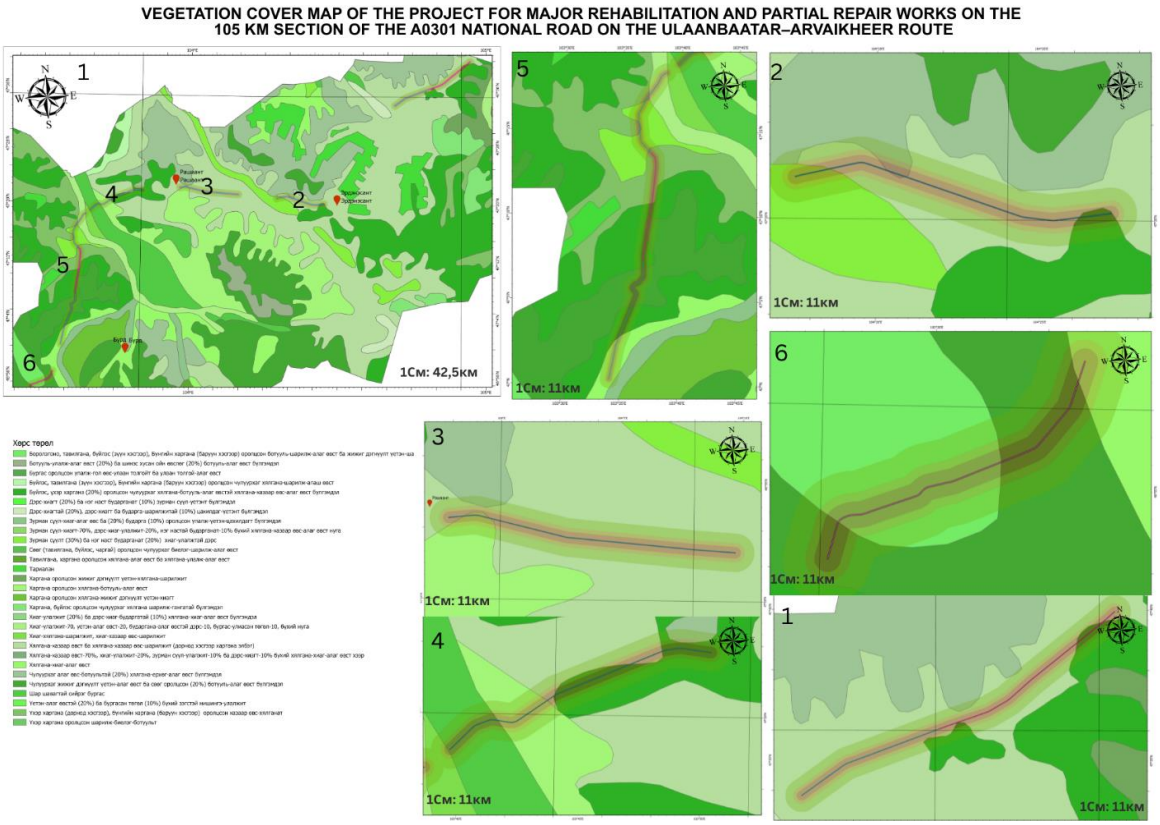



*Figure 10. Vegetation cover map of the project area and its surrounbdings*

## 2.9. FAUNA

Field surveys conducted along the highway corridor in 2025 assessed the distribution of local fauna and habitat conditions within the project's area of influence. Observations recorded several common avian species, including cranes (Grus spp.), ducks (Anas spp.), gulls (Larus spp.), and sparrows (Passer spp.). Raptors and small mammals such as hedgehogs were also observed. Insect communities were dominated by orthopteran species (grasshoppers), while active burrows of the Mongolian gerbil (Meriones unguiculatus) were frequently identified within suitable habitats. These findings indicate that the project area supports moderate but spatially dispersed biodiversity characteristic of steppe ecosystems.

No large migratory or wide-ranging mammal species were identified within the road corridor during the 2025 field survey. Furthermore, species of elevated conservation concern, including IUCN-listed rare and threatened taxa referenced in previous assessments, were not recorded during the 2025 field investigations within the direct project footprint or immediate corridor. References to these species are based on historical data and previously conducted regional biodiversity assessments rather than current field observations within the project area.

Supplementary information obtained through structured interviews with construction personnel and drivers further confirmed that, since 1 August, no additional wildlife species beyond those recorded during the field surveys have been encountered during routine travel along the corridor. This supports the conclusion that wildlife abundance and encounter frequency within the immediate road corridor remain relatively low.

According to previously conducted wildlife assessments and available historical records, species of high conservation concern are primarily associated with protected areas such as the Khugnu Khan Nature Reserve, rather than the direct footprint of the project alignment. Consequently, the highway corridor is not expected to significantly fragment critical habitats or disrupt major wildlife migration routes.

Nevertheless, it is recognized that ongoing and planned anthropogenic activities, particularly construction operations, traffic movement, and tourism-related activities, may exert localized and indirect effects on wildlife behavior and movement patterns. These impacts are considered to be of low to moderate significance and are expected to be manageable through the implementation of appropriate mitigation and environmental management measures.

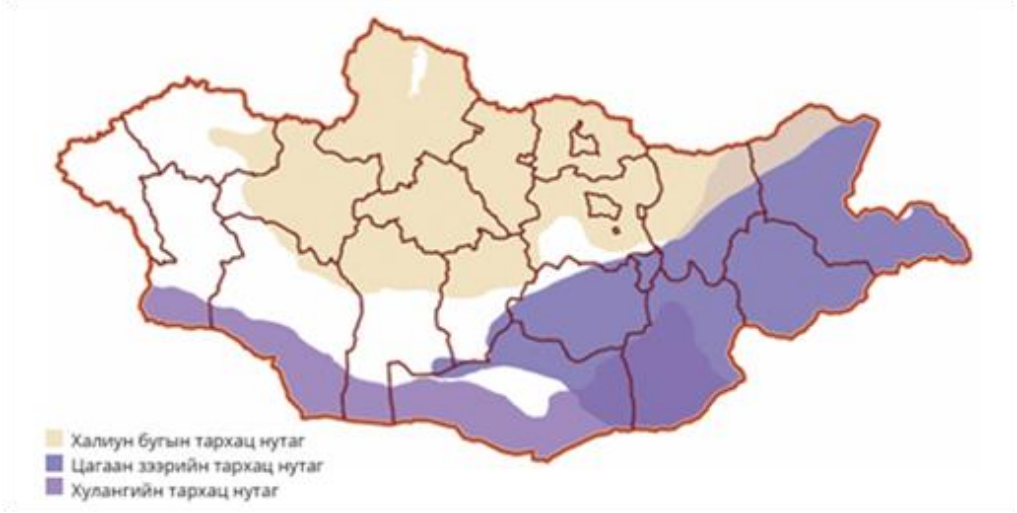



***Figure 11. Distribution map of Mongolian gazelle and red deer***

No large migratory or wide-ranging mammal species were identified within the ROAD corridor during the field survey.

***Table 26. Fauna recorded in the study area and associated risk***

| Group | Mongolian name | Latin name | Status* | Main habitat | Main road-related risks |
|---|---|---|---|---|---|
| Mammals | Чоно | *Canis lupus* | LC | Hills, steppe | Vehicle collision during nocturnal movement |
| | Улаан үнэг | *Vulpes vulpes* | LC | Steppe, peri-settlement areas | Roadkill in low-crossing zones |
| | Хэрэм дорго (дааган дорго) | *Urocitellus undulatus* | LC | Steppe, dry grasslands | Habitat fragmentation due to road embankment |
| | Тарвага | *Marmota sibirica* | EN (MN Red List) | Rocky steppe slopes | Illegal hunting pressure |
| | Туулай | *Lepus tolai* | LC | Open steppe | Vehicle collision during night movement |
| | Сүүлт суусар | *Mustela eversmanii* | NT | Rodent-rich steppe | Roadkill risk |
| | Хүчтэн бор барс (мануул) | *Otocolobus manul* | NT (IUCN) | Rocky steppe | Vehicle collision along corridor |
| | Хярс | *Vulpes corsac* | LC | Dry steppe | Night-time road mortality |
| | Буга | *Cervus elaphus* | LC (MN Red List) | Forest-steppe, valleys | Road crossing collisions, attraction to lighting |
| | Гөрөөс | *Capreolus pygargus* | LC | River valleys, shrublands | Barrier effects from fencing, movement obstruction |
| Birds | Хонин тоодог (great bustard) | *Otis tarda* | EN | Open steppe | Collision risk, nesting habitat disturbance |
| | Нөмрөг тас | *Aegypius monachus* | NT | Hills, cliffs | Powerline collision, attraction to carrion |
| | Хээрийн бүргэд | *Aquila nipalensis* | EN (IUCN) | Steppe hills | Powerline collision, scavenging risk |
| | Хээрийн тогоруу | *Anthropoides virgo* | LC | Wet steppe, agricultural edges | Collision during migration with chicks |
| | Идлэг шонхор | *Falco cherrug* | EN | Steppe | Powerline collision, illegal capture risk |
| | Өвөгт тогоруу | *Anthropoides virgo* | LC | Steppe | |

*LC - least concern, NT - near threatened, EN - endangered ( based on IUCN/MN Mongolian Red list classification).

## 2.10. PROTECTED AREAS AND ECOLOGICALLY SENSITIVE RECEPTORS

The subproject area of influence includes protected areas and other ecologically sensitive receptors that require specific consideration in the environmental baseline assessment and the subsequent environmental and social management framework. In particular, the project road corridor is associated with the buffer zone of the Khugnu-Tarna Nature Complex Protected Area.

*Road Sections 5 and 6, which are subject to periodic maintenance, pass through the Khugnu-Tarna Nature Complex Protected Area. In addition, the Batkhaan Mountain Nature Reserve is located approximately 8,742.65 m from Road Section 4.*

These protected areas and sensitive receptors constitute important environmental features that shall be taken into account in the assessment of potential impacts and in the development of appropriate mitigation and management measures for the subproject.

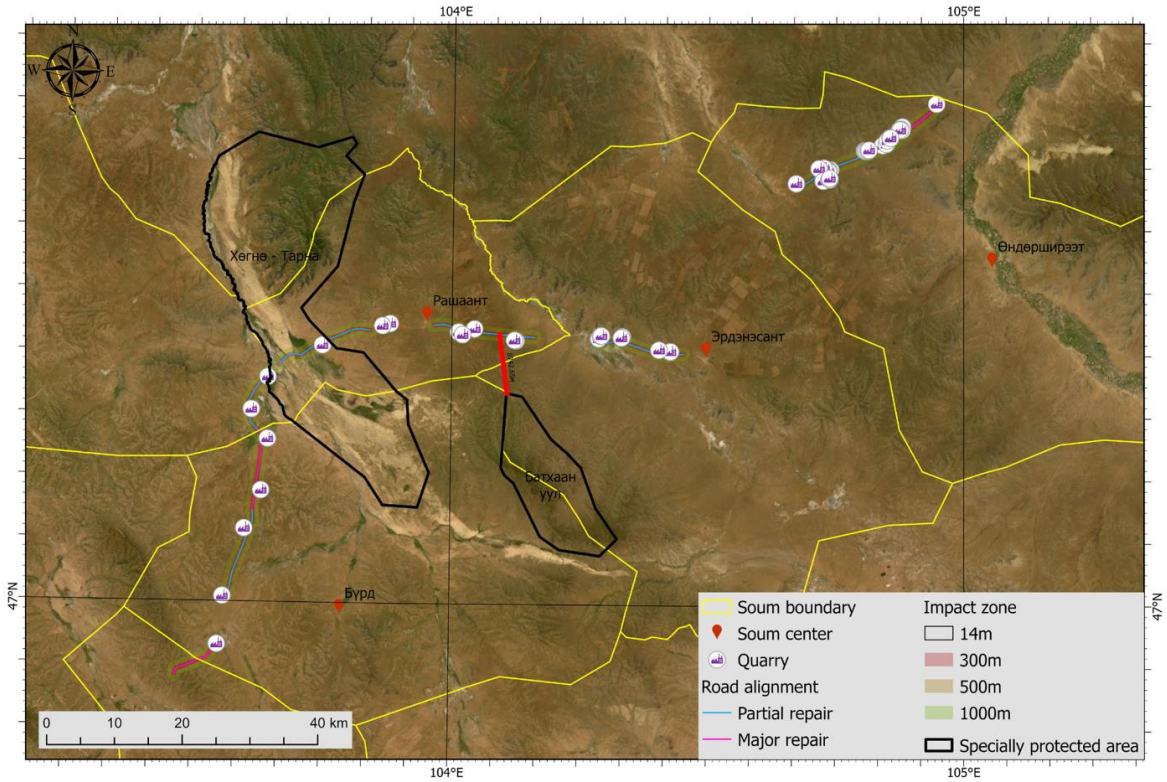



***Figure 12. Relative location of the project road and its proximity to the Khugnu-Tarna Nature Complex Protected Area and the Batkhaan Mountain Nature Reserve***

### 2.10.1. Khugnu-Tarna National Protected Area

The Khugnu-Tarna National protected area was stablished in 1997 and later expanded in 2003. The protected area was designated to conserve the unique ecological transition zone where mountain, forest-steppe, steppe, river basin, and sand dune ecosystems occur in close association. The expansion reflected increasing environmental pressure from human activity, livestock grazing, vegetation degradation, and habitat disturbance, while also recognizing the ecological and tourism significance of the Tarna River basin, the Mongol Els sand dunes, and the Ikh and Baga Mongol mountain ranges. Accordingly, the protected area is of significance not only for biodiversity conservation, but also for landscape integrity, ecosystem services, and the sustainable management of nature-based tourism.

The project road alignment passes though buffer zone of Khugnu Tarna National par. Based on the current baseline information, within the total ten road sections, Section 3 overlaps approximately 8.26 km and Section 4 overlaps approximately 0.13 km within the buffer zone of the protected are

### 2.10.2. Batkhaan Mountain Nature Reserve

The Batkhaan Mountain Nature Reserve is a state-protected as classified a nature reserve and was established in 1957 and located in Burd soum of Uvurkhangai Province and far from the subproject road alighnment. Therefore, this protected area is not in subproject area of influence (AoI) and no potential impact associated with this protected area.

## 2.11. SOCIO-ECONOMIC BASELINE

The project road alignment passes through the territories of Undershireet and Erdenesant soums of Tuv Province, Rashaant soum of Bulgan Province, Khashaat soum of Arkhangai Province, and Burd and Yesunzuil soums of Uvurkhangai Province. A total of seven baghs were identified as the primary units affected by the project, and the study was focused on these bags.

In the study, a corridor 500 meters wide on each side of the road centerline, totaling 1 km, was defined as the zone of direct impact from construction activities. In addition, an extended impact zone (indirect impact) was included in the study, taking into account the seasonal migration patterns of herder households and the specific characteristics of pasture use.

The study was conducted using a mixed methodology (qualitative and quantitative), employing the following main methods:

- **Secondary survey:** Analyzed official information from the national and provincial statistical offices, websites, and relevant studies and research conducted in the project area.
- **Business survey:** Conducted surveys covering 42 households out of a total of 395 registered households residing in the project impact area.
- **Business survey:** Included 36 business entities and household-based entrepreneurs operating in the project impact area at the time of data collection.
- **Consultative meetings / focus group discussions:** Meetings were held with representatives of local soum and bagh administrations, as well as public service organizations.
- **Key informant interviews:** Conducted individual interviews with local authorities, bagh governors, herders, and other relevant stakeholders.

In order to determine the socio-economic conditions of households in the local and project impact areas, the social impact assessment team conducted field research and stakeholder consultation activities during the following periods:

- From August 29 to September 3, 2025
- On March 19-20, 2026

The study included households, residents living in the project impact area, operating business entities, and relevant officials from soum and bagh administrations. Information-sharing, consultation, and participation activities were implemented in a phased manner. The main objectives of these surveys and consultation activities were:

- To identify the socio-economic characteristics and vulnerabilities of residents and business entities in the project area and impact zone
- To identify potential social risks and vulnerabilities that may arise during all phases of project implementation
- To assess potential impacts on livelihoods based on livestock husbandry, including pasture use, access to water sources, and livestock migration
- To identify local residents' information needs, key issues, and feedback
- To establish conditions for implementing stakeholder engagement plans and grievance redress mechanisms at the field level
- To collect baseline information to be used where compensation or damage assessment may be required

- To identify vulnerable groups (such as the elderly, low-income households, and female-headed households) and assess the potential impacts on them

The quantitative and qualitative data collected during the study were comparatively analyzed and used to determine the baseline socio-economic conditions. In addition, stakeholder feedback, questions, and perceptions of risks were consolidated and incorporated into the social impact assessment and risk mitigation measures.

The feedback and issues raised during the consultative meetings and surveys are summarized in Section 7.1.1 of this report. Meanwhile, the number of surveyed households and participants, survey questionnaires, meeting minutes, consolidated feedback, and participant records have been processed in accordance with personal data confidentiality principles and included in the report annexes.

## 2.12. STUDY LIMITATIONS

Due to the relatively small sample size of survey participants (2.95% of the total 1,423 households across seven bags, and 10.6% of the 395 households within the 2 km-wide study corridor), and considering the seasonal migration patterns of herders, it is possible that not all target groups were fully represented. Therefore, it is recommended that additional clarification and expanded engagement with target groups be conducted during the pre-construction phase.

## 2.13. POPULATION AND HOUSEHOLD STRUCTURE

The Ulaanbaatar-Arvaikheer road rehabilitation works consist of 10 sections in total, covering 105 km of major and routine maintenance. The road alignment passes through Uyanga bag of Undershireet soum, Bayan-Uul bag of Erdenesant soum, Argalkhairkhan and Khugnu Khaan bags of Rashaant soum, Jargalant bag of Khashaat soum, Ikh Borigdoi bag of Burd soum, and Ereen bag of Yesunzuil soum. The following table presents the total population of the seven project-affected bags, disaggregated by age and gender.

***Table 27. Population (by bag level)***

| Soum | Bag | 2022 | 2023 | 2024 |
|---|---|---|---|---|
| **Undurshireet** | Uyanga | 495 | 479 | 466 |
| **Erdenesant** | Bayan-Uul | 691 | 690 | 702 |
| **Rashaant** | Argal khairkhan | 720 | 688 | 653 |
| **Rashaant** | Khugnu-khan | 892 | 907 | 917 |
| **Khashaat** | Nomgon | 589 | 566 | 559 |
| **Burd** | Ikh Borigdoi | 679 | 666 | 640 |
| **Yesunzuil** | Ereen | 658 | 611 | 623 |
| Total population | | **4724** | **4607** | **4560** |
| **Population growth** | | - | -2.5% | -1.0% |
| **Gender** | Male | 2402 | 2358 | 2341 |
| | Female | 2322 | 2249 | 2219 |
| | Gender ratio | 103.4% | 104.8% | 105.5% |
| **Age classification** | 0-14 | 31.1% | 30.2% | 29.0% |
| | 15-64 | 63.5% | 64.3% | 65.2% |
| | 65+ | 5.4% | 5.4% | 5.8% |
| **Demographic dependency ratio** | Children | 49% | 47% | 44% |
| | Elderly | 8.5% | 8.5% | 8.9% |
| | Total | 57.4% | 55.4% | 53.3% |

*Source: National Statistics Organization, 2024*

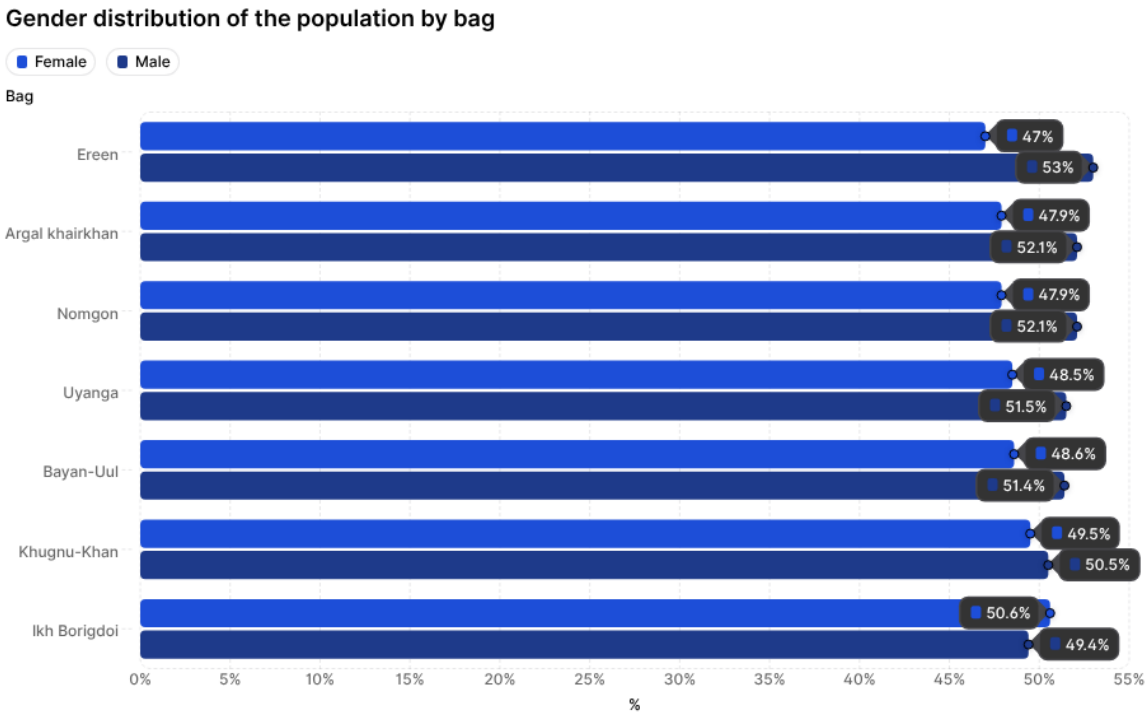
The population of the bags through which the project road alignment passes has shown a declining trend over the past three years. As of the end of 2024, a total of 4,560 people

reside in the area, of whom 51.3% (2,341) are male and 48.7% (2,219) are female. The gender structure indicates a slight increase in the proportion od males over the reference period.

In terms of age structure, children aged 0-14 account for 29% of the population, showing a declining trend in recent years. The working-age population (15-64 years) accounts for 65.2% and has been increasing. The proportion of elderly people aged 65 and above remains relatively stable at 5.4-5.8%. The overall demographic dependency ratio is 53.3%, with child dependency decreasing while elderly dependency remains stable.

Among the seven project-affected bags, the smallest population is in Uyanga bag of Undershireet soum with 162 households, while the largest is in Khugnu-Khan bag of Rashaant soum with 293 households.

Over the past three years, the total population in the impact area has decreased by 1% in Ereen bag of Yesunzuil soum, Bayan-Uul bag of Erdenesant soum, and Kkugnu-Khan bag of Rashaant soum. Meanwhile, population increases of 1-*2% were recorded in some areas, whereas Ikh Borigdoi bag of Burd soum decreased by 4%, Uyanga bag of Undershireet soum by 3%, Nomgon bag of Khashaat soum by 1%, and Argal Khairkhan bag of Rashaant soum by 5%.




***Graph 2. Gender distribution of population by bag, 2024***

In Ereen bag of Yesunzuil soum, the gender distribution shows the greatest disparity, with 47% female and 53% male. In Argalkhairkhan bag of Rashaant soum and Nomgon bag of Khashaat soum, 48% of the total population are female and 52% are male. In Uyangga bag of Undershireet soum and Bayan-Uul bag of Erdenesant soum, females account for 48.5% and males 51.5% of the population.

Khugnu-Khan bag of Rashaant soum shows the most balanced distribution, with 49.5% female and 50.5% male. Only in Ikh Borigdoi bag of Burd soum do females slightly outnumber males, comprising 50.6% of the population compared to 49.4% males.

*Table 28. Population distribution by age group in selected bags of the subproject area (%)*

| Age group | Uyanga | Bayan-Uul | Khugnu-khan | Argal khairkhan | Nomgon | Ikh Borigdoi | Ereen |
|---|---|---|---|---|---|---|---|
| 0-4 | 8.8% | 11.4% | 8.9% | 8.4% | 8.4% | 8.6% | 9.5% |
| 5-9 | 9.0% | 10.4% | 9.2% | 10.0% | 11.3% | 8.3% | 8.7% |
| 10-14 | 11.2% | 9.0% | 10.7% | 9.6% | 11.4% | 10.3% | 10.0% |
| 15-19 | 8.8% | 7.3% | 9.1% | 10.3% | 9.1% | 9.5% | 9.0% |
| 20-24 | 6.7% | 6.1% | 7.3% | 7.0% | 6.3% | 7.5% | 7.7% |
| 25-29 | 3.9% | 8.4% | 7.7% | 7.5% | 6.3% | 7.0% | 6.9% |
| 30-34 | 6.0% | 7.1% | 5.3% | 6.3% | 5.0% | 6.3% | 6.3% |
| 35-39 | 7.3% | 6.0% | 7.2% | 7.0% | 6.1% | 6.4% | 6.3% |
| 40-44 | 10.1% | 5.8% | 7.9% | 7.5% | 8.2% | 7.7% | 6.3% |
| 45-49 | 6.7% | 6.1% | 6.5% | 7.4% | 7.5% | 6.9% | 7.1% |
| 50-54 | 6.7% | 7.1% | 5.8% | 6.7% | 7.2% | 7.3% | 6.6% |
| 55-59 | 3.6% | 5.7% | 5.5% | 5.5% | 4.7% | 4.8% | 5.0% |
| 60-64 | 4.7% | 4.0% | 3.2% | 2.6% | 3.0% | 3.6% | 3.5% |
| 65-69 | 4.1% | 2.6% | 2.3% | 1.4% | 1.6% | 1.6% | 2.1% |
| 70+ | 2.6% | 3.0% | 3.5% | 2.8% | 3.9% | 4.2% | 5.3% |

*Source: National Statistics Organization, 2024*

The age structure of the population in the seven project-affected bags is presented in both table and graph formats. Overall, the 10-14 age group represents the highest proportion across most bags.

Specifically, the 10-14 age group accounts for 11.2% in Uyangga bag of Undershireet soum, 10.7% in Khugnu-Khan bag of Rashaant soum, 11.4% in Nomgon bag of Khashaat soum, 10.3% in Ikh Borigdoi bag of Burd soum, and 10.0% in Ereen bag of Yesunzuil soum. Meanwhile, in Bayan-Uul bag of Erdenesant soum, the 0-4 age group is the highest at 11.4%, and in Argal Khairkhan bag of Rashaant soum, the 15-19 age group is the highest at 10.3%. Overall, the age structure across the bags is relatively similar in pattern, with the 10-14 age group generally being the dominant cohort.

In the extended project impact area, a total of 349 households were identified, and the locations of registered households are presented below.

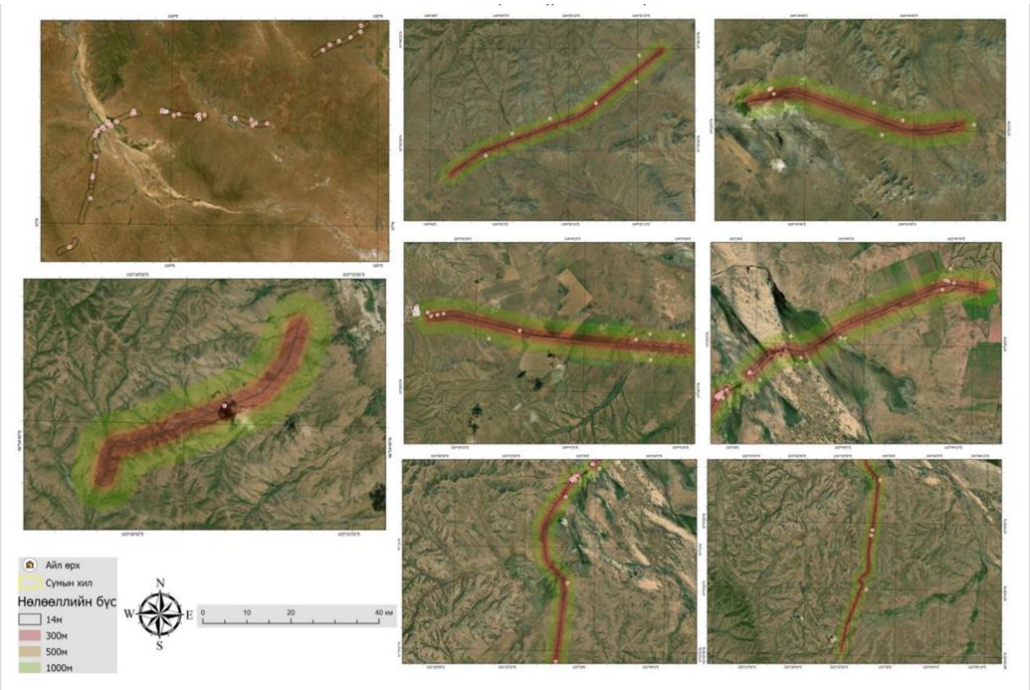



*Figure 13. Locations of registered households near the project area*

### 2.13.1 Ethnicity and Nationality

Based on the ethnic composition of the populations in the provinces within the project impact area, the majority of residents belong to the Khalkh ethnic group. Other ethnic and minority groups account for a small proportion, with Tuv Province showing relatively higher ethnic diversity.

In the household survey conducted within the impact area, all respondents (100%) identified themselves as Khalkh. Regarding religious affiliation, 89.5% of respondents identified as Buddhist, while 10.5% stated that they have no religious belief.

No ethnic minority or indiginous peoples groups, as defined under WB ESS7, were identified within the surveyed project impact area.

***Table 29. Ethnic groups in the population (by province)***

| Ethnicity and Nationality | Provinces | | | |
|---|---|---|---|---|
| | Arkhangai | Bulgan | Uvurkhangai | Tuv |
| Khalkh | 97.1 | 95.1 | 99.6 | 94.2 |
| Durvud | 0.2 | 0.7 | 0.1 | 0.8 |
| Kazakh | - | - | - | 1.1 |
| Bayad | 0.1 | 1.6 | 0.1 | 0.8 |
| Buriad | - | 0.9 | 0 | 0.9 |
| Darkhad | - | 0.5 | - | - |
| Khoton | - | 0.5 | - | - |
| Uriankhai | - | 0.2 | - | 0.5 |
| Zakhchin | - | 0.1 | - | 0.2 |
| Torguud | - | 0.1 | - | |
| Uuld | 2.3 | - | - | 0.2 |
| Tuva | - | - | - | 0.5 |
| Other | 0.3 | 0.3 | 0.2 | 0.8 |
| **Total** | **100** | **100** | **100** | **100** |

### 2.13.2 Marriage and family type

In the soums within the project impact area, marriage registrations have shown a declining trend over the past three years. As of 2024, the following number of marriages were registered: 26 in Burd soum, 21 in Yesunzuil soum, 40 in Rashaant soum, 35 in Khashaat soum, 22 in Undershireet soum, and 36 in Erdenesant soum.

In addition, 7 cases of divorce were recorded in Undershireet soum, and 3 cases of divorce were recorded in Erdenesant soum.

***Table 30. Number of marriages and divorces***

| Soum | Marriages | | | Divorces | | |
|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2024 | 2022 | 2023 | 2024 |
| Burd | 12 | 9 | 5 | 0 | 0 | 0 |
| Yesunzuil | 11 | 6 | 4 | 0 | 0 | 0 |
| Rashaant | 18 | 16 | 6 | 0 | 1 | 0 |
| Khashaat | 13 | 11 | 11 | 0 | 0 | 0 |
| Undurshireet | 9 | 1 | 12 | 1 | 2 | 4 |
| Erdensant | 9 | 14 | 13 | 2 | 1 | 0 |

Among the total households included in the survey, 17 are nuclear families living only as immediate family members, and 2 are female-headed households. Of all surveyed households, 8 households (42%) consist of 1-3 members. Households with 4-6 members account for 9 households (47%), representing the largest share. This is consistent with the average household size in Mongolia (3.8-4.0), indicating that most households are nuclear families. Two households (11%) have 7 or more members.

*Table 31. Household type (Structure)*

| Household type | Number of household | Average household size |
|---|---|---|
| **Nuclear family** | 17 | 4.1 |
| **Single parent household** | 2 | 4 |

*Source: Household survey, 2026*

### 2.13.3 Population migration and movement

#### Births and Deaths

Over the past three years, births in Burd soum have shown a declining trend, with an average of 49 births recorded per year, representing a decrease of approximately 19%. Deaths have averaged 18 cases per year, increasing by about 10%. During this period, the natural population growth has averaged 28 per year. In Yesunzuil soum, births have also decreased, with an average of 50 births per year, reflecting an 8% decline. Deaths have averaged 18 cases per year, increasing by 14%. The natural population growth in this soum has averaged 32 per year.

*Table 32. Number of births and deaths*

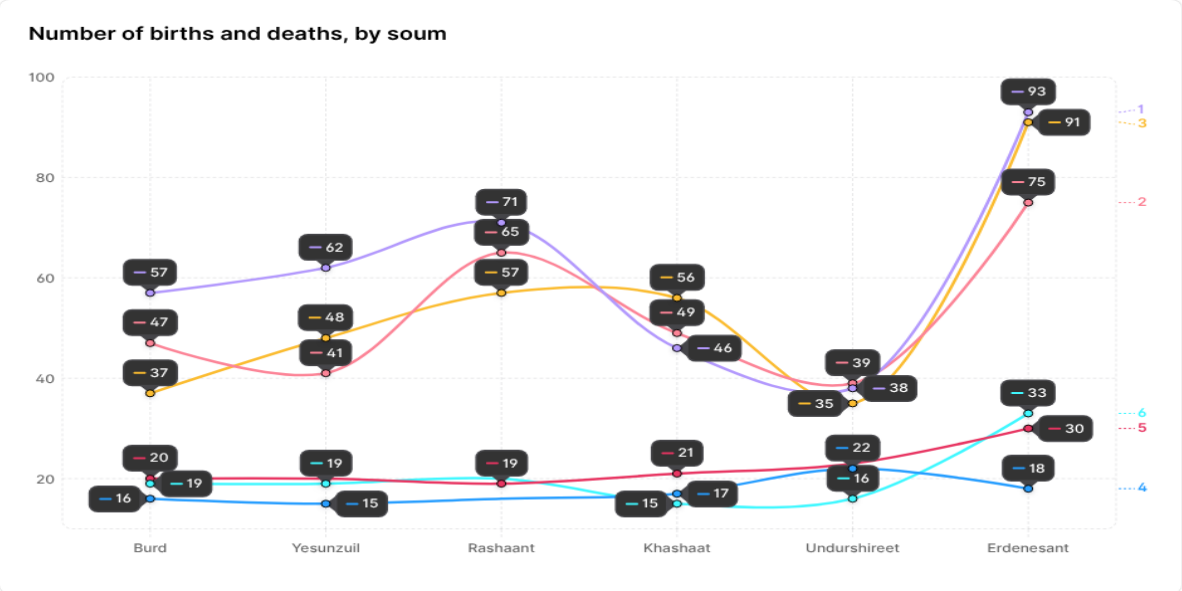
| Soum | Birth | | | Death | | |
|---|---|---|---|---|---|---|
| | 2022 | 2023 | 2024 | 2022 | 2023 | 2024 |
| Burd | 57 | 47 | 37 | 16 | 20 | 19 |
| Yesunzuil | 62 | 41 | 48 | 15 | 20 | 19 |
| Rashaant | 71 | 65 | 57 | 16 | 19 | 20 |
| Khashaat | 46 | 49 | 56 | 17 | 21 | 15 |
| Udurshireet | 38 | 39 | 35 | 22 | 23 | 16 |
| Erdenesant | 93 | 75 | 91 | 18 | 30 | 33 |

In Rashaant soum, births have declined over the past three years, with an average of 62 births recorded annually, representing a 10% decrease. Deaths have averaged 18 per year, increasing by 12%. The average natural population growth is 46 per year.

In Khashaat soum, births show an increasing trend, with an average of 50 births per year, reflecting a 10% increase. Deaths have averaged 17 per year, decreasing by 2.5%. The average natural population growth is 33 per year.

In Undershireet soum, births have slightly decreased, averaging 37 births per year, a 3% decline. Deaths have averaged 20 per year, decreasing by 12%. The average natural population growth is 17 per year.

In Erdenesant soum, births show an increasing trend, with an average of 86 births per year, a 1% increase. Deaths have averaged 27 per year, increasing significantly by 38%. The average natural population growth is 59 per year.




***Graph 3. Number of births and deaths, by soum***

### 2.13.4. Migration

In Yesunzuil and Burd soums of Uvurkhangai Province, no migration movements were recorded during the period 2020-2022. However, in the last two years, 144 people have migrated out of Yesunzuil soum and 235 people have migrated out of Burd soum.

Regarding in migration, a total of 88 people moved into Yesunzuil soum, with a 1.6 fold increase in the most recent year compared to the previous year. In Burd soum, 142 people migrated in, with an increase of 16 people in 2024 compared to the previous year.

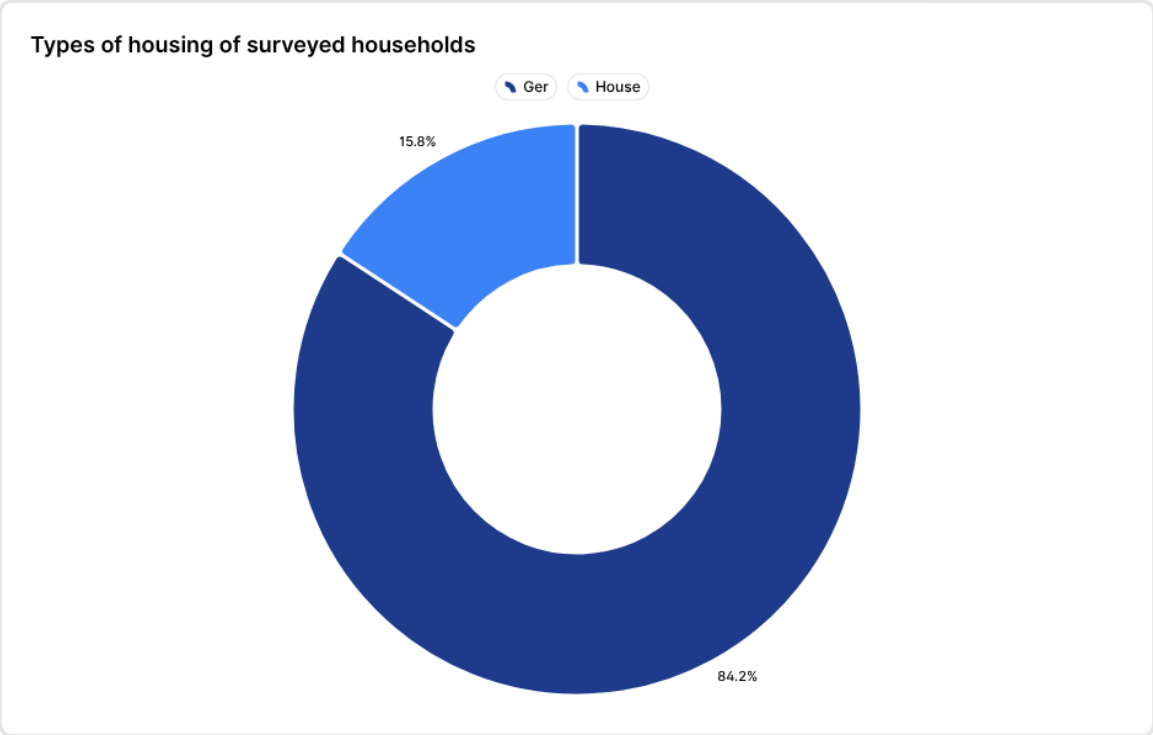
***Table 33. Population migration, 2020-2024***

| Movement | Soum | 2020 | 2021 | 2022 | 2023 | 2024 | Total |
|---|---|---|---|---|---|---|---|
| In-migration | Yesunzuil | 5 | 10 | 20 | 20 | 33 | 88 |
| | Burd | 28 | 42 | 10 | 23 | 39 | 142 |
| Out-migration | Yesunzuil | | | | 78 | 66 | 144 |
| | Burd | | | | 120 | 115 | 235 |

## 2.14. INFRASTRUCTURE

### 2.14.1. Public utilities and housing types

As shown in the figure below, 84% of the households included in the survey live in traditional ger dwellings in rural areas, while 16% reside in houses in settlement areas (such as soum centers).




*Graph 4. Types of housing of surveyed households*

### 2.14.2. Electric power supply

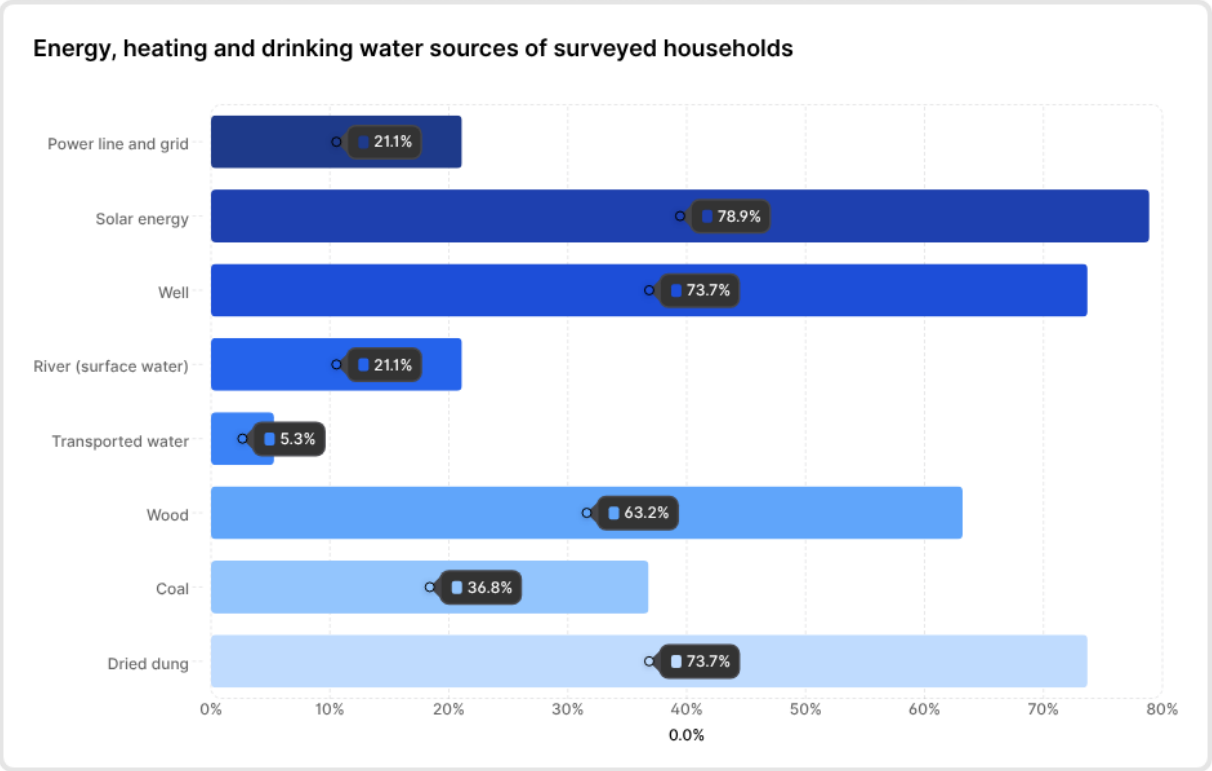
Energy consumption in the project bags is supplied through a combination of centralized power systems and renewable energy sources. A total of 119 households are connected to the centralized electricity supply, while 844 households use renewable energy systems. Due to electricity demand from construction lighting and stationary equipment during the project implementation phase, there is a potential risk of temporary overload on the local power supply system. Therefore, energy management measures should be planned and implemented where necessary.

The household electricity sources in the bags of Undershireet, Erdenesant, Rashaant, Khashaat, Burd, and Yesunzuil soums are presented in the table below.

*Table 34. Household energy sources*

| Bag | Solar | Wind | Small scale generator | Centralized system | Total |
|---|---|---|---|---|---|
| Bayan-Uul | 121 | - | - | 19 | 140 |
| Khugnu-Khan | 170 | - | - | 3 | 173 |
| Ikh borigdoi | 138 | - | - | 11 | 149 |
| Nomgon | 77 | - | 48 | 29 | 154 |
| Uyanga | 127 | - | - | 4 | 131 |
| Argal khairkhan | 8 | - | - | 31 | 39 |
| Ereen | 155 | - | - | 22 | 177 |
| Total | **796** | **0** | **48** | **119** | **963** |

In terms of energy sources, 78.9% of the surveyed households use renewable energy systems, while 21.1% are connected to the centralized electricity grid. Regarding heating sources, 63.2% of households use firewood, 36.8% use coal, and 73.7% use dung as a fuel source.




***Graph 5. Energy, heating and drinking water sources of surveyed households***

### 2.14.3. Water supply

The soums where the project is implemented are located in areas with limited water resources and primarily rely on groundwater wells and water distribution points rather than centralized water supply systems. Due to construction activities such as camps, equipment maintenance areas, and fuel storage facilities, there is a risk of contamination of drinking water sources. Therefore, it is necessary to implement water protection measures, spill prevention controls, and wastewater management systems for construction camps.

The household water supply sources in the six project soums are presented in the following table.

***Table 35. Number of wells by bag***

| Soum | Bag | Short cased well | Others | Deep drilled well | Shallow dug well | Wells, total |
|---|---|---|---|---|---|---|
| Undurshireet | Uyanga | 2 | 1 | 1 | 2 | 6 |
| Erdenesant | Bayan-Uul | 0 | 0 | 47 | 0 | 47 |
| Rashaant | Argal khairkhan | 0 | 0 | 1 | 0 | 1 |
| Rashaant | Khugnu-khan | 5 | 0 | 25 | 1 | 31 |
| Khashaat | Nomgon | 8 | 6 | 83 | 18 | 115 |
| Burd | Ikh Borigdoi | 0 | 0 | 40 | 2 | 42 |
| Yesunzuil | Ereen | 0 | 0 | 1 | 0 | 1 |
| | **Total** | **15** | **7** | **198** | **23** | **243** |

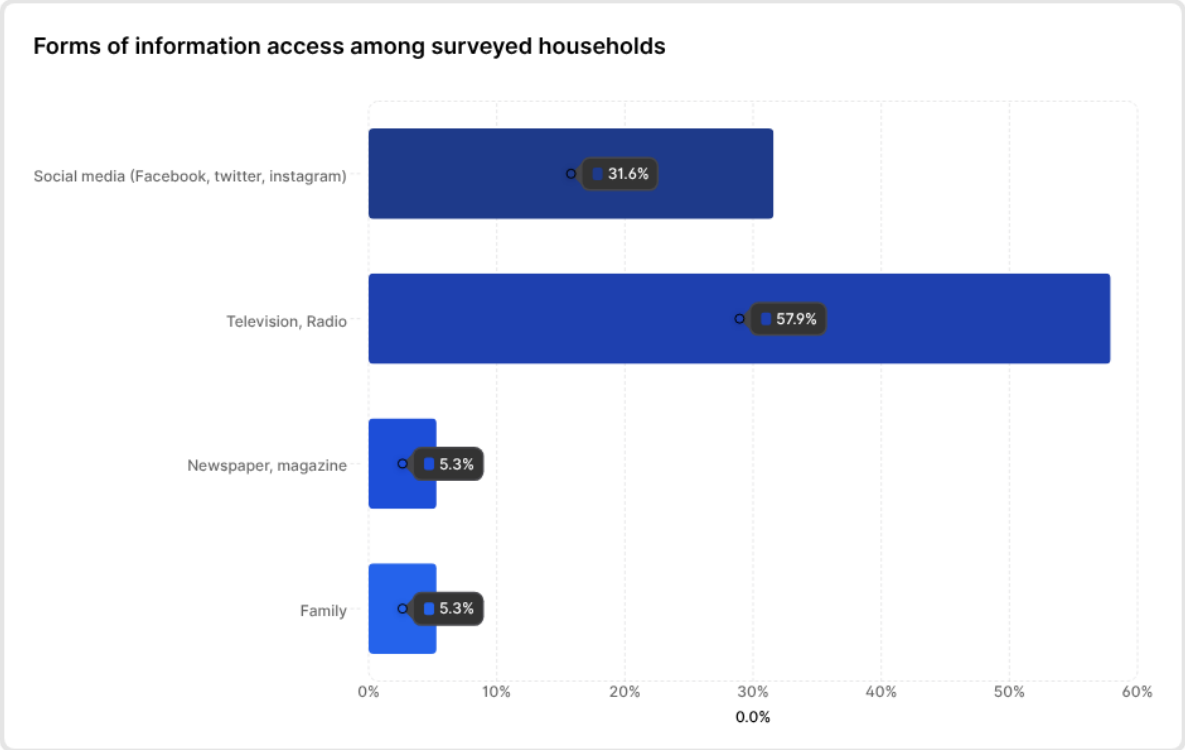
*Source: Population and Housing Census 2020, National Statistics Office of Mongolia*

According to the household survey results, 73.7% of respondents reported no complaints regarding water quality, while 26.3% expressed satisfaction. In terms of water sources, 73.7% of surveyed households use groundwater wells, 21.1% use rivers and streams, and 5.3% rely on transported water.

### 2.14.4. Communication

Regarding information sources, 57.9% of respondents obtain information from television, 31.6% from digital platforms, and 5.3% from newspapers, magazines, and family sources.

Most surveyed households are located in areas with mobile network coverage and primarily access information via mobile data services.




***Graph 6. Forms of information access among surveyed households***

**Mobile phone usage:** All surveyed households (100%) use mobile phones. Regarding the number of mobile phones per household, 41% have 2 phones, 17% have 1 phone, 18% have 4 phones, and 12% have 3 phones. In addition, households with 5 and 6 mobile phones each account for 6%.

**Communication tools:** The survey results show that 71% of respondents have internet access, while 29% do not have permanent internet connectivity. In terms of mobile network quality, 35% reported good coverage, 29% moderate, and 35% poor coverage. No households reported having no mobile network coverage.

**Information sources:** Regarding television usage, 82% watch regularly, 6% watch occasionally, and 12% do not watch television. In terms of television service providers, 88% use DDISH, while 12% use cable or local television services.

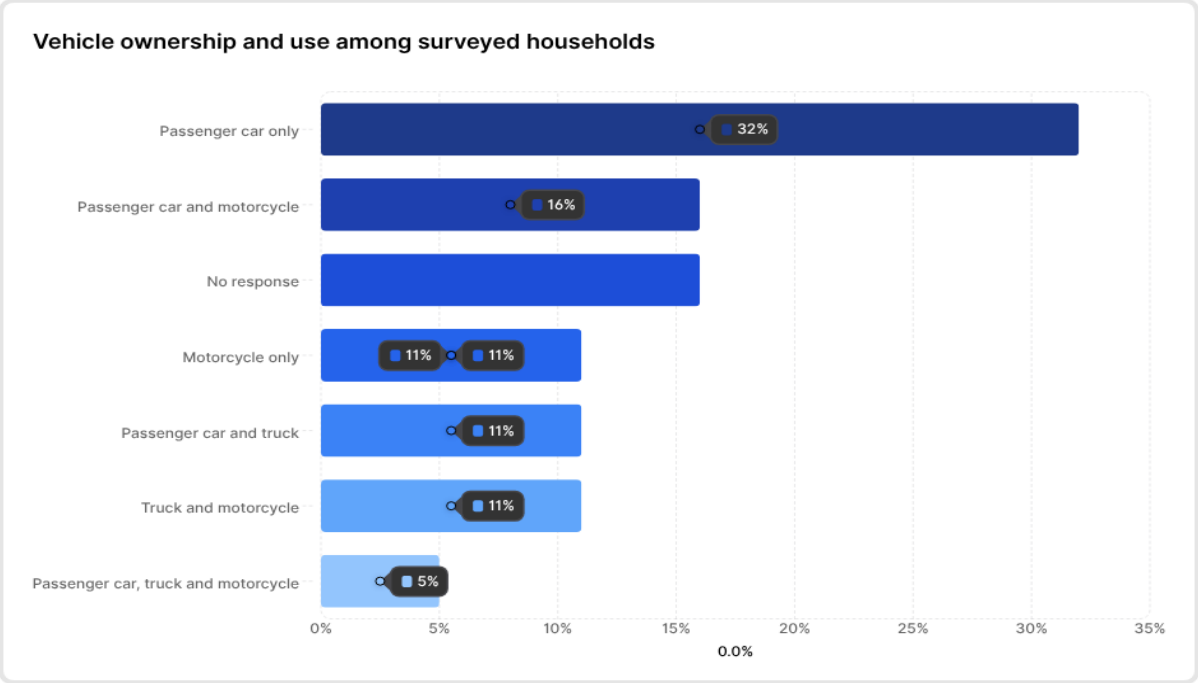
### 2.14.5. Transport and traffic participation

In 2025, a total of 3,065 vehicles that underwent technical inspection were registered across six soums in four provinces where the project is implemented. Of these, 427 vehicles are in Burd soum, 330 in Yesunzuil soum, 569 in Rashaant soum, 640 in Khashaat soum, 312 in Undershireet soum, and 787 in Erdenesant soum.

These vehicles regularly use the road section planned for rehabilitation, which may create a certain level of disruption during the construction phase.

The average daily traffic on national two-lane roads is generally 300-800 vehicles, and the Ulaanbaatar-Arvaikheer route is considered a high-traffic corridor with 500-800 vehicles per day. Traffic volume increases by 2-3 times during national holidays and decreases by 30-40% in winter.

Therefore, it is necessary to implement traffic management plans during construction to ensure the safety of vehicles and road users.

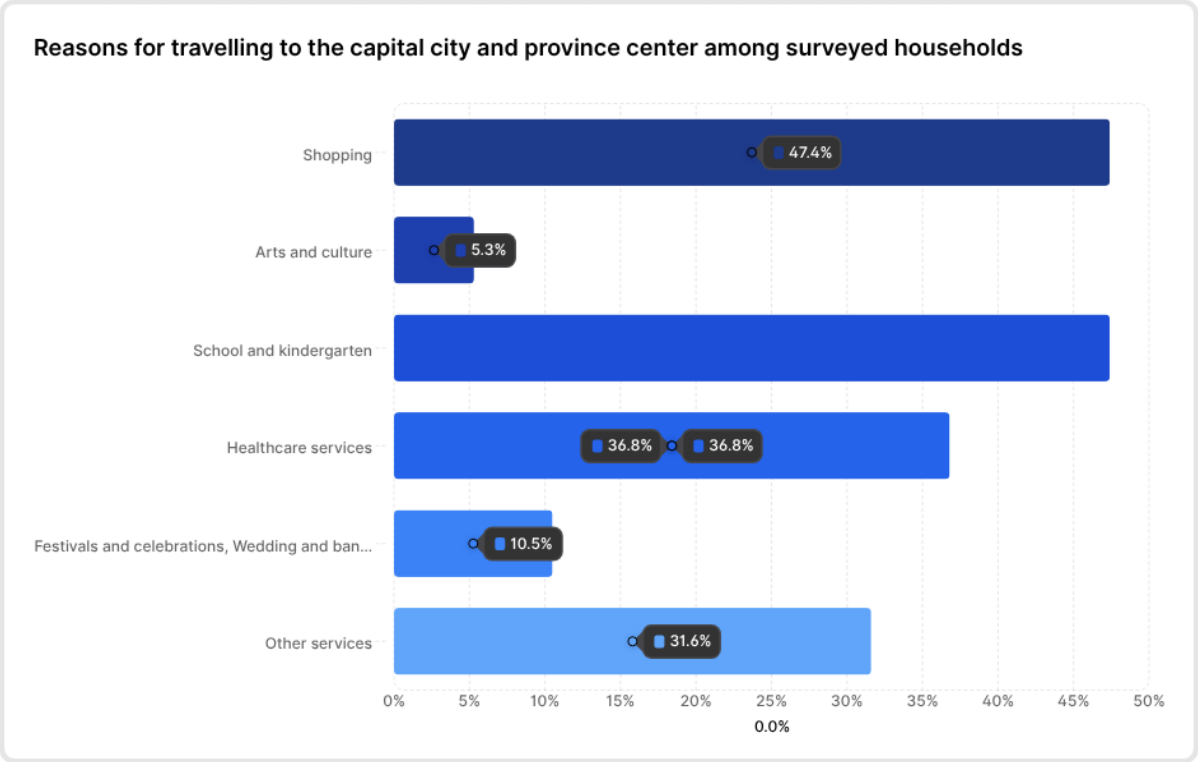



***Graph 7. Vehicle ownership and use among surveyed households***

The survey results show that household vehicle ownership is relatively diverse. Among surveyed households, 32% own only a passenger car, and 16% own both a passenger car and a motorcycle. In addition, 11% own only a motorcycle, 11% own both a passenger car and a truck, 11% own both a truck and a motorcycle, and 5% use a combination of passenger car, truck, and motorcycle. Meanwhile, 16% of respondents did not answer the question.

Travel frequency: The survey indicates that households travel on average 33 times per year to the soum center, 10 times per year to the Province center, and 13 times per year to the capital city. The most frequently traveling households reported up to 120 trips per year to the soum center, 45 trips to the Province center, and 36 trips to the capital city. The least active households travel once per year to the soum center, do not travel to the Province center, and travel once per year to the capital city.

Regarding travel purposes, 47.4% of respondents travel for shopping, and 47.4% travel to take or pick up children from school or kindergarten. In addition, 36.8% travel to access healthcare services, 31.6% for other services, 10.5% for festivals, weddings, and leisure activities, and 5.3% for cultural and artistic events.




*Graph 8. Reasons for travelling to the capital city and province center among surveyed households*

## 2.15. ECONOMY

### 2.15.1. Herder households

A total of 1,289 herder households are living in the project bags, with a total livestock population of 434,000 heads. The number of herder households has shown a declining trend in recent years, as illustrated in the following table.

*Table 36. Number of herder households*

| Soum | Bag | Herder households | | | Change | |
|---|---|---|---|---|---|---|
| | | 2023 | 2024 | 2025 | 2024 | 2025 |
| **Undurshireet** | Uyanga | 157 | 152 | 149 | -3.2% | -2.0% |
| **Erdenesant** | Bayan-Uul | 185 | 191 | 187 | 3.2% | -2.1% |
| **Rashaant** | Argal khairkhan | 203 | 195 | 183 | -3.9% | -6.2% |
| **Rashaant** | Khugnu-khan | 231 | 243 | 237 | 5.2% | -2.5% |
| **Khashaat** | Nomgon | 180 | 181 | 179 | 0.6% | -1.1% |
| **Burd** | Ikh borigdoi | 178 | 175 | 174 | -1.7% | -0.6% |
| **Yesunzuil** | Ereen | 187 | 185 | 180 | -1.1% | -2.7% |
| **Total** | | 1321 | 1322 | 1289 | 0.1% | -2.5% |

*Source: National Statistics Organization, 2025*

### 2.15.2. Livestock

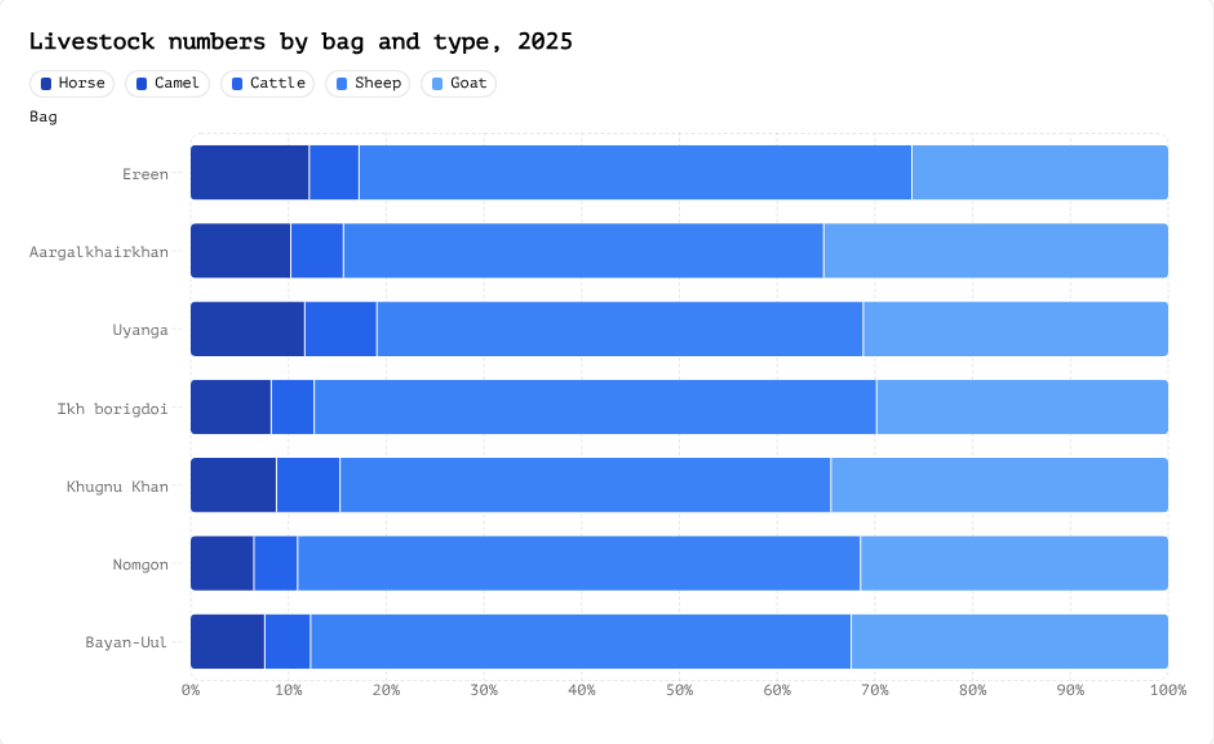
Livestock husbandry activities along the project road alignment have been estimated based on data provided by the respective soum administrations. The number of livestock at the soum level is as follows: 66.0 thousand in Bayan-Uul bag of Erdenesant soum, 83.2 thousand in Jargalant bag of Khashaat soum, 66.6 thousand in Khugnu-Khaan bag of Rashaant soum, 57.8 thousand in Argal Khairkhan bag of Rashaant soum, 70.7 thousand in Ikh Borigdoi bag of Burd soum, 42.0 thousand in Uyangga bag of Undershireet soum, and 51.1 thousand in Ereen bag of Yesunzuil soum.

In addition, within the project impact area, Rashaant soum in Bulgan Province has 43 herder households and 79,013 hectares of grazing land, while Undershireet soum has 14 herder households and 6,800 hectares of grazing land within the impact zone.

***Table 37. Livestock numbers (household heads)***

| | Horse | | Camel | | Cattle | | Sheep | | Goat | | Total | | Dynamic change |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Bags** | **2024** | **2025** | **2024** | **2025** | **2024** | **2025** | **2024** | **2025** | **2024** | **2025** | **2024** | **2025** | |
| Bayan-Uul | 4.4 | 5 | 0 | 0 | 2.8 | 3.1 | 36.2 | 36.5 | 20.6 | 21.4 | 64 | 66 | Increasing |
| Jargalant | 4.5 | 4.7 | 0.1 | 0.2 | 3 | 3.9 | 44 | 45.5 | 23.7 | 28.9 | 77.2 | 83.2 | Increasing |
| Khugnu-khan | 5.4 | 5.8 | 0.5 | 0.5 | 3.8 | 4.3 | 37.1 | 33.2 | 23.4 | 22.8 | 70.2 | 66.6 | Decreasing |
| Ikh borigdoi | 5.1 | 5.8 | 0.1 | 0.1 | 2.7 | 3.3 | 40.8 | 40.5 | 20.3 | 21 | 69 | 70.7 | Increasing |
| Uyange | 4.3 | 4.9 | 0 | 0 | 2.8 | 3.1 | 22.5 | 20.9 | 12.8 | 13.1 | 42.3 | 42 | Stable |
| Argal khairkhan | 5.3 | 5.9 | 0.2 | 0.2 | 2.9 | 3.1 | 33.6 | 28.3 | 20.6 | 20.3 | 62.5 | 57.8 | Decreasing |
| Ereen | 5.2 | 6.2 | 0 | 0 | 2.1 | 2.6 | 27.7 | 28.9 | 13.1 | 13.4 | 48.1 | 51.1 | Increasing |
| **Total** | **34.2** | **38.3** | **0.9** | **1** | **20.1** | **23.4** | **242** | **233.8** | **134.5** | **140.9** | **433** | **437.4** | **Increasing** |

*Source: National Statistics Organization, 2025*




***Graph 9. Livestock numbers by bag and type, 2025***

### 2.15.3. Business Entities and entrepreneurs

According to information provided by the Governor's Office, there are no registered or licensed business entities within the project impact area of Undershireet soum. However, one surveyed household operates roadside services, generating an annual income of 12.3 million MNT. This household has few livestock, four children, no additional income sources, and is permanently settled.

In Rashaant soum, there are 22 registered food production businesses and 50 licensed catering businesses. Within the field survey sample, two large business complexes located along the road fall within the project impact area, each employing 50-80 workers and operating as tax-paying entities. In the Khugnu Tarna tourism area, around 30

households/businesses operate on a semi-permanent basis, all located on the northern side of the road. The average annual income of the four surveyed households in this area is 28 million MNT. Additionally, according to the Protected Area Administration, more than 200 individuals, households, and businesses operate seasonally in this tourism area during summer.

In Burd soum, more than 10 businesses operate continuously within 30 meters on both sides of the Khuuvur road, contributing to household incomes. A total of 9 households engaged in such activities were included in the survey, with an average annual income of 42 million MNT from roadside services.

Although the surveyed businesses and households fully support the project, they expressed concerns about potential income loss. Therefore, it is recommended that road rehabilitation works in the two key locations-Khugnu Tarna area in Rashaant soum and Khuuvur area in Burd soum-be scheduled to minimize overlap with the peak tourism season, in order to reduce potential negative impacts on the income of these households and businesses.

### 2.15.4. Crop Farming

Information on crop farming within the seven bags affected by the Ulaanbaatar-Arvaikheer road rehabilitation project has been established based on official statistical records as of 2025. The total area of agricultural land potentially subject to project impact is estimated at 28,193 hectares. Field survey findings indicate that the primary cultivated areas along the project alignment are concentrated in Bayan-Uul bag of Erdenesant soum and Khugnu-Khan bag of Rashaant soum.

According to data provided by the Rashaant soum Governor's Office, 1,006 hectares of agricultural land fall within the direct impact zone, while the total cultivated land within the broader project impact area amounts to 3,806 hectares. No agricultural land was identified along the road alignment in the remaining bags.

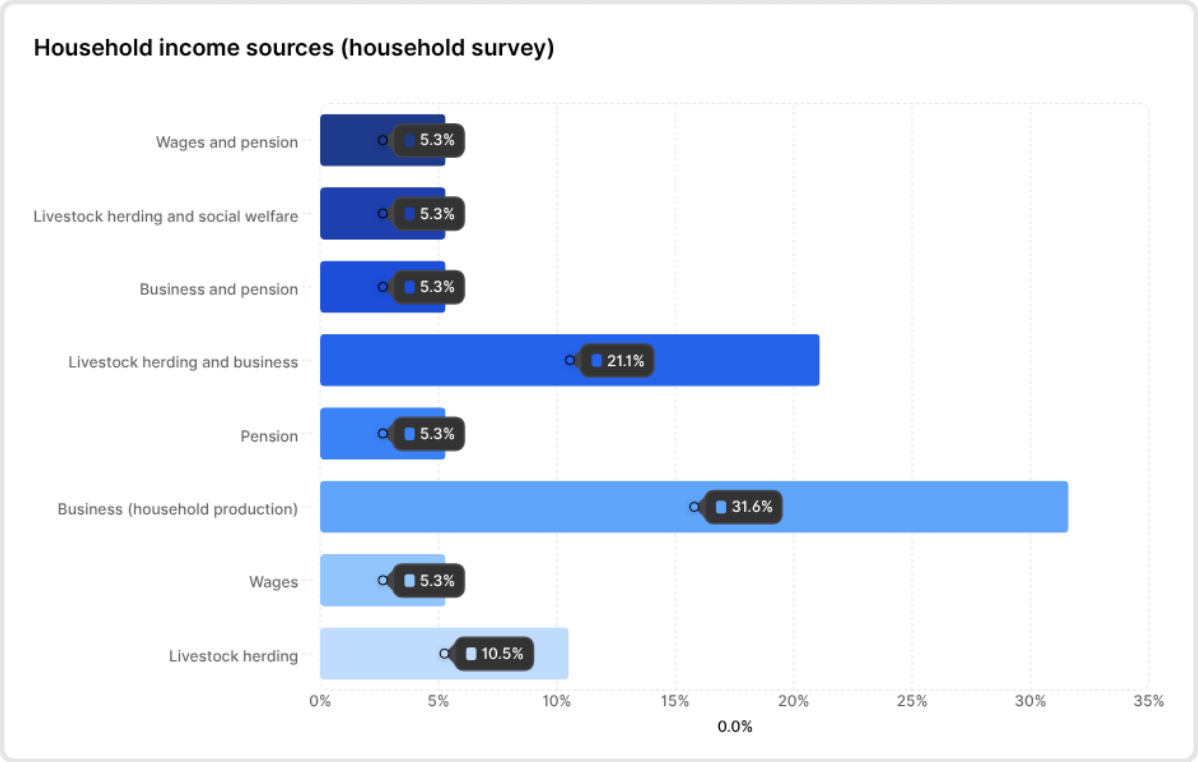
Furthermore, administrative data indicate that five farming households are registered within the impact area of Rashaant soum in Bulgan Province. As these households and entities were not engaged during the field survey, it is recommended that formal consultations be conducted with them prior to the commencement of construction activities.

***Table 38. Crop farming indicators (by bag)***

| Bags | Cukltivated area (ha) | Harvested yield (tons) |
|---|---|---|
| Bayan-Uul | 2800 | 1660 |
| Jargalant | 0.039 | 0.4 |
| Khugnu khan | 16132 | 21407.6 |
| Ikh Borigdoi | 2 | 7 |
| Uyanga | 2045 | 782 |
| Argal khairkhan | 7198 | 10491.6 |
| Ereen | 16.73 | 52.2 |
| **Total** | **28193.769** | **34400.8** |

### 2.15.5. Economic Situation of Households in the Impact Area

Household income sources: Among the surveyed households, 31.6% derive their primary income from roadside businesses, while 21.1% rely on a combination of livestock husbandry and business activities as their main source of income. A further 5.3% of respondents earn income from wages and salaries. In addition, 37% of surveyed households reported having two sources of income.

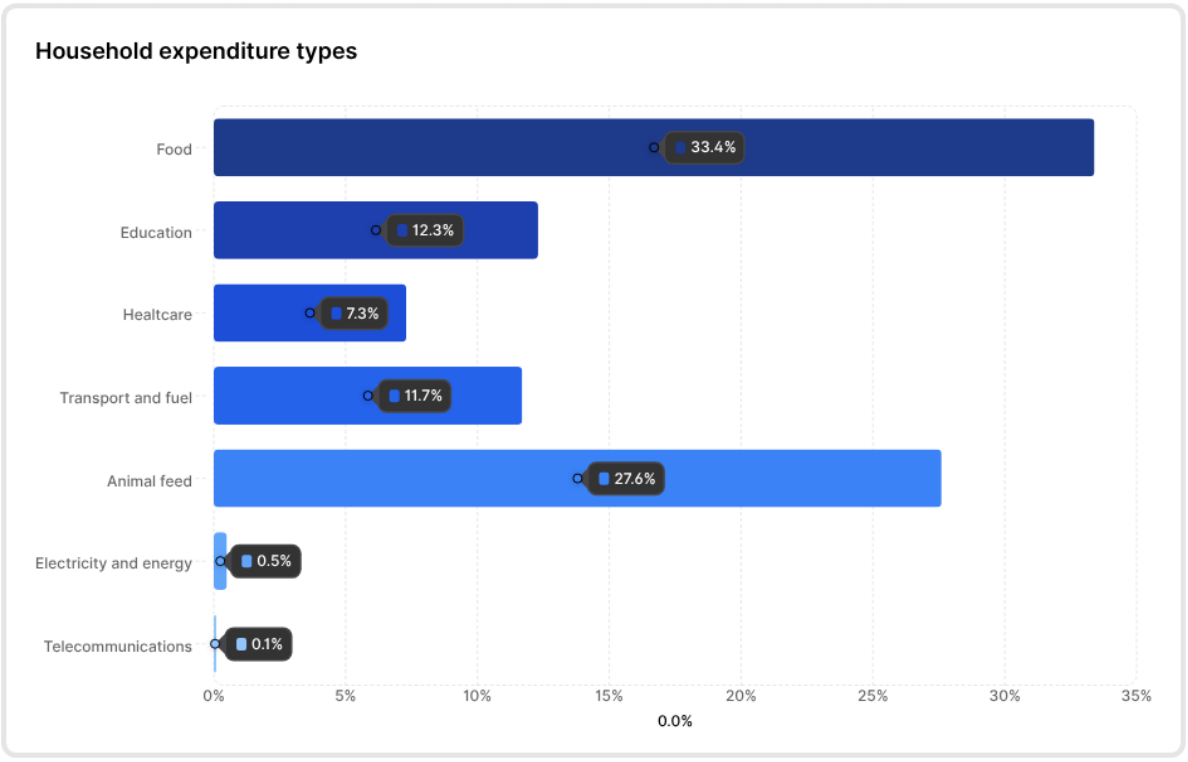



***Graph 10. Household income sources (household survey)***

**Household expenditure structure:** Surveyed households spend an average of 24.0 million MNT per year. The largest share of total household expenditure is allocated to food and livestock feed. Specifically, 33.4% of total expenses is spent on food and 27.6% on livestock feed, indicating that both production-related and consumption-related needs dominate household budgets.

This is followed by education related expenses, which account for 12.3% of total expenditure. Transportation and fuel costs represent 11.7%, reflecting the essential need for mobility in rural areas at a level comparable to education spending.

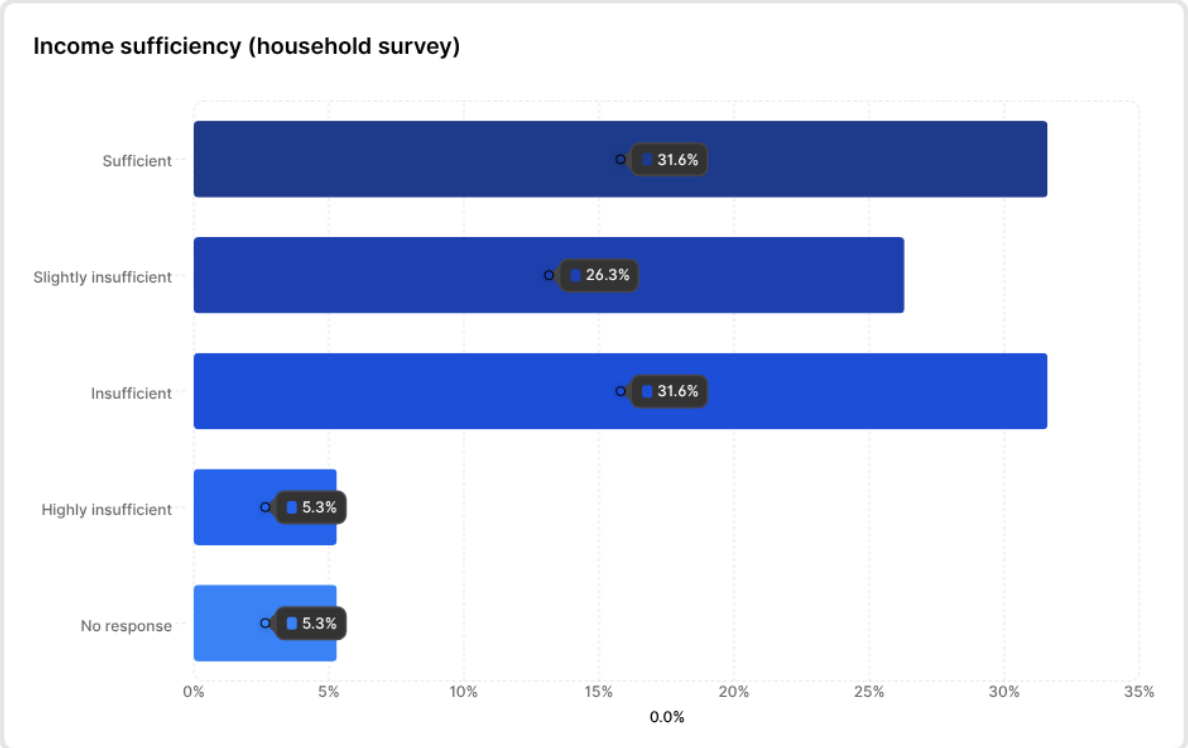
Healthcare expenses are relatively low, accounting for 7.3% of total expenditure, while electricity and energy costs reach 0.5%. Communication expenses represent the lowest share at 0.1% of total household spending.




***Graph 11. Household expenditure types***

The household budget structure of surveyed respondents demonstrates a combined "consumption-production" pattern, with 61% of total expenditure allocated to food and livestock feed. This indicates that household financial capacity is highly dependent on natural conditions and market price fluctuations.

**Income sufficiency:** Regarding whether household income is sufficient, 63.2% of respondents stated that their income is insufficient to meet household needs, while only 31.6% reported that their income is sufficient to cover household expenses.



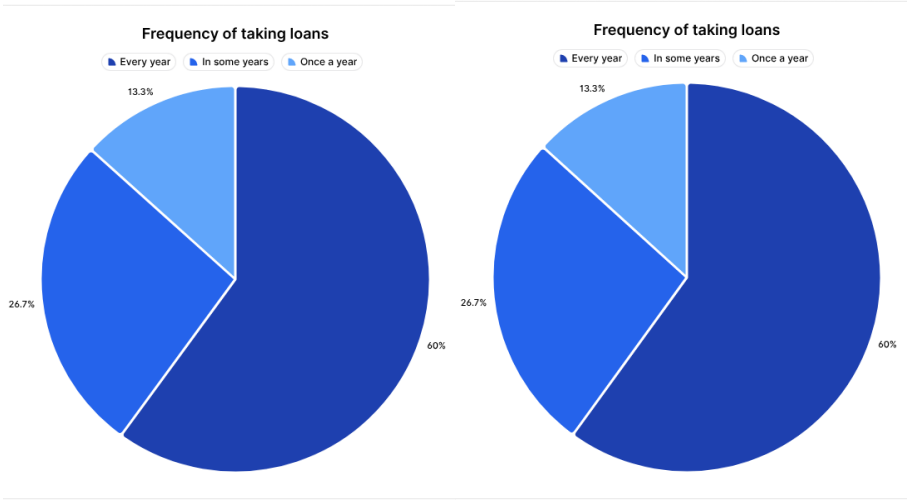

***Graph 12. Income sufficiency (household survey)***

Herders sell livestock products through soum centers, Province centers, cooperatives, and middlemen. Among respondents, 50% sell their products through middlemen, 16% through cooperatives, and 34% through soum centers. The average annual income by product type is as follows:

- Meat sales: 5.6 million MNT
- Milk and dairy products: 2.86 million MNT
- Wool and cashmere: 6.84 million MNT
- Hides and skins: 500,000 MNT

This income is not only dependent on the number of owned livestock but is also directly influenced by annual financial needs, particularly the amount of bank loans taken.

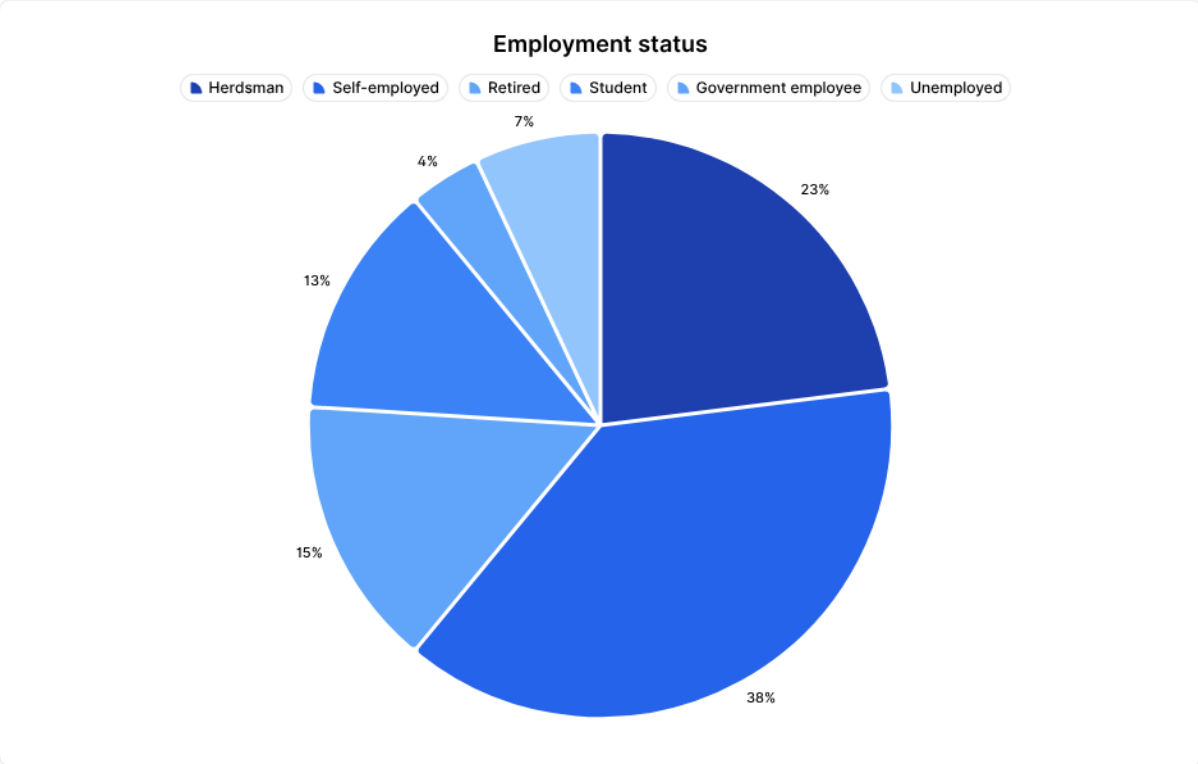
**Loans:** 78.9% of the total survey respondents have obtained bank loans. Among those who have taken loans, 60.0% borrow on a regular annual basis, while 13.3% take loans once per year.




***Graph 13. Household loan information (household survey)***

Loan amounts range between 3 and 60 million MNT, and the main purpose of borrowing is to purchase livestock feed. In terms of loan sources, 78.6% of respondents obtained loans from commercial banks, while 21.4% borrowed from non-bank financial institutions.

**Employment:** Approximately 23% of household members are herders, 4% are civil servants in government organizations, 38% are self-employed, 15% are pensioners (aged 60 and above), 3% are students, and 7% are unemployed.




*Graph 14. Employment status (household survey)*

## 2.16. LAND USE

### 2.16.1. Legal framework

Land relations in Mongolia are regulated by the Land Law, which defines three main types of land rights: ownership, possession, and use.

- Land ownership is granted only to citizens of Mongolia, and includes the right to dispose of and transfer land. However, ownership of pastureland, forest areas, water resources, and specially protected areas is prohibited.
- Land possession rights are granted to citizens and legal entities for a defined period (generally 15-60 years), with the possibility of extension. Possession rights may be inherited and transferred under certain conditions, but cannot be sold.
- Land use rights refer to permissions to utilize land resources. These rights may be granted to foreign entities, however, their use for agricultural purposes is subject to restrictions.

Regarding pastureland, Mongolia operates under a common-use system, where herders have the right to freely use pastures according to seasonal migration patterns. However, land with permanent facilities such as winter camps, wells, fences, and shelters may be allocated under possession rights.

Water resource use is regulated by the Water Law, and access to wells is granted based on permits and well registration (“well passport”).

### 2.16.2. General land use structure

The 105 km project road impact area is located within a steppe zone characterized predominantly by traditional pastoral livestock farming. However, within areas along the road corridor, a mixed land-use pattern is observed, including increased agricultural activities, tourism, and service-based land use.

*Table 39. Land use in the project soums*

| Administrative unit | Crop farming | Pastureland | Uvuljuu, Khavarjaa | Mining | Infrastructure | Urban development | Protected areas |
|---|---|---|---|---|---|---|---|
| Tuv province | | | | | | | |
| Undurshireet | | ✓ | ✓ | | ✓ | ✓ | |
| Erdenesant | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| Bulgan province | | | | | | | |
| Rashaant | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Arkhangai province | | | | | | | |
| Khashaat | | ✓ | ✓ | | ✓ | ✓ | |
| Uvurkhangai province | | | | | | | |
| Burd | | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Yesunzuil | | ✓ | ✓ | | ✓ | ✓ | |

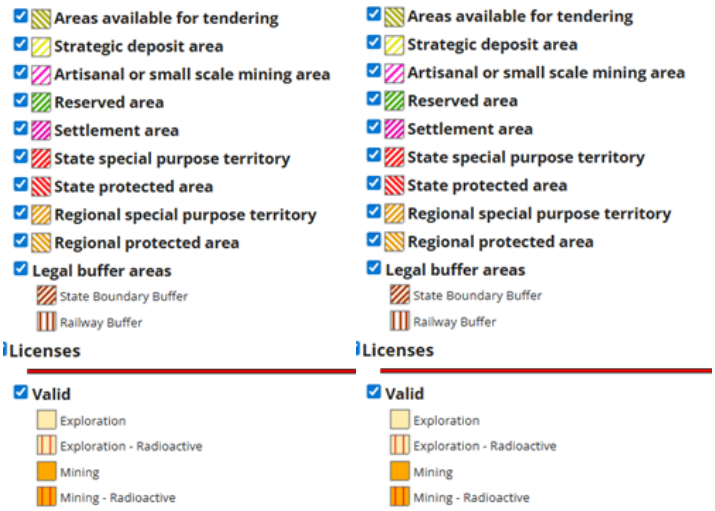



*Figure 14. Land use map of soums covered by project area*

### 2.16.3. Pastureland use and livestock movement

Most of the project impact area is designated for pasture use, and herders practice seasonal nomadic livestock movement. Livestock migration between winter pasture, spring pasture summer pastures, and autumn pasture occurs regularly.

However, construction and maintenance activities under the project road rehabilitation works may intersect with traditional livestock movement routes, potentially increasing traffic safety risks (including road accidents) and affecting pasture accessibility.

Winter and spring pastures are widely dispersed across all soums, and it is common for them to be located near the road corridor. This increases potential risks during the construction phase, including noise, dust generation, and reduced traffic safety.

### 2.16.4. Crop farming land use and spatial conflicts

In recent years, particularly in Erdenesant and Rashaant soums, agricultural land has increased significantly and is concentrated along the road corridor. According to 2025 statistical data, a total of approximately 28,000 hectares of cultivated land has been recorded within the extended project impact area, of which around 3,800 hectares are located within the road adjacent impact zone.

These cultivated areas are located parallel to the road, and in some sections extend along it. As they overlap with pastureland use, the following spatial conflicts have been identified:

- Restriction or disruption of livestock and wildlife movement
- Requirement for herders to detour around cultivated fields to access pasture and water sources
- Increased risk of livestock entering cultivated areas, leading to potential crop damage.

Therefore, within the framework of the project, it is necessary to implement livestock movement channeling and management measures to guide and regulate livestock movement between cultivated areas.

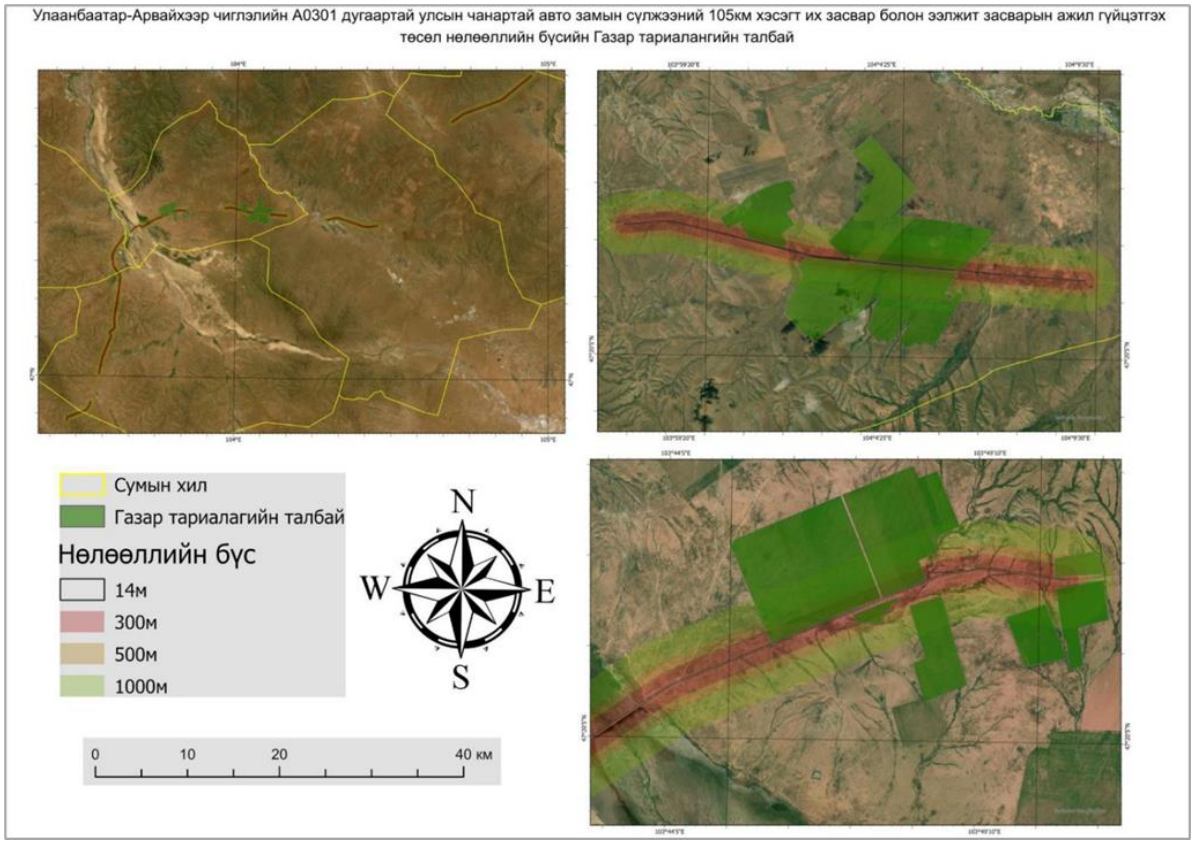



***Figure 15. Agricultural land areas within the project area***

### 2.16.5. Settlement and Service Land Use

The project road passes through areas with concentrated settlements and service activities, including Erdenesant soum center, Rashaant soum center, and the Khugnu Tarna area, where tourism and roadside services (food services, accommodation, fuel stations, and retail trade) are clustered. These areas are characterized by relatively high land-use density and a concentration of households and businesses whose income is directly dependent on road traffic flows. Consequently, there is a potential risk of increased economic vulnerability during the construction phase.

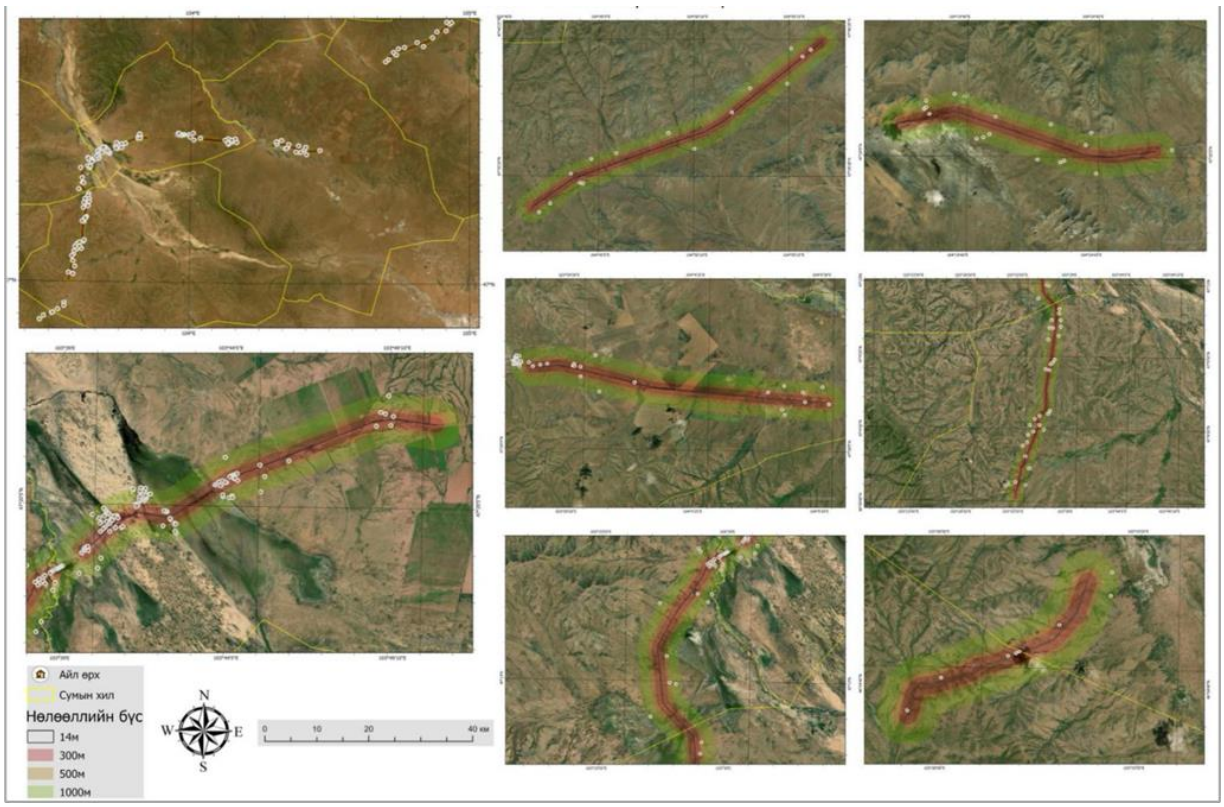



*Figure 16. Location map of sensitive receptors within the project impact area*

### 2.16.6. Protected areas

The project impact area includes parts of the Khugnu Tarna Nature Complex (around Elsen Tasarkhai). This protected area was designated in 1997 and is characterized by a fragile ecosystem combining forest, rocky formations, and sand dunes. It is also an area of high tourism significance. During the tourism season, the flow of both domestic and international visitors to and through this area increases significantly, along with a sharp rise in the number of service providers, businesses, and households operating in tourism-related activities. As such, this area is considered a highly sensitive receptor.

### 2.16.7. Mining activities

There are no active mining operations within the direct project impact area. However, exploration and exploitation licenses have been registered in nearby soums. These sites are located at a considerable distance from the project road corridor and are not expected to cause direct impacts. Nevertheless, potential future changes in land use due to newly issued mining licenses should be taken into account.

### 2.16.8. Infrastructure

The national road to be rehabilitated under the project serves as a key transport corridor connecting not only the project Provinces and soums but also facilitating trade, supply chains, and services between the capital city and other regions.

During the construction phase, it will be essential to properly manage traffic flow along this critical corridor. Furthermore, once the road rehabilitation is completed, increased traffic volume and higher travel speeds are expected, making road safety management a critical priority.

## 2.17. PUBLIC AND SOCIAL SERVICES

### 2.17.1. Education

As of 2025, a total of 3,004 students are enrolled across the six soums within the project area, with educational services delivered through six general education schools. The total number of students has shown a declining trend over the past three years.

In terms of early childhood education, 1,056 children are enrolled in pre-school education across the six soums as of 2025. The number of children attending kindergartens has also shown a decreasing trend over the past three years.

*Table 40. Number of children enrolled in educational institutions*

| Soum | Number of general education school students | | | | Number of children enrolled in pre-school education | | | |
|---|---|---|---|---|---|---|---|---|
| **Soum** | **2023** | **2024** | **2025** | **Dynamic** | **2023** | **2024** | **2025** | **Dynamic** |
| Burd | 323 | 290 | 286 | Decreased | 156 | 142 | 131 | Decreased |
| Yesunzuil | 359 | 329 | 316 | Decreased | 125 | 103 | 139 | Increased |
| Rashaant | 789 | 821 | 795 | Decreased | 196 | 181 | 155 | Decreased |
| Khashaat | 489 | 478 | 468 | Decreased | 210 | 214 | 212 | Increased |
| Undurshireet | 264 | 254 | 265 | Constant | 121 | 122 | 114 | Decreased |
| Erdenesant | 897 | 887 | 874 | Decreased | 361 | 339 | 305 | Decreased |
| **Total** | **3121** | **3059** | **3004** | Decreased | **1169** | **1101** | **1056** | Decreased |
| **Students in the project impact area** | **789** | **821** | **795** | Decreased | **196** | **181** | **155** | Decreased |

### 2.17.2. Health

Health centers in the centers of the six soums provide emergency medical services. A total of 58 medical staff are employed, including 30 nurses, 19 doctors, 4 laboratory technicians, and 5 midwives.

Yesunzuil and Undershireet soums do not have laboratory technicians, and therefore laboratory testing services are not available in these soums. The emergency contact phone numbers for each soum health center are also summarized in the last column of the table.

*Table 41. Information on soum health center*

| Soum | Nurses | Family doctors | Other doctors | Laborants | Midwives | Total | Phone number |
|---|---|---|---|---|---|---|---|
| Burd | 4 | 2 | 2 | 1 | 1 | 10 | 89895365 |
| Есөн зүйл | 4 | 2 | 2 | 0 | 1 | 9 | 89383000 |
| Rashaant | 5 | 1 | 0 | 1 | 0 | 7 | 80452148 |
| Khashaat | 7 | 1 | 1 | 1 | 1 | 11 | 91226691 |
| Undurshireet | 4 | 2 | 2 | 0 | 1 | 9 | 86981512 |
| Erdenesant | 6 | 2 | 2 | 1 | 1 | 12 | 96334833 |
| **Total** | **30** | **10** | **9** | **4** | **5** | **58** | |

The distances from each of the 10 road rehabilitation sections to the respective soum centers have been calculated and are presented in the following table. The routes to Erdenesant and Rashaant soum centers are paved roads, whereas travel times to other soum centers may be longer despite relatively short distances due to road conditions.

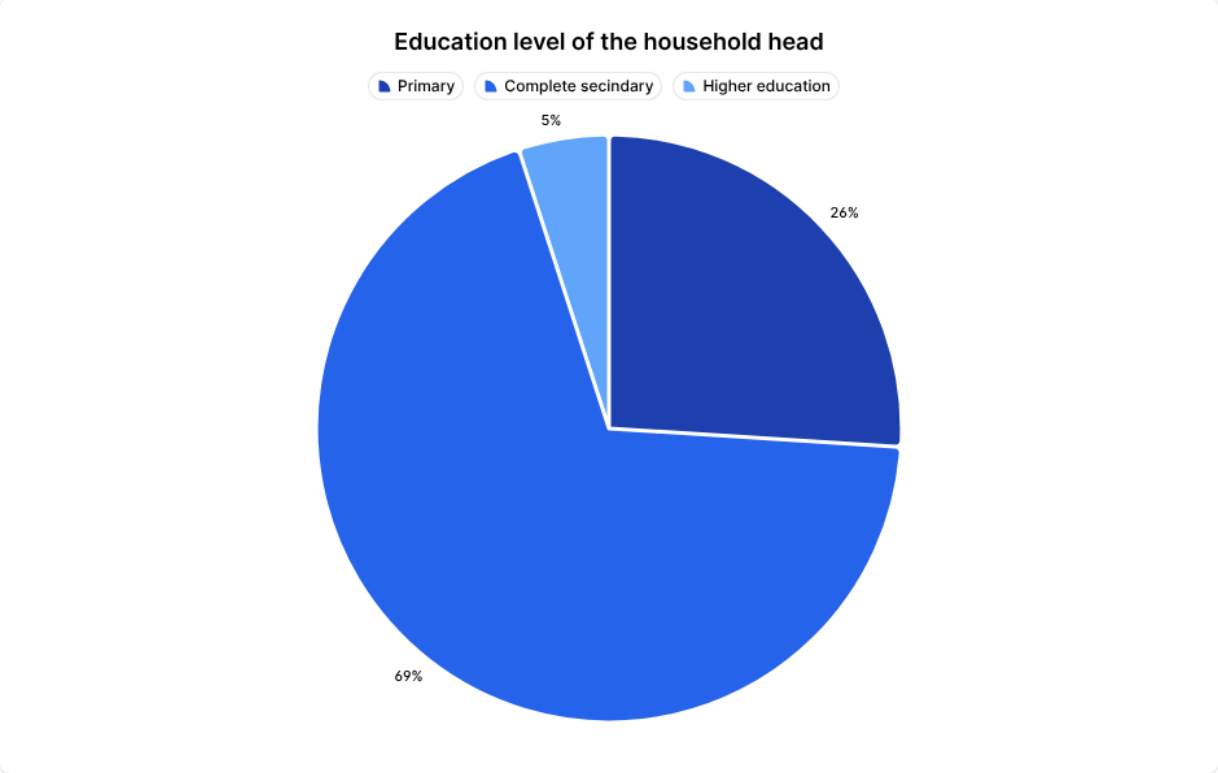
*Table 42. Distance from project sections to soum center*

| Rehabilitation sections | Undurshireet /km/ | Erdenesant /km/ | Rashaant /km/ | Khashaat /km/ | Burd /km/ | Yesunzuil /km/ |
|---|---|---|---|---|---|---|
| Section 1, rehabilitation | 31 | 51 | 113 | 156 | 169 | 187 |
| Section 2, partial rehabilitation | 47 | 39 | 101 | 143 | 157 | 174 |
| Section 3, partial | 73 | 12 | 33 | 99 | 113 | 130 |

| | | | | | | |
|---|---|---|---|---|---|---|
| rehabilitation | | | | | | |
| Section 4, partial rehabilitation | 97 | 36 | 33 | 76 | 90 | 107 |
| Section 5, partial rehabilitation | 101 | 33 | 39 | 76 | 89 | 114 |
| Section 6, partial rehabilitation | 121 | 60 | 16 | 52 | 66 | 83 |
| Section 7, partial rehabilitation | 135 | 74 | 34 | 46 | 51 | 68 |
| Section 8, major rehabilitaion | 146 | 85 | 45 | 57 | 40 | 58 |
| Section 9, partial rehabilitation | 159 | 98 | 58 | 70 | 27 | 45 |
| Section 10, major rehabilitaion | 178 | 116 | 76 | 88 | 26 | 26 |

### 2.17.3. Education and health service access among surveyed households

The educational attainment of adult members of the surveyed households is as follows: 69% have completed secondary education, 5% hold a bachelor's degree or higher, and 26% have primary-level education.




***Graph 15. Educational level of household heads (household survey)***

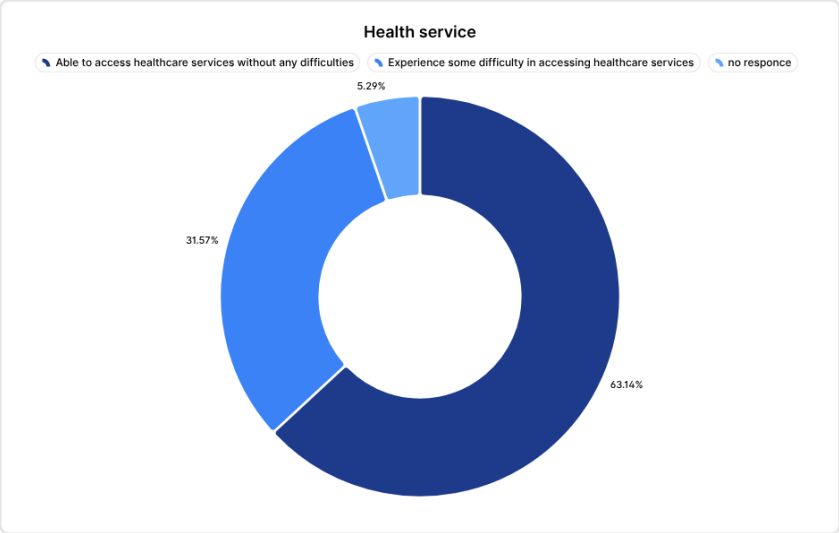
The surveyed households included 10 pre-school-aged children and 22 school-aged children. The average distance from households to kindergartens and schools is 45 km.

***Table 43. Educational level of households heads (household survey)***

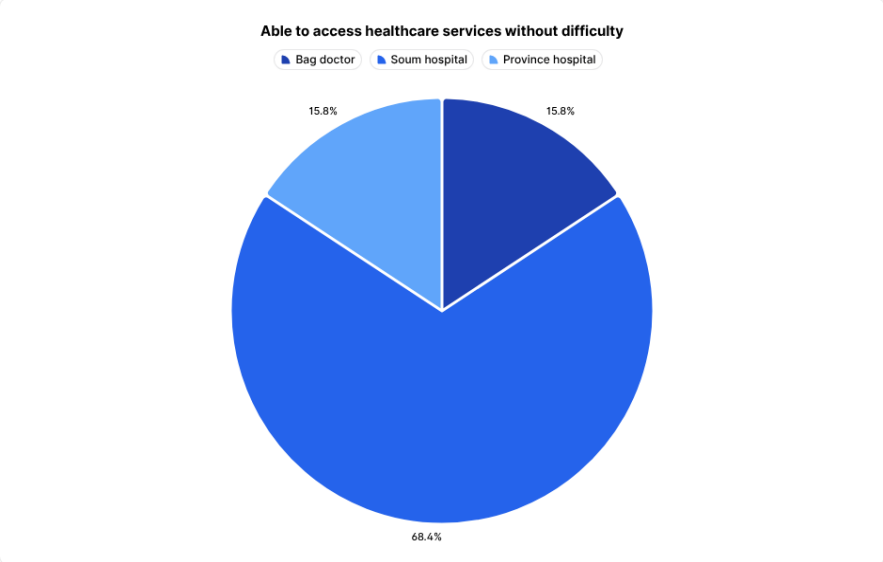
| | Number of children | Distance | | | Dropped-out children | Reason for dropping out |
|---|---|---|---|---|---|---|
| | | Short | Medium | Far | | |
| Kindergarten children | 10 | 25 | 45 | 70 | - | - |
| School-aged children | 22 | 25 | 45 | 70 | - | - |

**Health services:** The majority of respondents (63.2%), or approximately two out of every three participants, reported that they are able to access healthcare services without any

difficulties. Around one-third of respondents (31.6%) stated that they experience some form of difficulty in accessing medical services. This is likely influenced by factors such as limited availability of doctors and long distances to service facilities. A further 5.3% of respondents did not provide an answer to this question.




***Graph 16. Accessibility of healthcare services***



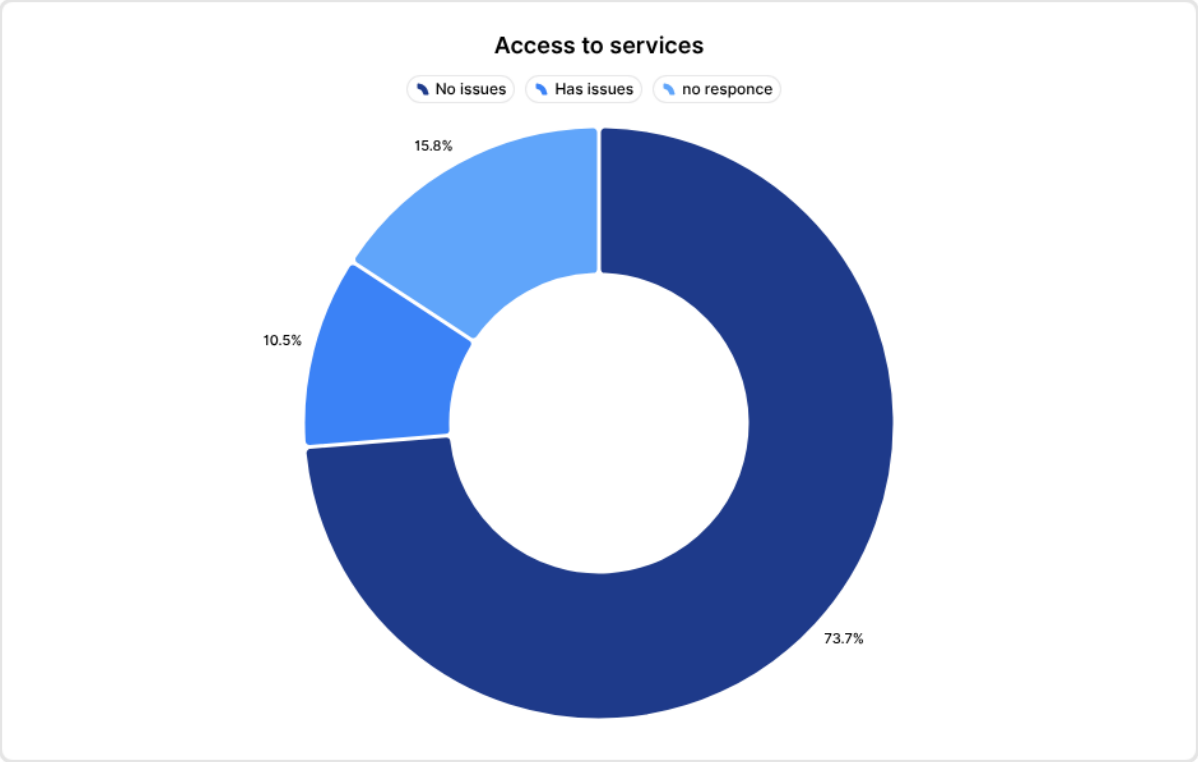

***Graph 17. Accessibility of health service***

Among respondents, 68.4% reported receiving healthcare services at soum hospitals, indicating that the primary burden of healthcare provision is concentrated at the soum level. A total of 15.8% receive care from bag-level doctors, reflecting the need for mobile or home-based services in remote areas. Another 15.8% seek specialized medical services at province-level hospitals.

Overall, 84.2% of respondents access healthcare services at the bag or soum level, suggesting that primary healthcare accessibility is relatively adequate. However, respondents who reported difficulties in accessing healthcare services mainly cited long waiting times and slow service delivery as the primary constraints.

**Public services:** A total of 73.7% of surveyed respondents reported experiencing difficulties in accessing public services. When asked to specify the reasons, 26.3% cited time-consuming procedures, 21.1% indicated long distances, 10.5% reported that administrative

documentation processes are complicated, and 15.8% mentioned other reasons. The remaining respondents did not provide an answer to this question.




***Graph 18. Accessibility of public services (household survey)***

## 2.18. VULNERABLE GROUPS AND GENDER ISSUES

During the construction phase of the road rehabilitation works, there is a potential increase in risks related to the safety and mobility of vulnerable groups, including children, young children with caregivers, and the elderly. Compared to other soum centers, the project road alignment is located closest to Rashaant soum center. Since most residents, schools, and public institutions in this soum are located on the northern side of the project area, the risk to public mobility and road safety is assessed as relatively low. In Undershireet soum, two households with elderly members live near the road alignment, and according to soum administration data, approximately 10 children reside along the road corridor within this soum.

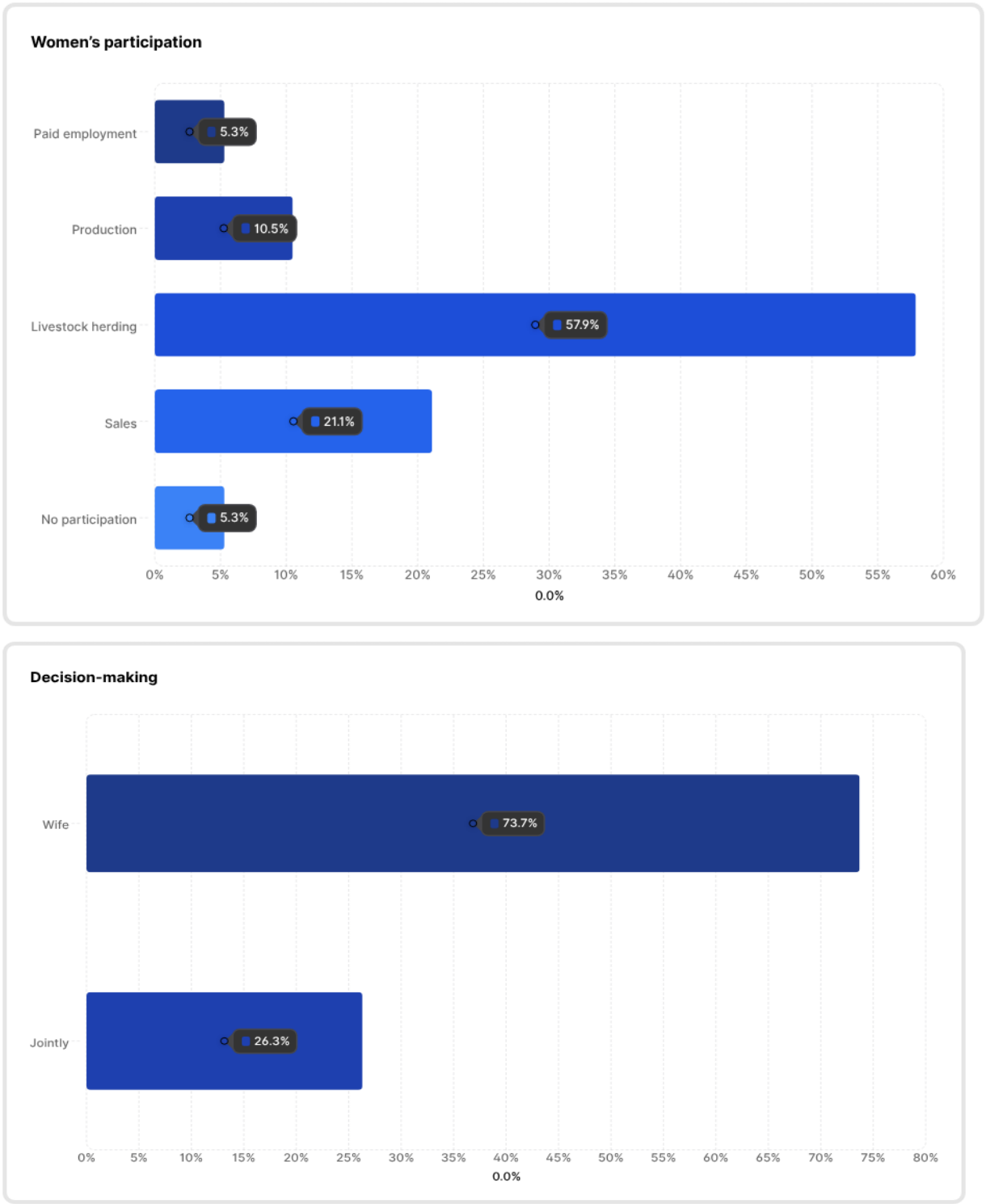
Within the project impact area of Rashaant soum, there are 48 persons with disabilities, 48 single-parent individuals (45 female and 3 male), 18 low-income households, and 20 households classified as target/vulnerable groups. In Burd soum (Khövee area), one person with a disability lives in a roadside service household, and their mobility along the road is limited.

Within a 1 km radius of the project road alignment, the population consists of 51% males and 49% females. Household survey results did not identify any significant gender related issues.

The participation of female household members in household economics and budget decision-making was assessed based on the survey results. NAmong female household members, 57.9% are engaged in livestock husbandry, 21.1% in trade and commerce, and 10.5% in production-related activities. In addition, 5.3% are engaged in wage employment, while the remaining proportion is not involved in any economic activities. These results

indicate that women's employment is mainly concentrated in livestock based livelihoods and trade, with a relatively low share of formal wage employment.

Regarding household budget decision-making, 73.7% of respondents stated that the wife makes financial decisions independently, while 26.3% reported that decisions are made jointly. This indicates a high level of female participation in household financial decision-making.




***Graph 19. Women's participation and household budget decision-making (household survey)***

# CHAPTER 3. LEGAL, REGULATORY, STANDARDS AND POLICY FRAMEWORK

The environmental and social management of the subproject shall be governed by the applicable legal and regulatory framework of Mongolia, the World Bank Environmental and Social Framework (ESF), the relevant Environmental and Social Standards (ESSs), and the applicable World Bank Group Environmental, Health and Safety Guidelines (EHSGs). This chapter defines the principal international and national requirements relevant to the subproject and explains how these requirements shall be translated into project-level and contractor-level environmental and social management measures during implementation.

The subproject consists of road rehabilitation and periodic maintenance works along the A0301 road corridor and therefore gives rise to environmental and social risks and impacts that require structured management throughout the pre-construction, construction, and operation phases. These include, among others, risks related to air quality, dust, noise and vibration, waste generation, wastewater, soil and water protection, biodiversity and protected areas, labor and working conditions, occupational health and safety, community health and safety, temporary land occupation, stakeholder engagement, and cultural heritage.

The purpose of this chapter is therefore to:

(i) identify the World Bank Environmental and Social Standards relevant to the subproject,
(ii) identify the applicable World Bank Group EHSGs and summarize the most relevant requirements,
(iii) define the Mongolian laws, regulations, and standards directly relevant to the subproject, and
(iv) establish a clear compliance pathway linking these requirements to the P-ESMP, the contractor's C-ESMP, and associated thematic management plans and procedures.

## 3.1. RELEVANCE OF THE WORLD BANK ENVIRONMENTAL AND SOCIAL STANDARDS

This subproject shall be implemented in accordance with the World Bank Environmental and Social Framework. Because the subproject involves road rehabilitation and periodic maintenance works, contractor mobilization, temporary facilities, material sourcing, labor and community interfaces, and environmentally sensitive receptors, the applicability of each Environmental and Social Standard has been assessed on a standard-by-standard basis. This section identifies which ESSs are applicable, which are not currently applicable, and what management measures and instruments are required for compliance during subproject implementation.

***Table 44. Relevance of the World Bank Environmental and Social Standards to the Subproject***

| ESS | Applicability | Relevance to the Subproject | Key Instruments / Measures |
|---|---|---|---|
| **ESS1** | Applicable | Road rehabilitation and maintenance works may generate environmental and social risks throughout the project cycle. | P-ESMP, C-ESMP, monitoring, reporting, corrective action procedures |
| **ESS2** | Applicable | Risks related to labor, OHS, worker welfare, grievances, and SEA/SH prevention | OHS Plan, labor arrangements, worker grievance mechanism, code of conduct, training, PPE |
| **ESS3** | Applicable | Resource use, emissions, dust, wastewater, waste, hazardous materials, and spill risks | Waste Management Plan, pollution controls, fuel and chemical handling, monitoring |
| **ESS4** | Applicable | Community safety, road user safety, | Traffic Management Plan, public |

| | | | |
|---|---|---|---|
| | | construction traffic, access restrictions, and camp-related risks | information, emergency response, community safety controls |
| **ESS5** | Screening relevance | Temporary land use or temporary restrictions may arise even if permanent acquisition is not currently expected | Screening, temporary land documentation, consultation, management measures if needed |
| **ESS6** | Applicable | Protected area sensitivity, habitat disturbance, vegetation impacts, biodiversity risks | Protected area controls, biodiversity measures, land restoration, monitoring |
| **ESS7** | Not currently applicable | No qualifying groups identified within the area of influence based on available information | Maintain screening confirmation during implementation |
| **ESS8** | Applicable | Risk of chance finds and impacts on tangible or intangible cultural heritage | Cultural heritage screening, consultation, Chance Find Procedure, training |
| **ESS9** | Not applicable | No financial intermediary financing arrangement | Not applicable |
| **ESS10** | Applicable | Multiple affected and interested stakeholders require disclosure and engagement | Stakeholder engagement, information disclosure, grievance redress, consultation records |

## 3.2. WORLD BANK GROUP ENVIRONMENTAL, HEALTH AND SAFETY GUIDELINES

In addition to compliance with the ESF and applicable Mongolian legislation, the subproject shall apply the relevant World Bank Group Environmental, Health and Safety Guidelines (EHSGs) as technical references for Good International Industry Practice. The General EHS Guidelines present common environmental, health, and safety issues applicable across sectors and are intended to be used together with relevant sector guidance where needed.

These requirements shall be incorporated into the P-ESMP, contractor C-ESMP, OHS Plan, Traffic Management Plan, Waste Management Plan, Emergency Preparedness and Response Plan, Camp Management Plan, and other site-level management documents.

***Table 45. Applicable EHSGs for the Subproject and Their Relevance***

| EHSG / Reference | Applicability to the Subproject | Key Requirements Relevant to the Subproject |
|---|---|---|
| **General Environmental, Health and Safety Guidelines** | Applicable to the entire subproject | Pollution prevention, air quality, noise, wastewater, waste, hazardous materials, OHS, community safety, emergency response, monitoring |
| **Construction-related good industry practice** | Applicable | Dust control, noise control, erosion prevention, spoil management, camp management, rehabilitation, worker and community safety |
| **Road infrastructure-related good practice** | Applicable by relevance to road works | Traffic management, signage, road user safety, accident prevention, safe access, roadside controls |

## 3.3. RELEVANT NATIONAL LAWS AND STANDARDS

This section includes Mongolian laws, regulations, and standards that are directly relevant to the environmental and social risks, impacts, and management requirements of the subproject as a road rehabilitation. Laws and standards that are not materially relevant to the subproject's environmental and social management obligations have been omitted in order to improve clarity, focus, and legal relevance

### 3.3.1. Relevant Laws and Regulations of Mongolia

During all phases of project implementation, the following laws and regulations of Mongolia shall be complied with where relevant to environmental protection, labor relations, occupational

health and safety, waste management, biodiversity conservation, protected areas, land use, public safety, and cultural heritage.

***Table 46. Mongolian Laws and Regulations Directly Relevant to the Subproject***

| No. | Law / Regulation | Relevance to the Subproject |
|---|---|---|
| **1** | Constitution of Mongolia | Provides the overarching legal basis for protection of human rights, health, and a safe living environment. |
| **2** | Law on Environmental Protection | Governs general environmental protection, natural resource use, and prevention of environmental harm during implementation. |
| **3** | Law on Environmental Impact Assessment | Relevant to environmental assessment, environmental management planning, and review/approval requirements applicable to project activities. |
| **4** | Air Law | Relevant to air quality protection, air pollution prevention, and emissions management during construction. |
| **5** | Water Law | Relevant to protection and use of water resources, wastewater control, and prevention of water pollution. |
| **6** | Law on Fauna | Relevant to biodiversity conservation and protection of wildlife potentially affected by project activities. |
| **7** | Law on Soil Protection and Desertification Prevention | Relevant to soil protection, erosion prevention, and management of disturbed land during construction. |
| **8** | Law on Waste | Relevant to reduction, segregation, collection, transport, storage, reuse, recycling, and disposal of waste generated during implementation. |
| **9** | Law on Protected Areas of Mongolia / relevant protected area regime provisions | Relevant to works in or near protected areas, including zoning restrictions and compliance requirements in ecologically sensitive locations. |
| **10** | Land Law / temporary land occupation requirements | Relevant where temporary land use, camps, stockpiles, borrow areas, access restrictions, or ancillary facilities arise. |
| **11** | Law on Occupational Safety and Health | Relevant to worker protection, safe working conditions, and occupational risk control. |
| **12** | Labour Law | Relevant to employment conditions, labor rights and obligations, labor relations, and worker grievance handling. |
| **13** | Law on Fire Safety | Relevant to fire prevention and response for camps, fuel storage, machinery, and temporary facilities. |
| **14** | Law on Meteorology and Environmental Monitoring | Relevant to environmental monitoring and use of climatic and meteorological information where needed for safety and environmental management. |
| **15** | Law on Cultural Heritage / applicable cultural protection provisions | Relevant to protection of cultural heritage and chance-find obligations during ground-disturbing activities. |

### 3.3.2 Relevant National Standards

***Table 47. National Standards Directly Relevant to the Subproject***

| No. | Standard Number | Standard Title | Relevance to the Subproject |
|---|---|---|---|
| **1** | MNS 4585:2025 | Air quality. General technical requirements | Applicable to baseline and construction-phase air quality assessment. |
| **2** | MNS 5885:2008 | Permissible levels of air pollutants. General technical requirements | Applicable to interpretation of air pollutant concentrations. |
| **3** | MNS (ISO) 4226:2000 | Air quality. General concepts and units of measurement | Relevant to air quality monitoring methodology and terminology. |
| **4** | MNS 0017-5-1-21:1992 | Road vehicles. Noise levels and measurement methods | Relevant to traffic and vehicle-related noise assessment. |
| **5** | MNS 0900:2018 | Drinking water for household use. Field testing methods | Relevant to camp water quality and worker welfare. |
| **6** | MNS 4047:1988 | Environmental protection. Hydrosphere. Surface water quality monitoring procedure | Relevant to surface water monitoring where applicable. |
| **7** | MNS 4586:2024 / | Water quality. Guidance for sampling rivers | Relevant to water sampling and |

| | | | |
|---|---|---|---|
| | MNS ISO 5667-6 | and streams | monitoring. |
| **8** | MNS ISO 5667-11:2024 | Water quality. Guidance for groundwater sampling | Relevant where groundwater monitoring is required. |
| **9** | MNS 5850:2019 | Soil quality. Maximum permissible concentrations of pollutants in soil | Relevant to contamination control and soil protection. |
| **10** | MNS 5916:2008 | Environment. Soil stripping and storage of fertile soil during earthworks | Relevant to topsoil management during construction. |
| **11** | MNS 5914:2008 | Environmental protection. Restoration of degraded land | Relevant to restoration of disturbed areas. |
| **12** | MNS 5918:2023 | Re-vegetation of degraded land. General technical requirements | Relevant to revegetation and rehabilitation. |
| **13** | MNS 3298:1991 | Environmental protection. Soil. General requirements for sampling | Relevant to soil sampling where required. |
| **14** | MNS 4990:2023 | Occupational safety and health. Workplace air. General requirements and permissible limits for hazardous substances | Relevant to workplace exposure and worker health protection. |
| **15** | MNS ISO 45001:2018 | Occupational health and safety management systems | Relevant to structured OHS management. |
| **16** | MNS 4244:1994 | Occupational safety standards system. Fire safety general requirements | Relevant to fire prevention and workplace safety. |
| **17** | MNS 5566:2020 | Requirements for mandatory fire-fighting equipment in organizations, buildings and facilities | Relevant to camps, storage areas, and temporary facilities. |
| **18** | MNS 7042:2024 | Railway and high-speed road fences. General requirements | Relevant where fencing or roadside protective barriers are required as part of project safety measures. |

***Table 48. Environmental and Social Instruments Applicable to the Subproject***

| Instrument / Requirement | Applicability to the Subproject | Responsible Entity | Remarks |
|---|---|---|---|
| **Project ESMP (P-ESMP)** | Applicable | IPIU | Primary project-level environmental and social management instrument |
| **Contractor ESMP (C-ESMP)** | Applicable | Contractor, subject to IPIU review/approval | Site-specific implementation instrument |
| **Traffic Management Plan** | Applicable | Contractor | Required due to road works, haul traffic, and public safety risk |
| **Occupational Health and Safety Plan** | Applicable | Contractor | Required under ESS2, ESS4, and EHSG requirements |
| **Waste Management Plan** | Applicable | Contractor | Required for domestic, construction, and hazardous waste streams |
| **Emergency Preparedness and Response Plan** | Applicable | Contractor | Required for spills, fires, accidents, and community safety incidents |
| **Chance Find Procedure** | Applicable | Contractor with IPIU oversight | Required under ESS8 |
| **Stakeholder Engagement and GRM Arrangements** | Applicable | IPIU with contractor support | Required under ESS10 |

# CHAPTER 4. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACT OF THE SUBPROJECT

This section presents an assessment of the current environmental and social baseline conditions in relation to the implementation of the local road rehabilitation project. It further identifies and evaluates the potential positive and adverse impacts that may result during both the construction and operational phases of the project. The assessment has been developed based on field observations, consultations and structured interviews with local residents and relevant stakeholders, as well as a review of secondary data sources and existing documentation.

## 4.1. ENVIRONMENTAL AND SOCIAL IMPACT

This section assesses the environmental and social risks and impacts of the subproject in relation to its technical scope, construction methods, associated and ancillary facilities, area of influence, sensitive environmental and social receptors, and likely residual effects during operation. The subproject involves rehabilitation of the road corridor together with associated works such as pavement rehabilitation, base and shoulder works, drainage improvement, earthworks, material transport, construction camps, material stockpile areas, machinery yards, borrow pits, quarry sites, temporary access arrangements, traffic diversions, fuel and lubricant storage, and waste handling areas.

The subproject is expected to generate important long-term positive benefits. These include improved road condition, reduced travel time, improved year-round access, lower vehicle operating costs, better access to health, education, markets, and public services, enhanced transport efficiency, and reduced dust generation from deteriorated road surfaces. Upgraded drainage structures are also expected to reduce localized erosion, water accumulation, and embankment instability, thereby improving the resilience and long-term performance of the corridor. However, these positive outcomes do not eliminate the need for robust assessment and management of adverse impacts during the pre-construction, construction, and operation phases. The impact profile of the subproject therefore includes both positive development benefits and potentially significant adverse environmental and social risks requiring structured mitigation and monitoring.

### 4.1.1 Environmental and Social Risks and Impacts

#### *4.1.1.1. Pre-Construction Phase*

The pre-construction phase is critical for impact prevention because decisions taken at this stage determine the scale, location, and severity of later impacts. Key pre-construction activities include detailed design finalization, verification of baseline conditions, identification of project-affected stakeholders, selection of borrow pits and quarry areas, siting of camps and temporary facilities, confirmation of haul routes, preparation of traffic management arrangements, environmental and social screening of sensitive locations, and consultation with local stakeholders. Although physical works may not yet have begun, poor planning at this stage can trigger significant downstream impacts during construction and operation. ESS1 specifically requires that environmental and social risks and impacts be assessed and managed throughout the project life cycle, which includes pre-construction decisions and approvals.

A principal pre-construction social risk is inadequate identification of project-affected persons, particularly seasonal herder households, roadside businesses, vulnerable road users, and mobile populations. If these groups are not adequately identified and consulted prior to mobilization, subsequent construction may create unmanaged impacts related to livestock movement, temporary access restrictions, disruption of business operations, reduced service accessibility, and inadequate grievance redress. This risk is particularly relevant for corridor projects where affected groups may be dispersed geographically and may use the road corridor and surrounding land in different ways at different times of the year. Accordingly, pre-construction stakeholder mapping, baseline verification, and consultation are not merely procedural steps but essential safeguards for impact prevention and social risk management.

A second major pre-construction issue is the adequacy of design from an environmental and social perspective. If the detailed design does not sufficiently incorporate drainage capacity, erosion protection, slope stabilization, settlement approaches, speed management, livestock and wildlife crossings, signage, roadside safety features, and access continuity for local communities and service users, the project may create or perpetuate operational safety and environmental risks even after rehabilitation is completed. Pre-construction design review shall therefore include not only engineering performance, but also road user safety, environmental resilience, social accessibility, and protection of sensitive receptors.

The selection of ancillary facility locations is also a material pre-construction environmental and social issue. Borrow pits, quarry sites, camps, stockpiles, fuel storage areas, machinery yards, and temporary roads may generate avoidable impacts if they are located near settlements, pastureland, water points, drainage lines, ecological receptors, protected areas, or culturally sensitive sites. In such cases, the project may create land degradation, access restrictions, biodiversity disturbance, pollution, and community opposition before the main works even begin. For this reason, ancillary facility siting shall be based on environmental and social screening, site-specific review, and where relevant consultation with affected stakeholders. This is particularly important where project activities may affect protected or conserved areas or other ecologically sensitive locations.

Institutional readiness is another material pre-construction risk. Weak coordination among the IPIU, Engineer, Contractor, and local authorities, or delayed approval of contractor-level environmental and social instruments, may reduce the effectiveness of mitigation from the outset. If reporting lines, review procedures, site supervision arrangements, and grievance mechanisms are not operational before mobilization, the project may enter construction without adequate environmental and social controls. Institutional preparedness should therefore be treated as a substantive project risk management issue rather than an administrative matter.

#### *4.1.1.2. Construction Phase*

The construction phase is expected to generate the highest concentration of adverse environmental and social impacts. These arise from earthworks, wildlife and livestock crossing, excavation, pavement removal and resurfacing, drainage rehabilitation, transport of materials, operation of heavy machinery, camp management, worker presence, fuel handling, waste generation, traffic diversions, and the use of borrow pits and quarry sites. Although many of these impacts are temporary and localized, they may be substantial in severity if not adequately

controlled, especially where works interact with local communities, herder-use areas, ecologically sensitive receptors, or sites of cultural sensitivity.

Construction will cause direct disturbance to land and soil through excavation, topsoil stripping, temporary storage of materials, machinery movement, traffic diversions, and temporary site occupation. These activities may lead to soil compaction, topsoil loss, localized erosion, pasture disturbance, altered drainage patterns, and visual degradation. Borrow pits and quarry sites create additional impacts through vegetation clearance, excavation scars, runoff concentration, and long-term land instability if not properly restored. The actual footprint of disturbance may extend beyond the road reserve where temporary roads, camps, stockpiles, or extraction areas are poorly controlled. Land disturbance and soil degradation are therefore environmental impacts of the construction phase and require strict site demarcation, topsoil management, erosion control, and progressive restoration.

Air quality impacts during construction are expected to arise primarily from dust generation and emissions from diesel-powered machinery and haul vehicles. Earthworks, grading, loading and unloading of materials, exposed stockpiles, and vehicle movement on unpaved surfaces may significantly increase dust, especially during dry and windy conditions. These impacts may affect nearby residents, roadside businesses, livestock, workers, and road users, and may also reduce visibility and increase traffic safety risks. Exhaust emissions from construction machinery may further contribute to short-term deterioration of ambient air quality. Accordingly, dust suppression, equipment maintenance, controlled material transport, and location-specific monitoring shall form an important part of construction-phase environmental management.

Noise and vibration will be generated by heavy equipment, transport vehicles, rollers, asphalt works, quarry operations, and camp-related activities. These impacts may affect the comfort, health, and well-being of nearby residents, roadside service users, tourism-sensitive areas, workers, and livestock. Noise and vibration may also alter livestock behavior and reduce the amenity value of surrounding areas. In sensitive locations, these effects may go beyond temporary nuisance and constitute a material impact requiring temporal restrictions, receptor-specific planning, and monitoring.

Water-related impacts may occur from drainage rehabilitation, ditch cleaning, culvert works, equipment washing, camp wastewater, and poor management of fuels and lubricants. Sediment, silt, suspended solids, oil, wastewater, and other contaminants may enter drainage channels or nearby water bodies, particularly during rainfall events. Water abstraction for dust suppression or camp use may also place pressure on local water resources where availability is limited. Inadequate drainage rehabilitation may create longer-term impacts such as runoff concentration, erosion, waterlogging, and embankment instability. Water resource protection and drainage performance are therefore both construction-phase and longer-term environmental concerns under the subproject.

Construction will also generate different types of waste, including excavated spoil, removed asphalt and concrete, packaging waste, scrap materials, domestic waste from workers, used oils, oily rags, and containers of hazardous substances. Improper segregation, storage, transport, or disposal of these wastes may create pollution, fire risk, visual nuisance, and community grievances. Waste management shall therefore be treated as a key environmental

control issue. Hazardous materials and fuels require particular attention, as temporary storage, refueling, and equipment servicing create a risk of spills that may affect soil and water. Proper containment, bunding, spill response measures, and contaminated-soil management shall be established at all relevant locations.

Protected areas, biodiversity (fauna and flora), and ecologically sensitive receptors require explicit consideration during construction. Where road sections, haul routes, camps, borrow pits, stockpiles, or temporary roads are located within or near protected area buffer zone, wildlife-friendly crossing, natural habitat, or protected or conserved areas identified in Chapter 2, the project may cause vegetation loss, habitat disturbance, wildlife displacement, behavioral disturbance from noise and lighting, dust deposition, accidental spills, and uncontrolled off-road access. Even where direct overlap is limited, indirect and cumulative impacts may arise from associated facilities and project-induced movement. ESS6 specifically recognizes the importance of protected area, and wildlife habitats, and requires risks to biodiversity and living natural resources to be identified and managed appropriately.

Occupational health and safety is one of the most significant construction-phase impact areas. Workers will be exposed to excavation hazards, heavy machinery, paving activities, hot bitumen, moving traffic, dust, noise, vibration, manual handling, weather extremes, and delayed emergency response along a long road corridor. If site supervision, training, PPE, incident reporting, medical preparedness, work-rest arrangements, and contractor-subcontractor controls are inadequate, serious injury, occupational illness, and potentially fatal incidents may occur. These are not merely internal contractor matters, they are material environmental and social risks that must be addressed through project-level and contractor-level management systems in accordance with ESS1 and ESS2.

Community health and safety is also a major construction-phase concern. ESS4 emphasizes community exposure to project-related risks, including road safety risks and risks arising from project activities and infrastructure. In this subproject, construction traffic, haul vehicles, detours, reduced visibility from dust, poor signage, active work fronts, livestock crossings, and temporary access disruption may expose residents, road users, pedestrians, herders, and roadside businesses to material risk. These impacts include not only accident risk, but also uncertainty regarding safe passage, reduced access to services, and increased vulnerability of children, elderly persons, and livestock-dependent households. Community safety management shall therefore include traffic control, public communication, safe access arrangements, protection of vulnerable users, and effective emergency response.

Construction may also affect local livelihoods and land use even in the absence of permanent land acquisition. Temporary occupation of land for camps, stockpiles, borrow pits, temporary roads, and material staging areas may disrupt grazing access, livestock routes, access to water points, roadside businesses, tourism-related services, and daily local movement. These impacts may be temporary, but they can still be substantial for affected households and businesses if not planned and communicated properly. The social dimension of construction impacts therefore extends beyond physical safety to include livelihood continuity, access, and local economic resilience.

Worker influx and worker-community interaction may create additional social risks, including tension with local communities, communicable disease concerns, SEA/SH-related risks, and exclusion of vulnerable groups from information and grievance channels. These risks may be amplified where camps are poorly managed, codes of conduct are not enforced, or local liaison arrangements are weak. Social inclusion, worker conduct, camp management, and grievance redress should therefore be considered integral components of construction-phase impact management.

Cultural heritage impacts may arise during ground-disturbing activities such as excavation, drainage works, borrow pit development, temporary road formation, and camp establishment. Even where no confirmed registered cultural heritage site lies within the direct footprint, the possibility of encountering archaeological materials, burial features, ritual sites, or other culturally significant resources remains. ESS8 requires Borrowers to protect cultural heritage and manage chance finds appropriately. Construction-phase impact management shall therefore include cultural heritage screening, worker awareness, and strict implementation of a Chance Find Procedure, including stop-work obligations and notification to competent authorities.

A final but critical construction-phase issue is the closure and rehabilitation of borrow pits, quarry areas, camps, temporary roads, stockpile areas, wildlife and livestock friendly crossing and other disturbed ancillary sites. If these sites are not properly closed, regraded, stabilized, and revegetated, they may remain sources of erosion, stagnant water, livestock and public safety hazards, ecological disturbance, and degradation during operation. Site closure and rehabilitation must therefore be treated as a core environmental and social obligation rather than an optional housekeeping measure.

#### *4.1.1.3. Operation Phase*

During operation, the subproject is expected to deliver substantial positive environmental and social benefits. These include improved access and mobility, enhanced service delivery, better regional connectivity, improved transport efficiency, reduced travel time, and reduced dust generated by deteriorated road surfaces. Improved drainage and more stable road structures are also expected to improve the resilience and long-term performance of the corridor. These benefits represent important positive development outcomes of the subproject.

However, operation may also generate residual and induced adverse impacts. Improved road condition may lead to increased traffic speed and traffic volume, which can in turn increase accident severity if signage, speed management, roadside safety features, settlement approaches, and livestock crossing arrangements are not adequate. This is particularly important in mixed-use rural corridors where the road serves not only through traffic but also local access, herder movement, and roadside economic activity. Operation-phase road safety should therefore be treated as an ongoing environmental and social management issue rather than an impact that is automatically resolved by rehabilitation.

Residual environmental impacts may also continue during operation if drainage maintenance is weak, roadside erosion is not addressed, vegetation recovery on restored sites is poor, or borrow pits and quarry sites are not adequately rehabilitated. In such cases, poorly restored areas may continue to present erosion risk, stagnant water, visual degradation, and safety

hazards for both livestock and people. The quality of construction close-out is therefore directly linked to the environmental performance of the project during operation.

From a social perspective, improved connectivity may stimulate mobility and local economic activity, but may also create new risks for vulnerable users if post-construction road safety measures and user feedback mechanisms are weak. Pedestrians, herders, livestock, and roadside service users may remain exposed to elevated traffic risk. In addition, project benefits may not be distributed equally if specific groups face continuing barriers in access or safety. Operation shall therefore be understood as a stage of both benefit realization and residual risk management.

### 4.1.2. Positive Environmental and Social Impacts

In addition to the risks and adverse impacts described above, the subproject is expected to generate several significant positive environmental and social impacts over the medium and long term. These include improved pavement smoothness and traffic flow, lower fuel consumption, reduced dust emissions from damaged surfaces, improved local air quality, reduced travel time, improved access to essential services, more reliable transport conditions, improved regional connectivity, and enhanced economic opportunities for communities along the corridor. Improved drainage is expected to reduce water accumulation, soil erosion, and instability of the road embankment. The project is also expected to improve year-round accessibility and overall transport resilience for communities and service users in the project area.

***Table 49. Summary of Key Environmental and Social Risks and Impacts by Project Phase***

| Project Phase | Key Risk / Impact Area | Summary Description | Indicative Pre-Mitigation Significance |
|---|---|---|---|
| **Pre-construction** | Incomplete identification of affected parties and sensitive receptors | Herder households, vulnerable users, ecological receptors, water points, and cultural sites may be missed if screening is incomplete | Moderate |
| **Pre-construction** | Inadequate stakeholder engagement and planning | Unresolved issues related to access, livestock movement, ancillary site selection, community safety, and local expectations may carry into construction | Moderate to Substantial |
| **Pre-construction** | Environmentally and socially inadequate design and siting | Poor design or siting of camps, borrow pits, temporary roads, crossings, and drainage may create avoidable long-term impacts | Substantial |
| **Construction** | Land disturbance, soil degradation, and erosion | Earthworks, detours, machinery movement, and ancillary facilities may disturb land, topsoil, and pasture areas | Substantial |
| **Construction** | Air quality, dust, and emissions | Dust from earthworks, hauling, and machinery may affect residents, livestock, and road users | Substantial |
| **Construction** | Noise and vibration | Heavy equipment and transport may disturb nearby residents, businesses, tourism users, and livestock | Moderate to Substantial |
| **Construction** | Water pollution and drainage impacts | Sediment, wastewater, spills, and poor drainage rehabilitation may affect local water quality and runoff | Moderate to Substantial |
| **Construction** | Waste and hazardous materials | Construction, domestic, and hazardous waste may create pollution and fire risk if poorly managed | Moderate |
| **Construction** | Protected areas, biodiversity, and habitat disturbance | Direct and indirect impacts may arise where works or ancillary sites are located in or near ecologically sensitive areas | Substantial |
| **Construction** | Occupational health and safety | Heavy machinery, hot bitumen, traffic-interface work, and remote response constraints create significant worker risk | Substantial |
| **Construction** | Community health and safety / traffic safety | Construction traffic, detours, poor signage, and active work fronts may create accident and public safety risks | Substantial |
| **Construction** | Livelihood disruption, access restrictions, and social disturbance | Grazing access, livestock movement, water access, roadside business operations, and community mobility may be disrupted | Substantial |
| **Construction** | Labor influx, SEA/SH, and | Worker-community interaction and weak camp | Moderate |

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| | social tension risks | management may create material social risks | |
| **Construction** | Cultural heritage / chance finds | Excavation and earthworks may affect known or previously unrecorded cultural heritage | Moderate |
| **Construction / close-out** | Inadequate rehabilitation of borrow pits and temporary sites | Poor restoration may leave erosion, safety hazards, ecological degradation, and visual impacts | Substantial |
| **Operation** | Improved access, mobility, and road condition | Positive impacts on connectivity, service delivery, transport efficiency, and local economic activity | Positive / Significant |
| **Operation** | Increased speed and traffic safety risks | Better road condition may increase travel speeds and accident severity without adequate controls | Substantial to High |
| **Operation** | Livestock collision and user safety risk | Faster traffic may increase collision risk for livestock, pedestrians, and local road users | High |
| **Operation** | Maintenance-related deterioration and drainage failure | Poor maintenance may undermine road integrity, safety, and environmental performance | Substantial |
| **Operation** | Residual ecological and social impacts | Poor restoration, weak safety feedback, or uneven benefit distribution may create residual impacts during operation | Moderate |

## 4.2. RISK ASSESSMENT METHODOLOGY

### 4.2.1. Assessment Approach

The environmental and social risk assessment for the subproject has been undertaken using an integrated qualitative methodology that is consistent with the principles of the World Bank Environmental and Social Framework. The assessment does not rely on a numerical scoring formula. Instead, it applies professional judgment to evaluate the significance of environmental and social risks and impacts by considering the nature and scale of the proposed works, the location and sensitivity of the project area, the types of receptors that may be affected, the magnitude and duration of potential impacts, the reversibility of those impacts, the extent of worker and community exposure, the footprint of associated and ancillary facilities, and the institutional arrangements available to manage, monitor, and correct environmental and social performance throughout the project cycle.

This methodology reflects the requirements of ESS1, under which environmental and social risks and impacts are to be identified, assessed, managed, and monitored throughout the pre-construction, construction, and operation phases of the project.

### 4.2.2. Assessment Dimensions Used in This ESMP

The World Bank's ESF indicates that risk classification takes into account the type, location, sensitivity, and scale of the project, the nature and magnitude of potential environmental and social risks and impacts, and the capacity and commitment of the Borrower.

| Risk level | Description |
|---|---|
| **High** | If mitigation measures are not implemented, there is a high risk of causing serious harm to the public and communities. Immediate priority actions are required, along with continuous and detailed monitoring. |
| **Substantial** | If likelihood and consequences are assessed above moderate levels, there is a significant risk that requires specific mitigation measures and regular monitoring. |
| **Moderate** | Can be managed through standard mitigation measures. Monitoring is required to ensure effectiveness of the implemented controls. |
| **Low** | Can be managed through routine operational controls. |

### 4.2.3. Environmental and social risk and mitigation measurement plan

*Table 50. Environmental mitigation plan*

| No. | Risk / Impact | Description | Pre-Mit. Rating | Mitigation - Generic Best Practice | Mitigation - Project-Specific (105 km Road Section) | Contractor | Engineer | IPIU / Employer | Timing |
|---|---|---|---|---|---|---|---|---|---|
| **PHASE 1 - PRE-CONSTRUCTION AND DESIGN** | | | | | | | | | |
| **1** | Biodiversity and wildlife movement | Road rehabilitation works, temporary roads, camps, quarries, borrow pits, and plant areas may disturb fauna, fragment habitat, and interfere with wildlife and livestock movement in sensitive sections. | Substantial | • Conduct pre-construction biodiversity screening and field verification of sensitive habitats, movement routes, water points, and ecological receptors.<br>• Avoid unnecessary disturbance outside approved footprints.<br>• Apply relevant national standards and good international practice for wildlife movement and habitat protection. | • Identify environmentally sensitive sections within the 105 km corridor and reflect them in the C-ESMP, TMP, quarry/borrow plans, and restoration plans.<br>• Confirm wildlife/livestock crossing locations and warning-sign requirements before works commence.<br>• Exclude camps, crusher plants, asphalt plants, and material storage areas from ecologically sensitive locations. | Contractor Environmental Specialist to carry out field verification, incorporate findings into C-ESMP, and ensure site demarcation. | Engineer Environmental Specialist to review biodiversity screening, confirm sensitive locations, and verify exclusion of ancillary facilities from no-go areas. | IPIU Environmental Specialist to oversee screening results, approve environmental restrictions, and ensure compliance with ESMP commitments. | Before mobilization, site clearance, and approval of C-ESMP. |
| **2** | Environmentally sensitive design and layout | If erosion control, drainage, slope protection, crossing arrangements, and ancillary facility siting | Substantial | • Integrate environmental safeguards into final design.<br>• Minimize land take and temporary disturbance.<br>• Ensure | • Confirm final locations of camps, plants, borrow pits, quarries, spoil disposal areas, and temporary roads through environmental screening before | Contractor design and environmental team to reflect approved environmental requirements in work planning and | Engineer to review design integration of erosion control, drainage, and ancillary facility layout before | IPIU to ensure environmental design requirements are included in final design, bidding documents, and approval | During detailed design finalization and prior to commencement of works. |

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| | | are not properly integrated into design, avoidable environmental impacts may continue during construction and operation. | | drainage, culverts, embankment protection, and erosion-control measures are incorporated at design stage. | approval. • Integrate side-drainage protection, culvert outlet stabilization, and surface runoff management into the 105 km design package. • Avoid unnecessary widening and ad hoc access track formation. | method statements. | earthworks. | conditions. | |
| **3** | Environmental permits, approvals, and management readiness | Construction may commence before site-specific environmental conditions, permits, and management plans are fully in place, resulting in unmitigated impacts. | Moderate | • Obtain all required permits and approvals before mobilization. • Prepare C-ESMP and all site-specific environmental management plans prior to works. • Establish environmental monitoring, incident response, and recordkeeping systems. | • Secure permits and approvals for water use, quarries, borrow pits, camp sites, spoil disposal, and waste transport/disposal before site opening. • Prepare site-specific plans for restoration, waste management, spill response, quarry/borrow management, camp management, and plant operation. | Contractor to obtain permits under contract requirements, prepare site-specific plans, and establish environmental registers before mobilization. | Engineer to review permits, plans, and environmental readiness prior to issuing clearance for works. | IPIU to verify environmental readiness and ensure no works commence without required approvals and plans. | Before Notice to Commence and before opening each work site. |
| **4** | Environmental baseline verification and monitoring readiness | If baseline conditions are not verified before works begin, later monitoring and compliance assessment may be unreliable. | Moderate | • Verify baseline environmental conditions before mobilization. • Establish monitoring points, methods, and reporting | • Confirm baseline conditions for air quality, noise, vibration, water, soil, and sensitive receptors within the project influence area before active works commence. • Ensure | Contractor Environmental Specialist to support baseline confirmation and establish site monitoring records. | Engineer to verify baseline records and monitoring readiness. | IPIU to confirm consistency with ESMP monitoring commitments. | Before mobilization and prior to active site works. |

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| | | | | arrangements. | monitoring equipment, forms, and reporting lines are in place before site opening. | | | | |
| **PHASE 2 - CONSTRUCTION** | | | | | | | | | |
| **5** | Soil erosion, land degradation, and topsoil loss | Vegetation clearing, excavation, embankment works, temporary roads, stockpiles, and repeated machinery movement may cause soil erosion, compaction, and loss of topsoil. | Substantial | • Strip and stockpile topsoil separately for reuse.<br>• Limit disturbance to the minimum required footprint.<br>• Stabilize exposed surfaces and erosion-prone outlets.<br>• Restore disturbed areas progressively. | • Strip and store topsoil from camp sites, temporary roads, quarry/borrow areas, spoil sites, and embankment widening areas.<br>• Apply erosion control at culvert outlets, drainage channels, side slopes, and spoil areas.<br>• Reuse stored topsoil during technical and biological rehabilitation. | Contractor to manage stripping, stockpiling, erosion control, and progressive rehabilitation of disturbed surfaces. | Engineer to inspect erosion-control measures and verify progressive restoration. | IPIU Environmental Specialist and local environmental inspectors to oversee implementation of restoration commitments. | Throughout construction and during restoration. |
| **6** | Air quality and dust generation (PM10 / PM2.5) | Dust from earthworks, haul roads, temporary roads, quarries, crushing, material handling, and vehicle movement may affect nearby receptors and workers. | Moderate | • Apply routine dust suppression.<br>• Cover trucks carrying loose materials.<br>• Enforce speed limits on unpaved roads.<br>• Maintain machinery to reduce exhaust emissions. | • Assign water trucks to active sections, temporary roads, haul routes, quarries, camps, and plant sites during dry and windy periods.<br>• Limit vehicle speed on unpaved and community roads.<br>• Locate asphalt and crushing plants away from sensitive receptors and equip them with dust-control | Contractor (Environmental Specialist, EHS Officer, Site Manager) to implement dust control, equipment maintenance, and monitoring. | Engineer to inspect dust suppression performance, review complaints log, and require corrective action where necessary. | IPIU Environmental and Social Specialists to monitor recurring complaints and ensure protection of sensitive receptors and vulnerable groups. | Throughout construction. |

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| | | | | | systems.<br>• Visually monitor dust and measure PM where complaints arise or off-site plumes occur. | | | | |
| **7** | Noise and vibration | Construction machinery, rollers, pavers, crushing equipment, generators, and material transport may cause nuisance and structural vibration near sensitive receptors. | Moderate | • Restrict high-noise works to daytime hours where feasible.<br>• Maintain equipment properly.<br>• Provide hearing protection for workers.<br>• Notify nearby residents in advance of unusual or night works. | • Limit high-noise works near gers, schools, clinics, and other sensitive receptors to approved working hours.<br>• Conduct vibration checks where heavy compaction occurs close to gers, wells, or fragile structures.<br>• Maintain noise monitoring at high-exposure locations when required. | Contractor to implement work-hour restrictions, equipment maintenance, PPE provision, and monitoring where required. | Engineer to verify compliance with working hours, monitoring requirements, and complaint response. | IPIU to oversee unresolved complaints and protection of sensitive receptors. | Throughout construction. |
| **8** | Surface water and groundwater pollution | Fuel spills, oil leaks, sediment runoff, camp wastewater, and poor storage of chemicals may contaminate streams, wells, and shallow groundwater. | Moderate | • Prevent direct discharge of untreated runoff or wastewater to natural drainage.<br>• Use secondary containment for fuel and lubricants.<br>• Maintain adequate camp sanitation systems. | • Install sediment traps, drainage controls, and runoff retention measures where necessary.<br>• Restrict fueling and maintenance to designated impermeable areas with bunding.<br>• Maintain spill kits at camps, plants, workshops, and fueling points.<br>• Prohibit washing of machinery in streams or drainage lines.<br>• Use septic or sealed holding systems for camp | Contractor (Environmental Specialist, Camp Manager, EHS Officer) to implement spill prevention, sanitation, wastewater, and runoff controls. | Engineer to inspect fuel storage, camp sanitation, spill preparedness, and water protection measures. | IPIU to oversee compliance and follow up significant incidents with relevant authorities. | Before commencement and throughout construction. |

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| | | | | | wastewater. | | | | |
| **9** | Water resource use and abstraction | Construction water demand may place pressure on local water sources if water use is not properly permitted and managed. | Moderate | • Obtain water use permits before abstraction.<br>• Use water efficiently and avoid unnecessary wastage. | • Use only approved water sources for the 105 km works.<br>• Schedule watering during cooler periods where practical to reduce evaporation.<br>• Reuse suitable non-potable water where safe and feasible.<br>• Monitor community water-source complaints and avoid adverse impacts on local users. | Contractor to implement permitted abstraction, efficient water use, and water-use recordkeeping. | Engineer to verify water permits, abstraction records, and protection of community sources. | IPIU to ensure compliance with permit conditions and community water protection commitments. | Before commencement and throughout construction. |
| **10** | Quarry, borrow pit, spoil site, and temporary facility management | Uncontrolled extraction, spoil disposal, temporary roads, camps, plant sites, and material stockpiles may cause land degradation, dust, erosion, drainage blockage, and long-term environmental damage. | Substantial | • Operate all ancillary facilities under approved site-specific plans.<br>• Restrict disturbance to approved footprints only.<br>• Manage topsoil, dust, drainage, and progressive closure. | • Restrict haulage to approved routes only and prohibit ad hoc track creation.<br>• Carry out maintenance of vehicles/equipment only in designated hardstanding areas.<br>• Strip topsoil before spoil placement, place spoil in controlled layers and stabilize slopes.<br>• Progressively close and rehabilitate temporary roads, camps, stockpile areas, and plant sites. | Contractor to implement approved management plans for quarries, borrow pits, spoil sites, camps, temporary roads, and plants, including progressive rehabilitation. | Engineer to inspect ancillary facility management and certify closure of each spoil site, camp, plant site, and borrow/quarry area as applicable. | IPIU to oversee implementation of rehabilitation obligations and close-out compliance. | Throughout construction and at demobilization / close-out. |

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| **11** | Waste and hazardous materials management | Construction waste, domestic waste, used oils, filters, batteries, bitumen residues, and contaminated materials may pollute soil and water if not properly managed. | Moderate | • Implement waste management plan.<br>• Segregate waste by stream.<br>• Store hazardous waste in sealed, labelled containers on impermeable surfaces.<br>• Use licensed waste transport and disposal services. | • Provide labelled bins at camps, worksites, quarries, plants, and workshops.<br>• Prohibit open dumping and open burning.<br>• Maintain waste registers, disposal receipts, and hazardous waste manifests.<br>• Remove all construction and camp waste before site closure and handover. | Contractor (EHS Officer, Camp Manager, Environmental Specialist) to implement segregation, storage, transport, and recordkeeping. | Engineer to inspect storage conditions and review waste logs and disposal records. | IPIU to oversee compliance and coordinate with local authorities where required. | Before commencement and throughout construction, final removal before demobilization. |
| **12** | Biodiversity disturbance and vehicle–wildlife / livestock collision during construction | Construction traffic and workfront activity may disturb wildlife and increase collision risk at sensitive movement locations. | Moderate | • Control vehicle speed in sensitive areas.<br>• Maintain warning signage.<br>• Avoid unnecessary night-time traffic in sensitive sections where feasible. | • Mark livestock / wildlife crossing locations on section TMPs and site maps.<br>• Use warning signs and speed control in known crossing areas.<br>• Record and investigate all wildlife or livestock collision incidents linked to construction activities. | Contractor to implement speed control, signage, and incident recording in sensitive sections. | Engineer to inspect crossing protection measures and review incident records. | IPIU to maintain oversight of biodiversity-related incidents and require additional measures if trends emerge. | Before commencement and throughout construction. |
| **PHASE 3 - POST-CONSTRUCTION AND OPERATIONAL** | | | | | | | | | |
| **13** | Post-construction environmental restoration and site closure | Incomplete restoration of quarries, borrow pits, spoil sites, camps, plants, and temporary roads may leave long- | Moderate | • Restore all temporarily used land to pre-project condition or better.<br>• Verify closure of all ancillary facilities before | • Carry out technical and biological rehabilitation of all disturbed areas, including topsoil replacement, grading, drainage reinstatement, | Contractor to complete rehabilitation and submit site-specific closure records prior to demobilization. | Engineer to inspect and certify closure of each quarry, borrow pit, spoil site, camp, plant area, and | IPIU to oversee final restoration outcomes and ensure unresolved environmental issues are tracked to | Progressive during construction, completed before demobilization and certified before final closure. |

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| | | term land degradation and residual environmental liability. | | final project close-out.<br>• Maintain post-construction monitoring where required. | surface stabilization, and revegetation.<br>• Close all temporary parallel tracks and restore them.<br>• Demobilize and fully restore camp and plant areas before final handover. | | temporary road. | completion. | |
| **14** | Operation-phase erosion, drainage, and environmental maintenance | Poor maintenance of drainage, slopes, culvert outlets, and restored surfaces may lead to erosion, sedimentation, and renewed land degradation after completion. | Moderate | • Conduct routine inspection and maintenance of drainage and erosion-prone areas.<br>• Repair defects promptly during the DNP and early operation period. | • Inspect culvert outlets, side drains, restored slopes, and previously disturbed ancillary-facility sites during the DNP and after major rain events.<br>• Correct erosion, settlement, blocked drainage, or failure of restoration measures without delay. | Contractor to remedy defects during DNP in accordance with contract requirements. | Engineer to verify defect correction and restoration performance during DNP inspections. | IPIU to coordinate with the future maintenance entity and track residual environmental defects during handover. | During DNP and early operation period. |
| **15** | Post-construction wildlife / livestock collision and ecological performance | After road improvement, higher vehicle speed may continue to create wildlife and livestock collision risk, especially in open sections and crossing zones. | Moderate | • Conduct post-construction monitoring of wildlife/livestock crossing performance and roadkill incidents.<br>• Adjust mitigation if incident patterns persist. | • Monitor crossing locations, warning signage effectiveness, and reported collision incidents during the post-construction monitoring period.<br>• Introduce additional signage, speed control, or crossing enhancement if monitoring indicates continuing risk. | Contractor to implement any DNP-period corrective measures required under contract. | Engineer to verify monitoring results and any corrective measures during DNP. | IPIU to oversee post-construction monitoring, coordinate with local authorities, and report material trends where required. | During DNP and agreed post-construction monitoring period. |

*Table 51. Social mitigation plan*

| No. | Risk / Impact | Description | Pre-Mit. Rating | Mitigation - Generic Best Practice | Mitigation - Project-Specific (105 km Road Section) | Contractor | Engineer | IPIU / Employer | Timing |
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| **PHASE 1 - PRE-CONSTRUCTION AND DESIGN** | | | | | | | | | |
| **1** | Incomplete social baseline and PAP identification | Initial social baseline work may not fully identify all project-affected persons (PAPs), seasonal land users, vulnerable households, mobile herders, roadside businesses, and community-use assets before mobilization. | Moderate | • Conduct systematic social screening aligned with ESS1, ESS5, and ESS10. • Prepare and maintain a PAP register covering households, land use, structures, livelihood dependence, and vulnerability indicators. • Update safeguard instruments where new impacts are identified. | • Undertake supplementary household and livelihood verification before opening each active section of the 105 km corridor. • Verify seasonal movement routes, herder camps, water points, roadside businesses, and community-use areas before temporary land occupation. • Maintain a rolling section-by-section verification process throughout mobilization. | Facilitate access for survey and verification teams, notify the Engineer and IPIU of any newly identified PAPs, assets, or land users, avoid land occupation before verification is completed. | Review the social baseline, PAP register, and supplementary verification results, identify data gaps and require corrective action before clearance of works. | Lead supplementary verification, maintain the central PAP register, update ESMP / RAP / RPF instruments and ensure newly identified impacts are addressed before works proceed. | Before design finalization and mobilization, updated as required prior to opening each work section. |
| **2** | Stakeholder engagement, information disclosure, vulnerable group inclusion, and GRM preparedness | Weak consultation coverage, limited outreach to vulnerable groups, and incomplete GRM preparation may result in unresolved concerns, weak project acceptance, and delayed grievance resolution. | Moderate | • Prepare and implement a Stakeholder Engagement Plan (SEP). • Establish the project GRM prior to commencement of works. • Use accessible, culturally appropriate, and inclusive consultation methods. • Maintain auditable records | • Conduct soum- and bag-level consultations before final selection of camps, borrow pits, quarry sites, temporary roads, and work sequencing. • Install project information boards and GRM boards at section-level work areas, soum centres, and other sensitive community locations. • Align engagement with seasonal herder mobility and local livelihood patterns. • | Support site-level information disclosure, advance construction notices, community liaison, and grievance intake. | Review consultation records, disclosure evidence, and GRM readiness, identify implementation gaps and require follow-up actions. | Lead formal stakeholder engagement, project-level disclosure, and central GRM operation, maintain the consultation archive and report progress to the World Bank. | From design stage through pre-construction and construction. |

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| | | | | of meetings, attendance, issues raised, responses, and follow-up actions. | Allow verbal grievance submission and assisted communication for vulnerable persons. | | | | |
| **3** | Temporary land use, access planning, and ancillary facility siting | Poor siting of camps, plant areas, temporary roads, quarries, and spoil areas may restrict access to pasture, water points, businesses, community facilities, and local roads, and may create avoidable social conflict. | Substantial | • Minimize temporary land occupation and avoid unnecessary use of private or community land.<br>• Verify land status and existing use before occupation.<br>• Plan access management and temporary-use arrangements in advance.<br>• Where temporary restrictions on the use of, or access to, land result in adverse impacts, relevant requirements of ESS5 regarding consultation, notification, assessment of impacts, and implementation of measures to assist affected persons shall be applied.<br>• Where verification confirms livelihood | • Confirm final locations of camps, asphalt and crusher plants, quarries, borrow pits, spoil areas, and temporary roads with local authorities and affected users before approval.<br>• Maintain access to pasture, water points, local roads, and service facilities wherever feasible.<br>• Record all temporary land use and access arrangements in the project land-use register and apply compensation/assistance measures where required. | Avoid opening ancillary facilities or temporary access routes before screening, local notification, and approval, maintain temporary access arrangements during works. | Review siting proposals, access arrangements, and land-use implications before site clearance, inspect compliance in the field. | Verify that site selection and temporary land use are consistent with ESMP, RAP / RPF, and stakeholder commitments, approve only screened and cleared locations. | Before approval of ancillary facilities and before commencement of works in each section. |

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| | | | | impacts that cannot be avoided, a dedicated Livelihood Restoration Plan (LRP) shall be prepared before works proceed in the affected section. | | | | | |
| **4** | Design-stage community safety and social compliance readiness | If design-stage road safety, settlement access, livestock movement, and institutional readiness are not adequately addressed, social risks may continue into construction and operation. | Substantial | • Integrate community and road safety review into the final design. • Ensure social management responsibilities, staffing, and reporting arrangements are in place before mobilization. • Deliver ESF induction and role-specific training. | • Confirm design provisions for settlement approaches, livestock crossings, pedestrian access, emergency access, and safe entry/exit points before approval. • Ensure IPIU, Engineer, and Contractor social staff are mobilized and trained before Notice to Commence. • Establish escalation procedures for grievances, incidents, and non-compliance. | Incorporate approved social and community safety requirements into work planning and C-ESMP implementation arrangements. | Review design-stage community safety provisions and verify social management readiness prior to site clearance. | Ensure social requirements are incorporated into final design, contracts, and supervision arrangements , lead capacity-building and institutional readiness. | During design finalization and before Notice to Commence. |
| **PHASE 2 - CONSTRUCTION** | | | | | | | | | |
| **5** | Community health, safety, and traffic management | Construction traffic, temporary diversions, road works, dust, noise, and unsafe work zones may affect residents, road users, school children, | Substantial | • Prepare and implement section-specific Traffic Management Plans (TMPs). • Maintain safe traffic control, barriers, warning signs, and temporary access. • Brief | • Conduct community safety briefings before works commence in each affected soum. • Maintain a 24-hour contact mechanism for urgent incidents and complaints. • Apply special controls at livestock-active areas, settlement approaches, schools, and business clusters. | Implement TMPs, site safety controls, temporary access arrangements, community notices, and incident reporting procedures. | Review and approve TMPs, inspect community safety measures, verify corrective actions for unsafe conditions or unresolved complaints. | Oversee community safety performance, coordination with local authorities, and serious incident follow-up. | Before and during works on each section. |

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| | | roadside users, and livestock. | | communities in advance of major disruptions. | • Maintain at least one safe and passable access route where feasible. | | | | |
| **6** | Labour and working conditions, worker welfare, and worker grievance management | Workers may face unsafe working conditions, wage issues, poor accommodation, weak grievance handling, discrimination, or labour-rights violations if appropriate systems are not enforced. | Substantial | • Implement labour management measures and Worker GRM.<br>• Provide written contracts, timely wage payment, adequate camp conditions, and fair working arrangements.<br>• Prohibit child labour, forced labour, and document confiscation. | • Display Worker GRM procedures in Mongolian at camps and worksites.<br>• Conduct regular inspections of camps, wage records, contracts, and worker welfare conditions.<br>• Ensure gender-sensitive accommodation, sanitation, lighting, and privacy measures where required.<br>• Maintain auditable records for contracts, payroll, grievances, and camp inspections. | Implement labour, welfare, accommodation, and Worker GRM measures for all direct and subcontracted workers. | Inspect camps, labour records, worker welfare, and Worker GRM performance, escalate serious labour violations. | Oversee compliance with LMP and ESMP commitments, require corrective action and follow up material non-compliance. | Prior to mobilization and throughout construction. |
| **7** | Occupational health and safety (OHS) | Workers may be exposed to injury, traffic-interface risk, heat and cold stress, paving hazards, heavy equipment risk, and emergency response limitations at remote sites. | Substantial | • Implement OHS Plan.<br>• Provide PPE, induction, toolbox talks, and task-specific training.<br>• Maintain incident reporting, investigation, and emergency response procedures. | • Apply heat-stress and cold-weather work protocols.<br>• Maintain first aid, medical response, and emergency transport arrangements at all active work fronts.<br>• Provide task-specific protection for paving, compaction, excavation, and traffic-interface operations. | Implement OHS controls, training, incident management, and emergency response arrangements. | Review OHS implementation, investigate incidents, and verify corrective actions. | Oversee serious incident reporting and follow-up, ensure compliance with project OHS commitments. | Prior to mobilization and throughout construction. |
| **8** | Labour influx, worker conduct, SEA/SH, and communicabl | The presence of external workers may create localized | Moderate | • Enforce a Code of Conduct (Annex 6-5) for all workers and subcontractors. | • Restrict worker accommodation to designated camp facilities and prohibit residence in local | Implement Code of Conduct, camp rules, training, confidential | Verify training, camp management, and confidentiality | Maintain oversight of referral pathways and survivor- | Before worker deployment and throughout construction. |

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| | e disease risk | social tension and increase the risk of SEA/SH, harassment, misconduct, and communicable disease transmission in nearby communities. | | • Provide mandatory SEA/SH training and awareness.<br>• Maintain confidential reporting channels and referral pathways.<br>• Apply camp-management rules and behavioural restrictions where necessary. | herder or community households.<br>• Develop SEA/SH Prevention and Response Plan as part of C-ESMP in alignment with outline in annex 6-6.<br>• Activate confidential SEA/SH hotline and referral arrangements before worker deployment.<br>• Conduct gender-sensitive consultations in affected soums and maintain survivor-centred response arrangements. | reporting channels, and workforce awareness measures. | of reporting arrangements, report incidents promptly to IPIU. | centred management, engage specialist support where necessary. | |
| **9** | Temporary access restriction, business disruption, and herder livelihood impacts | Construction may restrict access to pasture, water points, livestock routes, roadside businesses, tourist facilities, community roads, and local services, affecting livelihoods and seasonal economic activity. | Substantial | • Maintain access wherever feasible.<br>• Provide advance notice of restrictions.<br>• Restore disrupted routes promptly.<br>• Address livelihood impacts in accordance with applicable resettlement and compensation instruments. | • Maintain at least one passable access lane unless otherwise approved.<br>• Avoid peak seasonal herder movement periods where feasible.<br>• Provide temporary livestock crossings, local detours, and directional business signage where required.<br>• Avoid restricting access to pasture and wells<br>• In coordination with loca administration and herders, provide alternate pasture and well access where access restriction is inevitable and duly record<br>• Record business and herder-related impacts and resolve them | Implement temporary access measures, local detours, access restoration, and community notification, maintain records of affected users and complaints. | Verify restoration of access, livestock crossings, and business continuity measures, inspect field implementation and recommend corrective action. | Oversee livelihood-related grievances, additional mitigation, and compensation measures where required. | Before and during works, restoration verified at section completion. |

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| | | | | | through applicable mitigation, grievance, and compensation processes documented in the Livelihood resporation Plan (LRP). | | | | |
| **10** | Cultural heritage and chance finds | Earthworks, excavation, borrow operations, temporary roads, and ancillary facility development may affect unknown archaeological materials, sacred sites, local monuments, ovoos, or other cultural heritage resources. | Moderate | • Implement a Chance Find Procedure.<br>• Stop work immediately if cultural materials are encountered.<br>• Notify the Engineer and competent authorities without delay.<br>• Train workers on cultural heritage awareness before site disturbance. | • Verify known local cultural heritage features, sacred places, cemeteries, and ovoos within the project influence area before opening each work site or temporary facility.<br>• Exclude camps, borrow pits, and spoil areas from known cultural heritage locations.<br>• Document all reported finds and the actions taken. | Implement the Chance Find Procedure, stop work when required, protect the find location and notify the Engineer immediately. | Verify compliance with the Chance Find Procedure, coordinate notification and site protection, authorize restart only after clearance. | Oversee compliance with ESS8-related commitments and coordinate with relevant authorities where required. | Before earthworks and throughout construction. |
| **11** | Construction-phase stakeholder engagement and grievance management | If stakeholder engagement and grievance handling are not maintained throughout construction, complaints may escalate, trust may decline, and corrective actions may be delayed. | Substantial | • Maintain regular stakeholder engagement throughout construction.<br>• Operate a multi-channel GRM with transparent acknowledgement and resolution timelines.<br>• Keep confidential and standard grievance channels separate. | • Maintain hotline, complaint boxes, verbal submission options, and soum-accessible intake channels throughout the 105 km construction corridor.<br>• Conduct periodic community information updates in affected soums and bags.<br>• Maintain separate worker and community grievance registers and monitor grievance trends by type and location. | Operate site-level grievance intake points and support ongoing local communication and issue resolution. | Review grievance logs, response times, closure records, and stakeholder communication performance, require corrective action for delays or repeated issues. | Maintain central GRM register, resolve escalated cases, monitor grievance trends, and update corrective measures where required. | Fully operational before construction and maintained throughout implementation. |

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| **12** | Worker conduct in and near protected areas: hunting, poaching, and natural resource extraction | Construction workforce deployed in proximity to the Khugnu-Tarna National Protected Area buffer zone (~8.4 km at Sections 5 and 6) and Batkhaan Mountain Nature Reserve. Workers may engage in unauthorized hunting, trapping, poaching, or extraction of wildlife or natural resources (firewood, plants, soil) during free time, rest periods, or transit through these areas. High-value fauna in the baseline include Great Bustard, Steppe Eagle, and Mongolian Marmot (all nationally | Moderate | • Implement measures to prevent poaching and collection of natural resources in or near natural habitats;<br>• Code of Conduct must explicitly prohibit hunting, trapping, and natural resource extraction;<br>• worker awareness training on biodiversity protection required.<br>• WBG Good Practice Note on SEA/SH and CoC: CoC must cover worker conduct beyond the worksite and during rest periods. | • CoC (Annex 6-5) explicitly prohibits: hunting, trapping, or poaching of any wildlife species including in or near protected areas; unauthorized collection of plants, firewood, or other natural resources etc<br>• Cultural induction includes Mongolian legal penalties for poaching in protected areas; project-level consequences (immediate dismissal); and reporting procedure<br>• Restrict worker movement outside working hours.<br>• Supervision Engineer and/or Environmental Specialist to conducts unannounced checks at camp and along works corridor for evidence of unauthorized wildlife or resource extraction; findings reported to IPIU<br>• IPIU coordinates with Khugnu-Tarna NPA administration and relevant aimag environmental authority before works commence at Sections 5 and 6; ranger contacts shared with Site Manager and EHS Officer; any confirmed poaching or resource extraction incident reported to ranger authority within 24 | Implement CoC; deliver protected area awareness session before deployment at Sections 5–6; enforce movement restrictions; report all suspected violations to Environmental Specialist and CLO | Verify CoC signature for 100% of workers before Commencement Notice at Sections 5–6; verify protected area awareness session attendance; conduct random camp inspections; report confirmed violations to IPIU within 24 hours | Coordinates with NPA administration and aimag environmental authority before works commence at Sections 5–6; receives and escalates confirmed violation reports to relevant authority; includes poaching/resource extraction incident data in biannual WB E&S monitoring reports | Before deployment of any worker at Sections 5 and 6; maintained throughout works in and near protected area sections |

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| | | Endangered or threatened). | | | hours | | | | |
| **PHASE 3 - POST-CONSTRUCTION AND OPERATIONAL** | | | | | | | | | |
| **13** | Operation-phase road and community safety | Improved road condition may increase traffic speed and accident risk for pedestrians, herders, livestock, and roadside users if safety measures are not maintained. | High | • Maintain road safety measures, signs, markings, and warning devices. • Monitor safety performance after opening to traffic. • Address defects and hazards promptly during the DNP and early operation period. | • Inspect settlement approaches, livestock crossing areas, warning signage, and high-risk locations during DNP and early operation . • Coordinate with local authorities and traffic police where additional control or awareness is needed. | Rectify any contract-period safety defects and complete all permanent safety features before Taking-Over. | Verify operation-phase safety condition at Taking-Over and during DNP inspections. | Oversee early operation safety monitoring and coordinate follow-up with relevant authorities and maintenance entities. | At Taking-Over, during DNP, and early operation. |
| **14** | Residual livelihood impacts, temporary land restoration acceptance, and unresolved grievances | Residual access issues, incomplete restoration of temporarily used land, unresolved livelihood impacts, and pending grievances may remain after construction unless formally tracked and closed. | Substantial | • Restore all temporarily used land to pre-project condition or better, unless otherwise agreed. • Track unresolved cases to closure. • Maintain a post-construction feedback and grievance mechanism. | • Verify restoration of temporary roads, camps, plant areas, quarries, borrow pits, and access routes with affected users where applicable. • Maintain a post-construction grievance register through soum-accessible channels . • Formally transfer unresolved construction-phase cases and monitor them until closure. | Transfer all outstanding site-level records and unresolved cases before demobilization, complete outstanding restoration measures. | Verify closure or formal transfer of unresolved cases and confirm site restoration before final contract close-out. | Maintain post-construction register and coordinate follow-up with relevant local authorities and service providers. | Before demobilization, before Taking-Over, and during the agreed post-construction monitoring period. |
| **15** | Inclusive benefit realization, user feedback, | Improved road access may not benefit all groups | Moderate | • Conduct post-construction social monitoring and beneficiary assessment. | • Assess changes in access to markets, services, education, and health care for affected communities along the | Provide relevant records and support post-construction | Verify completeness of close-out and post-construction | Lead beneficiary assessment, user feedback monitoring, | Post-completion and during the agreed monitoring |

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| | and social monitoring | equally unless post-construction monitoring captures user feedback, access outcomes, and remaining barriers for vulnerable groups. | | • Use gender- and vulnerability-disaggregated indicators.<br>• Use findings to inform adaptive management. | 105 km corridor.<br>• Monitor user satisfaction and identify under-served groups, including remote herders, elderly persons, women-headed households, and persons with disabilities.<br>• Use results to strengthen future maintenance and service planning. | verification where required during the contract period. | records during DNP. | and follow-up actions where inequities or unresolved constraints are identified. | period. |
| **16** | Maintenance worker OHS: live traffic exposure, hot asphalt, and confined space hazards | Workers employed by the Road Maintenance Company (RMC) in routine and periodic pavement repair, drainage maintenance, sign replacement, and emergency patching operations face OHS hazards including: (i) exposure to live traffic during roadside and carriageway maintenance; (ii) hot asphalt burns and fume inhalation | Moderate | • Hierarchy of hazard control (eliminate → engineer → admin → PPE) applies to maintenance operations as it does to construction;<br>• permit-to-work for confined space entry and live-traffic works;<br>• hot asphalt P100 respirator and heat-resistant PPE;<br>• minimum 50 m traffic warning signs for all roadside maintenance operations;<br>• flagman or traffic control device at all carriageway maintenance locations<br>• Traffic | • RMC reviews its maintenance-phase OHS Protocol before any maintenance works commence to verify: protocol must cover: live-traffic procedures (minimum 50 m advance warning signs; flagmen or signs at all roadside works); hot asphalt PPE (P100 respirators; heat-resistant gloves and boots); cold weather protocols (no hot asphalt below −15°C; heated rest facilities); confined space entry permit-to-work for all culvert entry; emergency response procedure for remote sections and refines as necessary and implements<br>• PPE must be mandatory for all maintenance workers: high-visibility vest; safety helmet; steel-toe | RMC prepares and implements maintenance OHS Protocol before first maintenance campaign; provides PPE; activates maintenance TMP before any carriageway works; reports incidents to MRTD and IPIU within 24 hours | MRTD/sector authority reviews maintenance OHS Protocol before first maintenance campaign; verifies PPE compliance on spot inspections; reviews incident reports | Confirms maintenance OHS Protocol in place before handover to RMC; includes maintenance worker OHS performance in annual WB E&S monitoring reports for 3 years post-completion | From Taking-Over Certificate; maintained throughout operational life of the road |

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| | | during patching operations; (iii) confined space entry in drainage culverts for cleaning; (iv) working in adverse weather (extreme cold in winter, heat in summer); and (v) remote locations with limited emergency access. | | Management Plan provisions apply to maintenance operations on a live road; maintenance-specific TMP approved by Traffic Police before each significant carriageway maintenance campaign | boots; gloves; P100 respirator for hot asphalt handling; hearing protection for machinery-adjacent work<br>• A maintenance-specific TMP must be activated before any carriageway maintenance that requires lane restriction or closure; TMP addendum reviewed by Traffic Police before use; minimum provisions equivalent to construction-phase TMP of this project<br>• All maintenance workers receive OHS induction including live-traffic safety, hot asphalt handling, and emergency procedures before first assignment<br>• Any maintenance worker injury or near-miss reported to MRTD and IPIU within 24 hours; serious incident reported to WB within 24 hours via IPIU | | | | |

## 4.3. POSITIVE ENVIRONMENTAL AND SOCIAL IMPACTS

***Table 52. Positive project impacts***

| Impact Area | Description | Monitoring Indicator |
|---|---|---|
| **Road safety: reduction in fatalities and serious injuries** | Poor pavement condition, inadequate signs and markings, ineffective drainage, and deteriorated driving conditions contribute to increased accident risk. Rehabilitation of the road to the applicable standard, together with improved signs, markings, warning devices, and safety treatment of hazardous sections, is expected to reduce the frequency of fatal and serious-injury crashes. | Annual number of crashes, fatalities, and serious injuries for the relevant road section, baseline to be established from official section-specific records for 2022–2025, annual comparison after commissioning. |
| **Land use: reduction of parallel informal tracks and degraded land** | Once the rehabilitated paved road is operational, traffic is expected to concentrate on a single main carriageway, reducing the use of informal parallel dirt tracks. This will reduce land degradation, soil compaction, and pressure on pasture areas. | Number of parallel tracks closed or no longer used, area restored, photo and drone/GIS evidence at 6 and 12 months after completion, herder verification forms. |
| **Formalization of former water-holding quarry sites** | Suitable former quarry pits that retain water and are used by livestock may, where technically safe and environmentally acceptable, be formalized and handed over to soum authorities as supplementary local water points. This converts a legacy environmental liability into a locally useful asset. | Number of suitable quarry sites formally handed over, signed soum acceptance records, post-handover inspection records. |
| **Livelihoods: improved market access for herders** | Reliable road access is expected to reduce travel time and transport cost for moving livestock and livestock products to markets. This will support household cash income, product marketing opportunities, and access to services. | Household survey data on travel time to market, transport cost, sales frequency, and self-reported income change, disaggregated by sex and household type. |
| **Access to health services** | Improved road condition is expected to allow households to reach soum, aimag, and referral health facilities more reliably and in less time. This is particularly important for emergency response, referral transport, and routine health visits. | Average emergency response time, travel time to soum/aimag health facilities, before-and-after comparison based on health service records. |
| **Reduced exposure to dust** | By concentrating traffic on the improved paved road and reducing use of parallel dirt tracks, ambient dust exposure around households, service points, and pasture areas is expected to decline. This will have positive effects on health, household conditions, and livelihoods. | PM10 and, where required, PM2.5 measurements at representative sensitive receptors, comparison before project, during implementation, and 6 months after completion. |
| **Local employment and skills development** | Use of local labour during construction will create temporary and short-term income opportunities. On-the-job training will also contribute to improved skills in occupational safety, equipment operation, and site organization. | Number and percentage of local workers employed, sex-disaggregated employment records, number of workers trained, monthly payroll records. |
| **Improved transport reliability and reduced seasonal disruption** | Improved pavement, drainage, and rehabilitation of damaged sections are expected to reduce seasonal travel disruption, delays, and operating difficulties. This will benefit road users, businesses, and local service access. | Average travel time, number of seasonal disruptions/closures, user satisfaction survey results, self-reported change in transport cost. |

*Note: All corridor-specific baseline values, including crash statistics, fatalities, serious injuries, and emergency response times, should be finalized using official section-level records applicable to the relevant A0301 road section. Quantitative targets should be established by the IPIU on the basis of verified data from the responsible authorities.*

# CHAPTER 5. PROJECT ENVIRONMENTAL AND SOCIAL MANAGEMENT ORGANIZATION, ROLES, RESPONSIBILITIES, AND CAPACITY BUILDING

## 5.1. PURPOSE AND INSTITUTIONAL APPROACH

This Chapter establishes the environmental and social management structure for the subproject and defines the roles, responsibilities, reporting relationships, coordination arrangements, and capacity-building measures required for effective implementation of the Project ESMP. As this ESMP is a project-level environmental and social management instrument, overall responsibility for its implementation shall rest with the Integrated Project Implementation Unit (IPIU**)**, acting as the Project Management Office for environmental and social management purposes.

The Contractor shall implement the construction-phase measures assigned to it under the contract, the approved Contractor's ESMP (C-ESMP), and related site-specific plans. However, the Contractor's role shall be understood as one of implementation, while the IPIU shall retain responsibility for overall environmental and social management, strategic oversight, stakeholder engagement, grievance management, compliance follow-up, and reporting. The Supervision Engineer shall act as the independent verification and contract administration entity responsible for reviewing, monitoring, and certifying compliance with environmental and social obligations.

This institutional arrangement is consistent with the World Bank ESF, under which the Borrower is responsible for assessing, managing, and monitoring environmental and social risks and impacts associated with each stage of the project life cycle, and for doing so in a systematic and proportionate manner.

## 5.2. ENVIRONMENTAL AND SOCIAL MANAGEMENT STRUCTURE

Environmental and social management under the subproject shall be organized through a three-tier structure:

- the **IPIU** shall serve as the project-level lead entity and shall be responsible for strategic management, oversight, approvals, stakeholder engagement, central GRM management, coordination with the World Bank and government agencies, and consolidation of environmental and social performance reporting.
- the **Supervision Engineer** shall be responsible for technical review and approval of contractor-level instruments, field-based supervision, compliance verification, non-conformity management, inspection reporting, and certification of compliance with environmental and social requirements under the contract.
- the **Contractor** shall be responsible for day-to-day implementation of all construction-phase environmental and social measures, including labour and working conditions, occupational health and safety, pollution prevention, traffic and community safety, camp management, stakeholder notifications at site level, incident response, rehabilitation of disturbed areas, and maintenance of site records.

In addition, coordination shall be maintained with relevant state and local institutions, including Province and soum administrations, environmental authorities, cultural heritage authorities, police, emergency services, labour and social welfare institutions, and road maintenance authorities, depending on the phase and issue concerned.

*Table 53. Environmental and Social Management Structure*

| Level | Institution / Entity | Primary E&S Role |
|---|---|---|
| **Project-level governance** | IPIU | Overall accountability for ESMP implementation, approvals, reporting, stakeholder engagement, GRM oversight, corrective action follow-up |
| **Compliance verification** | Supervision Engineer | Review and approval of C-ESMP and site-specific plans, field supervision, inspections, non-conformity management, monthly E&S reporting |
| **Site-level implementation** | Contractor | Daily implementation of mitigation measures, OHS, labour management, traffic management, pollution control, community notifications, and rehabilitation |
| **Local support and coordination** | Province / soum administrations and relevant sector agencies | Support on access, vulnerable groups, local disclosure, grievances, emergency coordination, land use, and herder mobility |
| **Post-construction transition** | IPIU with MRTD / responsible road maintenance entities | Handover of E&S obligations, closure of construction-phase actions, operation-phase feedback and monitoring arrangements |

## 5.3. ROLES AND RESPONSIBILITIES

### 5.3.1. IPIU Responsibilities

The IPIU shall be the lead institution responsible for the overall implementation and performance of this ESMP. Its responsibilities shall include, but not be limited to, the following:

The IPIU shall ensure that all project-level environmental and social instruments are prepared, updated, disclosed, and implemented, including the ESMP, SEP, GRM procedures, labour-related oversight arrangements, rehabilitation obligations, monitoring arrangements, and close-out requirements. It shall ensure that environmental and social provisions are reflected in bidding documents, contract conditions, technical specifications, supervision arrangements, and payment-related compliance provisions.

The IPIU shall ensure that no section of works is allowed to commence unless the relevant design, safeguards documentation, section-specific plans, and approvals have been completed. It shall oversee the review and approval process for the Contractor's C-ESMP and related subsidiary plans through the Supervision Engineer and shall verify that contractor-level measures remain aligned with the final project ESMP.

The IPIU shall lead all formal project-level stakeholder engagement and information disclosure**,** maintain the project-level GRM, ensure inclusion of vulnerable and mobile groups, and oversee the timely resolution of grievances. It shall also ensure that separate and confidential arrangements are maintained for SEA/SH-related complaints.

The IPIU shall be responsible for receiving and reviewing monthly environmental and social reports from the Engineer, tracking corrective actions, following up on repeated non-compliance, and escalating material issues where necessary. It shall report environmental and social performance to the World Bank in accordance with agreed reporting requirements.

The IPIU shall maintain a complete documentary archive of approvals, consultation records, GRM logs, training records, monitoring reports, incident reports, non-conformity notices, corrective actions, and closure documentation. This archive shall be maintained in a form suitable for audit, supervision, and World Bank review.

### 5.3.2. Supervision engineer responsibilities

The Supervision Engineer shall serve as the primary contract administration and compliance verification entity for environmental and social matters. The Engineer shall review and recommend approval of the Contractor's C-ESMP and all related site-specific instruments, including traffic management, camp management, borrow pit and quarry management, waste management, labour and OHS arrangements, emergency response, and rehabilitation plans.

The Engineer shall conduct regular site inspections and verify compliance with the ESMP, C-ESMP, contractual provisions, and approved method statements. It shall document site findings, issue non-conformity notices where necessary, verify implementation of corrective actions, and include environmental and social performance in monthly reports to the IPIU.

The Engineer shall verify the adequacy of community safety arrangements, labour and OHS controls, GRM operation at site level, stakeholder notifications, environmental monitoring, and rehabilitation progress. It shall immediately notify the IPIU of any serious incident, fatality, major spill, significant grievance escalation, or repeated breach of environmental and social obligations.

The Engineer shall also verify that demobilization, temporary site closure, and rehabilitation of camps, borrow pits, quarry sites, temporary roads, spoil areas, and other disturbed sites are completed to the required standard before recommending certification of completion.

### 5.3.3. Contractor Responsibilities

The Contractor shall be responsible for the day-to-day implementation of all construction-phase environmental and social commitments assigned under the contract. This shall include preparation, updating, and implementation of the C-ESMP and all supporting site-specific plans.

The Contractor shall appoint and maintain qualified environmental, social, occupational health and safety, and community liaison personnel at site level. It shall implement all mitigation measures related to pollution prevention, waste management, traffic and road safety, labour management, worker accommodation, community notifications, emergency response, and rehabilitation of disturbed sites.

The Contractor shall provide induction and refresher training for workers and subcontractors, implement the Code of Conduct, operate the worker-level grievance mechanism, maintain site registers for incidents, complaints, monitoring, training, and inspections, and immediately report incidents and non-compliance to the Engineer.

The Contractor shall also ensure that subcontractors comply with all relevant environmental and social requirements and that contractor-level controls extend across the subcontracting chain.

### 5.3.4. Local Authorities and Relevant Agencies

Local government institutions and relevant public agencies shall support the project within their legal mandates. Their role may include coordination on local information disclosure, identification of vulnerable households, support for herder route verification, emergency response coordination, local grievance facilitation, rehabilitation acceptance, and operation-

phase transition issues. Their participation does not replace the responsibilities of the IPIU, the Engineer, or the Contractor, but supports effective local implementation.

## 5.4. MINIMUM ENVIRONMENTAL AND SOCIAL STAFFING REQUIREMENTS

To ensure adequate implementation capacity, the following minimum staffing structure shall be maintained for the duration of the project.

*Table 54. Minimum Environmental and Social Staffing Requirements*

| Entity | Minimum staffing requirement | Key responsibilities |
|---|---|---|
| **IPIU** | Environmental Specialist, Social Specialist / Stakeholder Engagement and GRM Focal Point, additional specialist support as needed | Project-level oversight, reporting, approvals, stakeholder engagement, GRM management, corrective action follow-up |
| **Supervision Engineer** | Environmental Specialist, Social Specialist, OHS / Safety Specialist | Compliance review, field inspection, monitoring verification, non-conformity management, monthly reporting |
| **Contractor** | Environmental Specialist, Social Specialist / Community Liaison Officer, OHS Manager / HSE Officer, Camp Manager, GRM focal point | Site-level implementation, monitoring, worker training, camp management, community notification, incident response, rehabilitation |

Where the scale, geographic spread, or risk profile of the works requires, additional personnel or short-term specialist consultants shall be mobilized.

## 5.5. REPORTING, COORDINATION, AND ESCALATION ARRANGEMENTS

A formal reporting and coordination mechanism shall be maintained throughout implementation.

*Table 55. Environmental and Social Reporting and Coordination Arrangements*

| Report / Meeting | Prepared by | Reviewed by / Submitted to | Frequency |
|---|---|---|---|
| **Daily site E&S log** | Contractor | Engineer | Daily |
| **Weekly site compliance summary** | Contractor | Engineer | Weekly |
| **Monthly E&S compliance report** | Contractor | Engineer and IPIU | Monthly |
| **Monthly E&S coordination meeting** | Engineer / IPIU | IPIU, Contractor | Monthly |
| **Serious incident notification** | Contractor / Engineer | IPIU, World Bank as required | Immediate / within project-required period |
| **Quarterly stakeholder engagement and GRM review** | IPIU | IPIU management / World Bank as applicable | Quarterly |
| **Rehabilitation close-out report** | Contractor | Engineer and IPIU | At section close-out and final demobilization |

All serious incidents, fatalities, major environmental events, severe community conflict issues, major SEA/SH cases requiring escalation, and repeated or systemic non-compliance shall be escalated through the project reporting chain without delay.

*Table 56. Capacity Building and Training Plan*

| No. | Training Topic | Main Participants | Lead Responsibility | Timing / Frequency |
|---|---|---|---|---|
| 1 | **ESMP / C-ESMP Implementation and Environmental & Social Compliance Training** | IPIU Environmental and Social Specialists, Supervision Engineer Environmental and Social Specialists, Contractor Environmental Specialist, Contractor Social Specialist / Community Liaison Officer, key site supervisors, GRM focal points | IPIU with support from the Supervision Engineer | Before mobilization, refresher quarterly, and before opening each new construction section where required |
| 2 | **Occupational Health and Safety (OHS),** | Contractor workers and supervisors, OHS Manager / HSE Officer, traffic | Contractor OHS Team with | Induction before deployment, toolbox |

| | | | | |
|---|---|---|---|---|
| | **Traffic and Community Safety, and Emergency Response Training** | controllers, drivers, camp manager, Supervision Engineer safety staff, IPIU observers as required | oversight from the Supervision Engineer and IPIU | talks during construction, formal refresher monthly and before high-risk activities |

## 5.7. TRAINING RECORDS AND EVIDENCE

For every training event, the following minimum records shall be maintained: date, venue, agenda, trainer, participant list with signatures, photographs, materials used, short evaluation or feedback form, and follow-up actions where relevant. These records shall form part of the project E&S archive.

## 5.8. DOCUMENT CONTROL AND RECORD MANAGEMENT

The IPIU shall maintain a centralized archive of key environmental and social records, including approved versions of the ESMP and C-ESMP, consultation records, training records, GRM logs, incident reports, monitoring records, non-conformity notices, corrective action plans, spill records, rehabilitation records, photo evidence, disclosure screenshots, and close-out acceptance documentation. This archive shall support supervision, audit, World Bank review, and institutional memory.

# CHAPTER 6. INFORMATION DISCLOSURE AND PUBLIC CONSULTATION

## 6.1. Introduction

The Stakeholder Engagement Plan (SEP) for the MTCLIP (P174806) and its Additional Financing provides a structured framework for stakeholder identification, information disclosure, consultation, and feedback throughout the project lifecycle. The SEP was originally prepared in July 2021 and updated in June 2023 and February 2026.

The SEP applies to all project components and is publicly disclosed and maintained on the MRT website. The Project is financed through a blended IBRD loan and IDA credit and implemented by MRT, with coordination among relevant national and local institutions.

The SEP is prepared in accordance with the World Bank ESF, particularly ESS10 on Stakeholder Engagement and Information Disclosure, and integrates national legal requirements on consultation, disclosure, and environmental assessment. It is an integral part of the Project's environmental and social instruments, alongside the ESMF, ESMPs, LMP, RPF, and GRM.

## 6.2. Objectives and Scope of Engagement

The SEP establishes a systematic and inclusive approach to engaging stakeholders throughout project preparation, construction, and operation. Its key objectives are to ensure structured stakeholder identification, promote informed and meaningful participation, support transparent information disclosure, incorporate stakeholder feedback into project decision-making, and ensure accessible grievance redress mechanisms.

The SEP applies to all individuals and groups affected by or interested in the Project, including communities along road corridors, herders, transport operators, businesses, government institutions, civil society, and development partners. Special attention is given to vulnerable and disadvantaged groups such as women-headed households, elderly persons, persons with disabilities, and low-income herder communities.

## 6.3. Stakeholder Identification and Engagement Approach

Stakeholders are categorized as project-affected parties and other interested parties. Affected parties include communities along road corridors, roadside businesses, transport operators, workers, and users of last-mile connectivity roads, who may experience both positive impacts (improved access, reduced travel time) and temporary negative impacts (dust, noise, access disruption).

Other interested parties include national and local government agencies, NGOs, private sector actors, academic institutions, and development partners, who contribute to oversight, technical input, and policy alignment.

Engagement is guided by principles of openness, inclusiveness, informed participation, sensitivity to vulnerable groups, and flexibility in communication methods. Special engagement measures are applied to ensure participation of vulnerable groups through targeted consultations, small-group discussions, and localized outreach via soum and bag authorities.

### 6.4 Stakeholder Engagement Program

Stakeholder engagement has been implemented since project preparation and will continue throughout implementation. During preparation, consultations were conducted at national, aimag, and soum levels with government agencies, communities, herders, transport operators, and civil society organizations.

During implementation, engagement activities will include pre-construction consultations, construction-phase community meetings, vulnerable group outreach, and institutional coordination meetings. Engagement methods include community meetings, focus group discussions, public notices, digital communication, site visits, and formal workshops depending on stakeholder type and project stage.

A structured reporting-back mechanism ensures stakeholders are informed of how their feedback has been addressed through meetings, public updates, written responses, and disclosure of mitigation actions. All key project documents, including ESMPs, LMP, RPF, GRM procedures, and construction schedules, are disclosed through MRTD platforms, local offices, and community channels.

### 6.5 Resources, Responsibilities, and Compliance Requirements

The SEP is implemented by MRTD through the Integrated Project Implementation Unit (IPIU), with contractors responsible for site-level engagement under supervision of the IPIU and Supervision Engineers. Resources for SEP implementation are financed under project management and contractor environmental and social budgets.

Minimum mandatory requirements include pre-mobilization consultations, installation of information boards, regular community meetings, and targeted vulnerable group consultations. Contractors must ensure 100% consultation of directly affected households prior to access restrictions or borrow pit activation.

Non-compliance with SEP requirements triggers corrective action plans and may lead to contractual enforcement measures. SEA/SH prevention, code of conduct enforcement, and confidential grievance pathways are mandatory requirements for all contractors.

### 6.6 Grievance Mechanism (GM)

The SEP includes a multi-tier Grievance Mechanism operating at contractor, project (IPIU), and national (MRTD) levels, with access to the World Bank Grievance Redress Service where needed. The mechanism allows submission through multiple channels including phone, email, SMS, written complaints, suggestion boxes, and walk-ins.

All grievances are registered within 24 hours, acknowledged within 2 working days, investigated within 10 working days, and resolved within 20 working days where feasible. The system ensures accessibility, transparency, and protection against retaliation. Anonymous complaints are accepted.

SEA/SH-related grievances are handled through a separate confidential referral pathway and are not processed through the standard grievance procedure.

### 6.7 Monitoring, Reporting, and Disclosure

SEP implementation is monitored by the IPIU through routine tracking of engagement activities, participation levels, grievance performance, and information disclosure effectiveness. Key indicators include number of consultations, participation of vulnerable groups, grievance resolution rates, and satisfaction levels.

Contractors submit monthly engagement and grievance reports, while the IPIU prepares quarterly consolidated reports for MRT and the World Bank. Summarized results, including grievance statistics and engagement outcomes, are disclosed publicly in aggregated form.

The SEP is a living document and may be updated during implementation based on project needs, stakeholder feedback, and emerging risks to ensure continued relevance and effectiveness.

*Table 57. Summary of Consultations with Local Communities, Businesses and Government Organizations*

| No. | Type of Comment / Request | Description of Comment / Request | Stakeholder | Consultation Method and Date | Reflected in ESMP | Responsible Party | Status |
|---|---|---|---|---|---|---|---|
| **A. ROAD SAFETY AND TRAFFIC MANAGEMENT** | | | | | | | |
| 1 | Request to install speed calming measures | Installation of speed limit and warning signs, speed bumps (Burd, Yesunzuil, Rashaan soums) | Business entities and entrepreneur households | Household survey / FGD - 17/11/2025 Household survey / FGD - 19/11/2025Household survey / FGD - 20/03/2026 | ESMP No.19, 32: Measures for installation of speed bumps and road signage included. TMP requires mandatory speed limits and safety signage during construction. | Contractor, IPIU | Included in the Management Plan |
| 2 | Establish pedestrian and livestock crossings | Increase pedestrian and livestock crossings, especially on embankment sections (Undurshireet, Burd, Yesunzuil soums) | Herder households and business households | Household survey - 17/11/2025FGD - 17-24/11/2025Household survey - 19-20/03/2026 | ESMP No.4, 26, 32 (ensure access to businesses, protective fencing). However, locations and number of livestock crossings require further specification in TMP. | Contractor, IPIU | Partially included |
| 3 | Avoid road closure / provide advance notice | At least 3 months advance notice for closures, continuous update of work schedule, start works during low traffic periods | Businesses (Rashaan - Khugnu Tarna), tourism companies (e.g. “Sod Khan Travel” LLC) | Household survey - 17/11/2025Consultation - 18/11/2025Household survey - 19/03/2026 | ESMP No.2: Advance preparation and disclosure of closure schedule, No.25: ensure access to businesses is not blocked | Contractor, IPIU | Partially included |
| 4 | Provide signage and access | Clearly mark livestock, pedestrian and vehicle access points, provide additional safety signage | Business households, entities | Household survey - 17/11/2025Household survey - 19-20/03/2026FGD - 17-24/11/2025 | ESMP No.4 (TMP): road markings and warning signs, No.26 (construction social safety), No.32 (operation phase signage maintenance) | Contractor, IPIU | Included |
| 5 | Insufficient parking area | Need for truck parking and stopping areas (tourism zone of Khugnu Tarna NP) | Tourism businesses | Household survey - 17/11/2025Household survey - 19/11/2025 | Not specifically covered in ESMP, parking determined by design scope and outside project scope | IPIU | Outside project scope, referred to relevant authorities |
| 6 | Schedule works during low traffic periods | Conduct works during low traffic times (night, early morning), avoid tourism season | Businesses, tourism companies | Household survey - 17/11/2025Household survey - 19/03/2026 | ESMP No.25: schedule works in non-tourism season, 14-15: notify residents for night work | Contractor, IPIU | Included |
| **B. LIVESTOCK AND HERDER RIGHTS** | | | | | | | |
| 7 | Livestock accidents and compensation | Clarify responsibility and procedure for | Herder households | Household survey - 17/11/2025FGD - 17- | ESMP 3, 26, 32, 33 partially covers, no specific | IPIU | Not resolved |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | procedure | compensation in case of livestock accidents, dispute resolution unclear | | 24/11/2025 | compensation procedure defined, to be addressed under applicable law | | |
| 8 | Livestock crossings and pasture access | Improve signage to reduce accidents and conflicts | Herder households | Household survey - 17/11/2025 | Covered under ESMP No.32 (operation phase safety) | IPIU, Soum Governor Office | Partially included |
| 9 | Maintain access to pasture | Road alignment cuts pasture, need livestock crossings and continued access | Herder households | Household survey - 17/11/2025FGD - 17-24/11/2025Consultation | ESMP No.3 (ESS5 land use), No.25 (maintain access), requires further specification in TMP | Contractor, IPIU, Soum Governor Office | Partially included |
| 10 | Impact on pasture land | Damage from borrow pits, camps, temporary roads | Herder households, local residents | Consultation (Sep 2025)FGD - 17-24/11/2025 | ESMP No.3 (land acquisition, ESS5), No.4 (location of camps/pits), No.31 (rehabilitation in 2027) | Contractor, IPIU | Included |
| **C. BUSINESS AND LIVELIHOOD IMPACTS** | | | | | | | |
| 11 | Impact on tourism business income | Concern on employment and income loss in Khugnu Tarna tourism zone, economic losses should be assessed | Tourism companies, business households | Household survey - 17/11/2025Consultation - 18/11/2025 | ESMP No.25: avoid tourism season, maintain access, compensation under ESS5, no clear income loss methodology | Contractor, IPIU, World Bank | Partially included |
| 12 | Timely completion of works | Complete works quickly to minimize economic losses | Businesses, herders | Household survey - 17/11/202519/11/202519-20/03/2026FGD | ESMP No.28: scheduling and seasonal planning, no mechanism for delay compensation | Contractor, IPIU | Partially included |
| 13 | Local employment opportunities | Hire local workforce, procure local goods/services | Herder household (Yesunzuil), businesses | Household survey - 19/11/2025FGD - 17-24/11/2025 | ESMP No.5, 27: local employment targets, requires detailed HR plan | Contractor, IPIU | Partially included |
| 14 | Compensation for affected businesses | Clarify compensation mechanism for income loss | Roadside businesses | Household survey - 17-19/11/202519-20/03/2026 | ESMP No.3, 25: compensation per ESS5, requires RPF | IPIU, World Bank | Partially included |
| **D. INFRASTRUCTURE AND ACCESS** | | | | | | | |
| 15 | Maintain household access | Lack of access roads may impact households | Herder and settled households | Household survey - 17/11/2025FGD - 17-24/11/2025 | ESMP No.4, 25, 26: maintain access, provide temporary roads, TMP required | Contractor, IPIU | Included |
| 16 | Drainage and waterlogging | Flooding near access roads during rain, need drainage structures | Business households | Household survey - 19/11/2025FGD - 17-24/11/2025 | ESMP No.20 (flood risk), drainage channels required in design | Contractor, IPIU | Included |
| 17 | Road | Current road width | Businesses | Household survey - | Outside project scope | Ministry of | Outside scope |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | widening/extension | insufficient, request extension | | 19/11/202517/11/2025 | (design issue) | Roads, PIU | |
| 18 | Waste management facility | Lack of disposal sites, need proper waste system | Herder households | Household survey - 17/11/2025 | ESMP No.21, 30: waste management plan, no public disposal site defined | Contractor, Governor Office | Partially included |
| **E. ENVIRONMENTAL IMPACTS** | | | | | | | |
| 19 | Dust control | Concern over dust impacts, request watering and covered trucks | Businesses, herders | Household survey - 19/11/2025FGD - 17-24/11/2025 | ESMP No.13 fully includes dust suppression measures | Contractor, Consultant | Included |
| 20 | Noise and vibration | Impacts from heavy machinery and blasting | Households | FGD - 17-24/11/2025Consultation | ESMP No.14-15: daytime work, mitigation measures | Contractor, Consultant | Included |
| 21 | Water pollution prevention | Risk from camps, fuel stations, chemicals | Herders, residents | Consultation (Sep 2025)FGD | ESMP No.17, 22-23 | Contractor, Consultant, IPIU | Included |
| **F. SOCIAL, LABOR AND GENDER** | | | | | | | |
| 22 | Worker code of conduct | Behavior of external workers, camp rules | Local authorities | Consultation (Sep 2025)FGD | ESMP No.5, 26, 27: CoC, training, OHS | Contractor, IPIU | Included |
| 23 | Inclusion of women and vulnerable groups | Increase participation in consultations | Local residents | FGD - Nov 2025, Mar 2026 | ESMP No.2, 26, 33 | IPIU, Contractor, Social worker | Included |
| 24 | SEA/SH risk baseline | Increased risk due to influx of workers | Local authorities | Consultation (Sep 2025) | ESMP No.5, 26, GRM confidential channel included | IPIU, Contractor | Included |
| 25 | Labor conditions and wages | Ensure compliance with labor law | Local authorities | Consultation (Sep 2025)FGD | ESMP No.27 | Contractor, IPIU, Labor Inspectorate | Included |
| **G. INFORMATION DISCLOSURE AND PARTICIPATION** | | | | | | | |
| 26 | Advance disclosure of work schedule | Notify at least 3 months in advance, inform restrictions | Businesses | Surveys, consultations | ESMP No.2, 25-26, to be detailed in SEP and GRM | Contractor, IPIU | Included |
| 27 | GRM awareness | Ensure accessibility and awareness | Communities | FGD, consultations | ESMP No.2, 26, 33 | Contractor, IPIU, Local Gov. | Included |
| 28 | Participation in decision-making | Engage local stakeholders in decisions | Local authorities | Consultation (Sep 2025) | ESMP No.2, 4, 26 | Contractor, IPIU, Local Gov. | Included |
| 29 | Cultural and natural heritage protection | Protect Khugnu Tarna NP area | Authorities, tourism operators | Consultation (Sep 2025)Survey | ESMP No.5, 29, 18-19, additional guidance may be required | Contractor, IPIU | Partially included |

# CHAPTER 7. GRIEVANCE REDRESS MECHANISM

## 7.1 Grievance Redress Mechanism (GRM)

The Project will implement a Grievance Redress Mechanism (GRM) in line with the World Bank ESF, particularly ESS10 on Stakeholder Engagement and Information Disclosure. The GRM applies to the MTCLIP (P174806) and its Additional Financing. The GRM described in this section reflects the approved version dated 23 February 2026.

It provides a structured, transparent, and accessible system for receiving, recording, tracking, and resolving grievances related to environmental, social, labor, occupational health and safety (OHS), traffic safety, land access, and other project-related impacts across all project phases. The GRM complements, but does not replace, national judicial and administrative grievance systems.

## 7.2 Community Grievance Redress Mechanism

The community GRM is designed for PAPs, local residents, vulnerable groups, road users, businesses, and civil society organizations. It covers grievances related to environmental impacts (dust, noise, pollution, vibration), social impacts (land access, livelihoods, community safety), traffic safety, stakeholder engagement, and general project implementation issues.

Access is ensured through multiple entry points:

- Contractor site-level focal points and grievance boxes
- Local soum and bag authorities assisting vulnerable complainants
- Project-level channels (IPIU email, phone, written and digital platforms)
- National systems such as the 11-11 citizen hotline
- Anonymous submission options

All grievances are registered within 24 hours, acknowledged within 2 working days, screened within 3 working days, and resolved within 20 working days where feasible. The IPIU maintains overall responsibility for coordination, monitoring, and closure.

## 7.3 Workers' Grievance Redress Mechanism

A separate Workers' GRM will be established by each contractor in accordance with ESS2 and the Labor Management Procedures (LMP). It applies to all project workers, including direct, contracted, and primary supply chain workers. The mechanism covers employment-related grievances such as wages, working conditions, occupational health and safety, workplace conduct, and disciplinary matters. Workers may submit grievances through site-based focal points or designated channels, with resolution targeted within 15 working days where feasible. Workers also retain the right to access national labor dispute resolution mechanisms.

## 7.4 Sensitive Grievance Handling (GBV/SEA/SH)

Grievances involving Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH) are handled through a confidential, survivor-centered referral pathway.

These cases are not processed through the standard GRM investigation procedure. Instead:

- Immediate referral to qualified service providers is required

- Informed consent and strict confidentiality are ensured
- No internal investigation or mediation is conducted by project staff
- Records are anonymized and used only for monitoring purposes
- Survivors are protected from retaliation and supported through access to national services

This approach ensures safety, dignity, and compliance with World Bank requirements.

### 7.5 Grievance Handling Process and Escalation

The GRM follows a structured six-stage process:

1. Receipt and registration within 24 hours
2. Acknowledgment within 2 working days
3. Screening and categorization within 3 working days
4. Investigation and resolution within 20 working days
5. Implementation and closure verification by IPIU
6. Escalation to contractor, IPIU, or MRT senior management if unresolved

At all stages, complainants retain the right to access external legal or administrative remedies.

### 7.6 Institutional Responsibilities, Monitoring, and Reporting

Contractors are responsible for first-line grievance intake and site-level resolution, while the CSC provides compliance oversight. The IPIU manages the centralized GRM database, classification, monitoring, and reporting, and MRT provides strategic oversight and escalation review.

Performance indicators include timely registration, acknowledgment, and resolution (with a target of at least 80% resolved within 20 working days and 70% satisfaction rate). GRM data is analyzed for trends to improve mitigation measures and project performance.

Reporting is conducted monthly internally and quarterly to MRT and the World Bank. External grievance mechanisms remain fully accessible, including national courts, the National Human Rights Commission of Mongolia, labor dispute systems, and the World Bank's Grievance Redress Service and Inspection Panel.

# CHAPTER 8. REPORTING AND MANAGEMENT

## 8.1. REQUIREMENTS FOR ENVIRONMENTAL AND SOCIAL DOCUMENTATION REPORTING

Within the framework of this project, rehabilitation works will be implemented on a 105 km section of the national highway A0301, Ulaanbaatar-Arvaikheer direction. During project implementation, all necessary plans, procedures, and reports shall be developed and implemented to mitigate and prevent potential adverse environmental and social impacts, and to ensure compliance with relevant laws, regulations, and standards.

These documents will establish the core framework for identifying environmental and social impacts associated with project activities, planning mitigation measures, monitoring implementation, ensuring stakeholder engagement, and addressing occupational health and safety and social issues.

***Table 58. Reports and Documents to be Developed under the Project***

| No. | Report name | Content | Applicable standard/law | Timeline / frequency |
|---|---|---|---|---|
| 1 | Environmental and Social Management Plan (ESMP) | Measures to mitigate and manage environmental and social impacts | World Bank ESF, Law on Environmental Protection of Mongolia, and relevant standards | Prior to commencement of project impacts |
| 2 | Contractor's Environmental and Social Management Plan (C-ESMP) | Detailed implementation measures of ESMP at site level | | Before construction starts, updated as needed |
| 3 | Environmental and Social Management Framework (ESMF) | Project-level framework establishing the environmental and social principles, screening approach, institutional arrangements, stakeholder engagement requirements, and grievance redress arrangements applicable to all subprojects under the Project | World Bank ESF | Approved at project level and applied throughout project implementation |
| 4 | Environmental Management Plan | Measures to mitigate environmental impacts | National regulation on preparation and reporting of EMPs | Before commencement of project impacts |
| 5 | Traffic Management Plan (TMP) | Traffic safety and transport risk mitigation measures | World Bank ESS4 | Before construction starts, updated during implementation |
| 6 | Labor Management Procedures (LMP) | Labor conditions, rights, and grievance handling | World Bank ESS2 | Before any project activities, reviewed annually |
| 7 | Gender-Based Violence Prevention and Response Plan | Prevention and response to SEA/SH and GBV | World Bank ESS2, ESS4, ESS10 | Before project start, updated regularly |
| 8 | Occupational Health and Safety (OHS) Plan | Worker safety and accident prevention measures | World Bank ESS2 | Before any work begins, implemented continuously |
| 9 | Waste and Hazardous Materials Management Plan | Classification, storage, and disposal of waste | World Bank ESS3 | Before construction starts, continuously implemented |

| | | | | |
|---|---|---|---|---|
| 10 | Erosion and Water Drainage Protection Plan | Soil erosion, drainage, and water protection measures | World Bank ESS1, ESS3 | Before construction, monitored quarterly |
| 11 | Biodiversity Management Plan | Mitigation of impacts on flora and fauna | World Bank ESS1, ESS6 | Before project impacts, reviewed annually |
| 12 | Workers' Camp Management Plan | Housing, sanitation, and social risk management | World Bank ESS2, ESS4 | Before construction, regularly monitored |
| 13 | Construction Site Management Plan | Site organization, safety, and environmental protection | World Bank ESS1, ESS3, ESS4 | Before construction, updated during implementation |
| 14 | Emergency Preparedness and Response Plan | Response measures for accidents and disasters | World Bank ESS2, ESS4 | Before construction, reviewed annually |
| 15 | Pollution Prevention Plan | Air, water, and soil pollution control measures | World Bank ESS3 | Before project impacts, continuously implemented |
| 16 | Materials Source and Quarry Management Plan | Material sourcing, use, and rehabilitation | World Bank ESS1, ESS3, ESS6 | Before construction, monitored during use |
| 17 | Chance Find Procedure | Measures for cultural heritage discoveries | World Bank ESS8 | Before construction, applied when needed |
| 18 | Stakeholder Engagement Plan (SEP) | Public participation and information disclosure | World Bank ESS10 | Throughout the project |
| 19 | Grievance Redress Mechanism (GRM) | Project-level mechanism for receiving, registering, assessing, resolving, and reporting community and worker grievances, including a separate confidential channel for SEA/SH-related complaints, aligned with the Project ESMF and maintained by the IPIU with site-level support from the Contractor | World Bank ESS10, ESS2 | Operational prior to commencement of works and maintained throughout construction, close-out, and post-construction transition period |

## 8.2. INSTITUTIONAL ARRANGEMENTS AND RESPONSIBILITIES DURING PROJECT IMPLEMENTATION

### 8.2.1. Environmental and Social Management

Environmental and social management shall be undertaken throughout the full project cycle, including pre-construction, construction, demobilization, rehabilitation, handover, and the post-construction transition period. The process shall be implemented through the following four interrelated steps.

**Step 1. Screening, baseline verification, and identification of risks and impacts**

The IPIU, with technical support from the Supervision Engineer and relevant specialists, shall ensure that environmental and social baseline conditions in the project area are reviewed and verified in accordance with the Project ESMF, the final project design, and available field data. This process shall include identification of environmental and social receptors, project-affected stakeholders, vulnerable groups, potential community safety risks, labour and working condition risks, biodiversity-related sensitivities, cultural heritage risks, temporary land use impacts, and rehabilitation obligations associated with ancillary facilities and construction activities.

Based on this process, the environmental and social risks and impacts of the subproject shall be identified and categorized, and the required environmental and social management instruments shall be confirmed in accordance with the Project ESMF. For this subproject, the principal

instrument is the Project ESMP, supported by the Contractor's ESMP and relevant subsidiary plans. Where additional instruments or procedures are required under the ESMF, they shall be prepared and applied accordingly.

**Step 2**. **Preparation and updating of environmental and social instruments**

Relevant environmental and social management documents shall be prepared on the basis of the identified risks and impacts and in accordance with the requirements of the Project ESMF, the World Bank ESF, and applicable Mongolian legislation. These documents shall clearly define the nature, scale, location, and duration of impacts, mitigation and preventive measures, monitoring arrangements, stakeholder engagement measures, grievance procedures, rehabilitation obligations, institutional responsibilities, and reporting requirements.

The Contractor's C-ESMP and all associated site-specific plans shall be prepared prior to commencement of construction and shall be reviewed by the Supervision Engineer and approved through the established project procedures. These documents shall remain aligned with the final Project ESMP and shall be updated where project conditions materially change.

**Step 3. Review, approval, disclosure, and integration into implementation**

All required environmental and social instruments shall be reviewed and approved in accordance with the Project ESMF, the ESMP approval procedures, and applicable legal requirements. Once approved, these documents shall be integrated into project implementation arrangements, supervision procedures, and contract administration processes.

The IPIU shall be responsible for formal information disclosure and stakeholder engagement at project level, while the Contractor shall support site-level disclosure and advance notification of construction activities, traffic changes, and temporary disruptions. Approved documents shall be disclosed through appropriate channels, including official communication mechanisms, local consultations, information boards, and other accessible means as required under the Stakeholder Engagement Plan.

The grievance redress mechanism shall be implemented in a manner fully consistent with the Project ESMF. The project-level GRM shall be owned and overseen by the IPIU, while the Contractor shall support site-level intake and communication. Worker grievances shall be managed through a separate Worker GRM consistent with ESS2, and SEA/SH-related complaints shall be handled through a separate confidential channel.

**Step 4**. **Implementation, monitoring, corrective action, and reporting**

The mitigation, monitoring, stakeholder engagement, grievance handling, labour management, occupational health and safety, pollution prevention, and rehabilitation measures defined in the ESMP and related plans shall be implemented throughout the project cycle.

The Contractor shall carry out day-to-day implementation and site-level monitoring. The Supervision Engineer shall verify compliance through regular inspections, monitoring review, and non-conformity management. The IPIU shall oversee implementation performance at project level, track corrective actions, review grievance trends, ensure that unresolved or

systemic issues are escalated appropriately, and submit periodic environmental and social reports to the World Bank.

Monitoring and reporting results shall be used not only to track compliance, but also to identify recurring issues, strengthen stakeholder engagement, improve mitigation effectiveness, and update environmental and social management measures where necessary.

### 8.3. IMPLEMENTATION AND MONITORING

The Environmental and Social Management Plan (ESMP) is an integral part of subproject implementation and monitoring. Day-to-day implementation of construction-phase measures shall be carried out by the Contractor at site level in accordance with the approved Contractor's ESMP, relevant method statements, and contract requirements. However, overall responsibility for project-level environmental and social management shall remain with the IPIU.

Monitoring and supervision shall be carried out at the following levels:

- **Contractor:** daily implementation, site-level monitoring, internal inspections, incident reporting, grievance intake support, and implementation of corrective actions,
- **Supervision Engineer:** technical oversight, compliance verification, field inspections, non-conformity management, and monthly environmental and social reporting to the IPIU,
- **IPIU:** strategic monitoring, stakeholder engagement oversight, management of the project-level GRM, coordination, corrective action follow-up, consolidation of project-level reporting, and reporting to the World Bank,
- **World Bank:** external oversight, review, and implementation support in accordance with the financing agreement and applicable ESF requirements.

Reporting shall be undertaken through the following minimum formats:

- monthly progress reports,
- monthly environmental and social compliance reports from the Contractor through the Engineer to the IPIU,
- quarterly environmental and social monitoring reports at project level,
- incident reports for accidents, serious grievances, major spills, fatalities, significant community safety events, SEA/SH-related incidents requiring escalation, and other unforeseen events,
- section close-out and rehabilitation completion reports,
- post-construction grievance transition and close-out records, where applicable.

An annual environmental and social implementation review shall be prepared by the IPIU, consolidating implementation progress, key risks, grievance trends, stakeholder engagement outcomes, corrective actions, and outstanding issues. Where required under Mongolian law, the annual environmental management reporting requirements shall also be fulfilled in a manner consistent with the Project ESMP.

# CHAPTER 9. ENVIRONMENTAL AND SOCIAL MONITORING

The legal framework for implementing environmental monitoring activities in Mongolia is based on relevant laws, regulations, procedures, and national standards. Within the scope of the project, continuous monitoring and assessment of environmental quality, along with the timely implementation of necessary mitigation measures, constitute an integral part of the national environmental protection policy and legal framework.

Defining baseline environmental monitoring indicators serves as a fundamental tool for assessing the status and quality of environmental components, including air, water, soil, noise, and biodiversity. These indicators are essential for identifying pollutants, assessing impacts caused by human activities, evaluating the effectiveness of waste management, and planning appropriate mitigation measures to reduce adverse impacts.

Environmental monitoring under this project shall be implemented in compliance with the following legal and regulatory documents:

- Law on Environmental Protection (1995, revised edition)
- Law on Environmental Impact Assessment (2012, revised edition)
- Law on Waste (2017)
- Law on Land (2002)
- Regulation on the Preparation, Review, Approval, and Reporting of Environmental Management Plans (2019)
- Relevant national standards (refer to Chapter 2 for details)

In accordance with the above legal framework, and particularly the "Regulation on the Preparation, Review, Approval, and Reporting of Environmental Management Plans" (2019), environmental monitoring shall be implemented in a systematic and planned manner.

Therefore, an Environmental Monitoring Plan has been developed to ensure that environmental changes are regularly observed, measured, analyzed, documented, and reported at each stage of project implementation and operation, and that corrective actions are taken when necessary.

The road rehabilitation contractor shall implement the Environmental and Social Monitoring Program throughout all phases of construction and operation to ensure effective implementation of mitigation measures specified in the Environmental and Social Management Plan (ESMP), particularly those aimed at minimizing environmental and social impacts. In addition, the contractor shall evaluate the impacts of monitoring program indicators.

Monitoring during construction and operation shall be carried out monthly/quarterly in accordance with checklists prepared by the contractor.

The External Environmental Consultant (EEC) shall provide recommendations on corrective and preventive measures in case any issues arise during ESMP implementation.

Furthermore, during the road rehabilitation construction phase, the contractor shall monitor changes in baseline environmental conditions, assess the effectiveness of mitigation measures,

and implement corrective actions where impacts related to construction activities cannot be avoided or minimized.

The contractor shall organize monitoring activities, while the Integrated Project Implementation Unit (IPIU) and its external environmental and social consultants shall supervise implementation. This supervision ensures compliance with contractual obligations and monitors stakeholder engagement throughout project implementation.

- Environmental and social inspections shall be conducted monthly/quarterly to ensure compliance with ESMP, World Bank requirements, and national standards. Random site inspections may also be conducted.
- Monitoring reports shall include corrective actions and their implementation status.

Monitoring indicators, thresholds, parameters, locations, frequency, and responsible entities are defined in the monitoring plan.

*Table 59. Environmental and Social Monitoring Plan*

| Monitoring Indicator | Location | Frequency / Timing | Methodology / Standards | Cost (Year 1 Construction Phase) | Cost (Year 2 Operation Phase) | Responsible Entity (Implementing) | Supervising Entity |
|---|---|---|---|---|---|---|---|
| **CONSTRUCTION PHASE** | | | | | | | |
| **Air Quality:** Dust (µg/m³), CO (µg/m³), $SO_2$ (µg/m³), $NO_2$ (µg/m³) | 3 monitoring points near project site | Once per quarterly | MNS 4585:2025 Air Quality Standard, MNS 5885:2008 Permissible Limits | Measurement cost×4 | Measurement cost×4 | Contractor in collaboration with accredited entity | Supervision Consultant, IPIU |
| | 1 monitoring points near settlements | Every month | | Measurement cost×7 | Measurement cost×4 | | |
| | 1 monitoring points near protected area | Every month | | Measurement cost×7 | Measurement cost×4 | | |
| **Noise:** Max level (dBA) | 3 monitoring points near project site | Twice per year | | Measurement cost ×10 | Measurement cost ×10 | Contractor with specialized organization | Supervision Consultant, IPIU |
| | 1 monitoring points near settlements | Every month | | Measurement cost×7 | Measurement cost×4 | | |
| | 1 monitoring points near protected area | Every month | | Measurement cost×7 | Measurement cost×4 | | |
| **Water Quality:** Hydrochemical (mg/L), Physical (°C), Biological, Heavy metals (As, Pb, Zn, Cd, Fe, Cu) | 3 herder wells near project site | Twice per year | MNS 4586:2024 Water Quality, MNS 0900:2018 Drinking Water Hygiene | Lab analysis cost ×6 | Lab analysis cost ×6 | Contractor via accredited laboratory | Supervision Consultant, IPIU |
| | Tarnai river | Twice per year | | Lab analysis cost ×2 | Lab analysis cost ×2 | | |
| **Soil Quality:** Physical, agrochemical, heavy metals (As, Pb, Zn, Cd, Fe) | 5 monitoring points near project site | Twice per year | MNS 5850:2008 Soil Pollution Limits, MNS 5914:2008 Land Rehabilitation | Lab analysis cost ×10 | Lab analysis cost ×10 | Contractor via accredited laboratory | Supervision Consultant, IPIU |
| **Vegetation:** Species, cover, biomass | 2 monitoring points near project site | Once per year (July) | MNS 5546:2004 Pasture Degradation Assessment | Measurement cost ×2 | Measurement cost ×2 | Contractor with specialists | Supervision Consultant, IPIU |
| **Fauna:** Species, population, distribution | Migration and habitat areas, especially near water sources | Field surveys as required | Field surveys, community-based data collection | Measurement cost ×1 | Measurement cost ×1 | Contractor with experts | Supervision Consultant, IPIU |
| **Waste Management:** Solid, liquid waste (workers) | Camps, work sites | Twice per year (spring, autumn) | Site inspections, records, surveys | Measurement cost ×2 | Measurement cost ×2 | Contractor | Supervision Consultant, IPIU |
| **Labor and Working Conditions:** | Camp, worksite, | Monthly, incident-based | Employment contracts, payroll | Included in operational | Included in operational | Contractor submits monthly reports via | IPIU Social Specialist, |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| • % of workers with written contracts (target: 100%)<br>• Timely payment of wages<br>• Presence of workers under 18 (target: 0)<br>• Retention of personal documents (target: 0)<br>• Share of local workers (target: ≥30%) | Contractor HR records | inspections | records, ID verification documents, IPIU labor inspections (ESS2, Labor Law of Mongolia, Article 7) | costs | costs | Supervising Engineer to IPIU | World Bank |
| **Occupational Health and Safety (OHS):**<br>• Lost Time Injuries (LTI) (target: 0)<br>• Near-miss incidents • PPE compliance (target: ≥95%)<br>• Pre-employment medical screening (target: 100%)<br>• OHS training coverage (target: 100%) | All worksites, camps | Daily (OHS logs), monthly summary, incident-based, spot checks | Daily OHS logs, incident reports, PPE inspection records | Included in operational costs | Included in operational costs | Contractor OHS Specialist reports monthly via Supervising Engineer to IPIU | IPIU Social Specialist, World Bank |
| **Worker Grievance Redress Mechanism (WGRM):**<br>• Number of grievances received (disaggregated by gender)<br>• % resolved within 10 working days (target: ≥90%)<br>• Ratio of resolved/total grievances<br>• SEA/SH grievances separately recorded (target: immediate resolution) | Camp, Contractor WGRM records | Monthly, SEA/SH within 24 hours | Standard grievance forms, W-GRM logbook, electronic database | Included in operational costs | Included in operational costs | Contractor submits monthly reports via Supervising Engineer to IPIU | IPIU Social Specialist, World Bank |
| **Code of Conduct (CoC) and SEA/SH Training:** • % of workers signing CoC (target: 100%)<br>• SEA/SH prevention training coverage (target: 100%)<br>• Refresher training (quarterly)<br>• Female focal point appointed (target: Yes) | Camp, Contractor records | Training before mobilization and quarterly, verification monthly | Training attendance sheets, signed CoC registry | Included in operational costs | Included in operational costs | Contractor submits quarterly reports via Supervising Engineer to IPIU | IPIU Social Specialist, World Bank |
| **Traffic Safety (during** | Along all work | Weekly | Supervising Engineer | Included in | Included in | Contractor (OHS + | IPIU Social |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **construction):**<br>• Number of traffic accidents (target: 0)<br>• TMP compliance (signage, barriers) (%)<br>• Heavy vehicle speed compliance (%)<br>• Availability of traffic controllers | sections, as per TMP | inspections, incident-based | TMP inspection logs, accident reports, compliant with Mongolian Road Traffic Safety Law | operational costs | operational costs | Traffic Controller) submits weekly reports via Supervising Engineer to IPIU | Specialist, World Bank |
| **SEA/SH Monitoring:**<br>• Baseline data (registered SEA/SH cases – e.g. 5 cases in 6 soums in 2024)<br>• Number of SEA/SH complaints during construction • % responded within 24 hours (target: 100%) • Female GRM focal point appointed and trained • Referral pathways established | Baseline: Police records in 6 soums, During construction: confidential GRM channels | Baseline before construction, monthly during construction | Confidential GRM records, police reports for baseline | Included in operational costs | Included in operational costs | Contractor ensures immediate referral and reports within 24 hours to IPIU, monthly aggregation | IPIU Social Specialist reports to World Bank within 24 hours |
| **Emergency Access:** • Emergency vehicle access maintained<br>• Advance notice ≥14 days before road closure (%) | All work sections, road closure points | Weekly inspections, per closure | TMP inspections, public notification records (SMS, posters) | Included in operational costs | Included in operational costs | Contractor (OHS + Traffic Controller) reports weekly via Supervising Engineer to IPIU | IPIU |
| **Stakeholder Engagement (SEP implementation):**<br>• Number of meetings vs SEP schedule (target: ≥1 per soum/month)<br>• Number of participants (≥20% women)<br>• Number of disclosed documents (ESMP summary, GRM info) | 6 soums, notice boards, roadside stops, service centers, public gathering points | Monthly meetings, notices ≥14 days prior to road closure | Meeting minutes, attendance sheets (gender-disaggregated), photo evidence of disclosures | Included in operational costs | Included in operational costs | Contractor (OHS + Community Liaison Officer) reports monthly via Supervising Engineer to IPIU | IPIU Social Specialist |
| **Community GRM:**<br>• Total grievances received (monthly, by gender/category)<br>• % acknowledged within 2 days (target: 100%)<br>• % resolved within 7 days (low risk ≥90%) • Cases | Camp, site offices, grievance boxes in 6 soums, contact: +976-85453999 | Boxes checked weekly, monthly reporting, quarterly summary | Standard grievance forms, consolidated GRM log, closure sign-off sheets | Included in operational costs | Included in operational costs | Contractor submits monthly reports via Supervising Engineer to IPIU | IPIU Social Specialist, World Bank (GRS) |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| unresolved >30 days (target: 0)<br>• Awareness level among affected households | | | | | | | |
| **Vulnerable Groups Monitoring:**<br>• Number of registered vulnerable households<br>• % contacted quarterly (target: ≥80%)<br>• Women participation in separate consultations | Vulnerable households in Rashaan, Undurshireet and other identified baghs | Monthly contact, quarterly update | Communication logs, vulnerable group registry | Included in operational costs | Included in operational costs | Contractor submits quarterly reports via Supervising Engineer to IPIU | IPIU Social Specialist, Soum Social Worker |
| **Stakeholder Satisfaction** | Contractor organization | Annually | Within routine monitoring framework | - | - | IPIU, Local Authorities | IPIU, Local Authorities |
| **Incident Monitoring** | Project implementation sites | As incidents occur | Incident investigation, risk assessment, mitigation measures | - | - | Contractor, IPIU | Local Authorities, IPIU |

# Annex 6-1. Borrow pit and quarry restoration plan

### 6-1.1 Purpose

The purpose of this Plan is to ensure that all borrow pits, quarries, associated temporary access roads, stockpile areas, workshop areas, fuel points, and other ancillary areas used under the Project are safely closed, technically and biologically rehabilitated, and restored in an environmentally sound and stable manner following use, so that the affected land is returned to a condition equivalent to, or better than, its pre-project condition.

### 6-1.2 Scope

This Plan applies to all of the following:

1. New borrow areas used under the Project,
2. Stone, gravel, and soil quarry sites,
3. Temporary material stockpile areas,
4. Temporary access roads to borrow pits and quarries,
5. Workshops, fuel storage areas, loading areas, and associated ancillary sites,
6. Legacy disturbed areas included under the Project for closure and rehabilitation, where applicable.

### 6-1.3 Objectives

The objectives of this Plan are to:

- confine disturbance strictly to approved footprints,
- protect and reuse topsoil,
- stabilize slopes, edges, excavated faces, and spoil formations,
- prevent ponding, erosion, sedimentation, dust generation, and unsafe depressions,
- ensure safety for people, livestock, and vehicles,
- restore vegetation cover, and
- implement post-closure monitoring, verification, and formal handover procedures.

### 6-1.4 Key Principles

Rehabilitation shall be implemented in accordance with the following principles:

1. **Avoidance and minimization** – excavation, extraction, and vehicle movement outside approved boundaries shall be prohibited.
2. **Progressive rehabilitation** – where feasible, disturbed areas shall be rehabilitated progressively during operations.
3. **Topsoil conservation** – topsoil shall be stripped, stored separately, and reused during restoration.
4. **Safety-first closure** – unstable faces, steep edges, deep pits, and other physical hazards shall be removed or made safe.
5. **Stable final landform** – the final landform shall be physically stable and provided with appropriate drainage.
6. **Ecological suitability** – rehabilitation methods shall be suited to local soils, vegetation, and climatic conditions.

### 6-1.5 Roles and Responsibilities

#### 6-1.5.1 Contractor

The Contractor shall:

- prepare site-specific rehabilitation plans as part of the C-ESMP,
- implement topsoil stripping, storage, land regrading, and technical and biological rehabilitation measures,
- maintain closure registers, photo logs, work records, and inspection records, and
- not consider any borrow pit or quarry closed unless verified by the Engineer.

#### 6-1.5.2 Supervision Engineer

The Engineer shall:

- review and approve rehabilitation plans,
- inspect operations, progressive rehabilitation, and final closure,
- verify the adequacy and quality of technical and biological rehabilitation, and
- issue Non-Conformity Notices and require corrective action where deficiencies are identified.

#### 6-1.5.3 IPIU

The IPIU shall:

- oversee overall implementation of rehabilitation obligations,
- coordinate verification at section close-out and final handover, and
- participate in acceptance inspections with local authorities where required.

### 6-1.6 Mandatory Operational Requirements

1. No extraction or excavation shall take place outside approved boundaries.
2. Topsoil shall be stripped separately, typically to a depth of 20–30 cm, and stored in designated stockpiles.
3. Topsoil stockpiles shall be protected against wind and water erosion.
4. Haul routes shall be restricted to approved alignments, and parallel track formation shall be prohibited.
5. Fueling, servicing, and maintenance of machinery shall occur only in designated hardstanding areas.
6. Temporary drainage, sediment control, and runoff management measures shall be maintained throughout operations.
7. Hazardous edges and unstable areas shall be marked and protected by temporary fencing or warning signs.

### 6-1.7 Technical Rehabilitation

Technical rehabilitation shall include:

- removal of waste materials, scrap metal, fuel residues, containers, concrete residues, asphalt residues, and other debris,
- reshaping excavated areas in accordance with the approved final landform,
- stabilizing steep slopes and unsafe quarry faces,
- filling unsafe depressions where necessary or reshaping them into stable and safe forms,
- restoring natural or designed drainage pathways,
- dismantling and grading temporary roads, stockpile areas, workshops, and fuel storage areas, and
- respreading stored topsoil over rehabilitated surfaces.

### 6-1.8 Biological Rehabilitation

Biological rehabilitation shall include:

- respreading topsoil,
- seeding with suitable local perennial grasses and other approved native species,
- applying mulch, erosion mats, or other protective measures where necessary,
- conducting aftercare until vegetation is established, and
- reseeding areas where vegetation establishment is unsuccessful.

### 6-1.9 Acceptance Criteria

A borrow pit or quarry shall be considered rehabilitated only when:

1. no exposed waste remains on site,
2. unsafe edges, pits, and unstable slopes have been eliminated or made safe,
3. drainage has been restored or stabilized,
4. topsoil has been respread,
5. seeding has been completed or vegetation establishment is evident,
6. temporary roads, workshops, and fuel points have been fully removed and restored, and
7. the site has passed inspection by the Engineer.

### 6-1.10 Monitoring

- Weekly: compliance inspection of active borrow pits and quarries
- Monthly: progressive rehabilitation review
- At closure: final closure inspection
- After major rain, wind, or erosion event: erosion and drainage inspection
- During vegetation establishment: rehabilitation performance inspection

### 6-1.11 Records and Evidence

The following records shall be maintained:

- site-specific closure maps,
- before/after photo logs,
- topsoil stripping and reuse records,
- rehabilitation work logs,
- inspection checklists,
- Engineer’s closure certificate, and
- handover records.

### 6-1.12 Handover

Upon completion of rehabilitation, the Contractor shall submit a final closure request to the Engineer. The Engineer shall conduct an inspection and, where satisfactory, organize a joint acceptance inspection with the IPIU and, where required, local authorities. Formal site closure and handover shall be completed only after acceptance is confirmed.

# Annex 6-2. Biodiversity Management Plan

## 1. PURPOSE OF THE BIODIVERSITY MANAGEMENT PLAN

The purpose of the BMP is:

- To provide a simple and practical guidance to protection of avifauna and fauna in the project area of influence;
- To provide technical methods for bird and wildlife survey monitoring during the construction and operation stages of the project
- To meet the World Bank ESF ESS6 and international best practices for biodiversity conservation

## 2. IMPORTANT HABITAT AND AVIFAUNA, FAUNA IN THE PROJECT AREA

Bird sensitive sites along the road alignment

The study area is fairly homogenous with no distinct bird habitat observed; therefore, the following sites are considered sensitive sites for this study:

- Areas with surface water points which are small lake, ephemeral ponds and Tuul river valleys. Specific habitats such as water sources attract many different species of birds, especially during migration periods. Species like Swans, Cranes and ducks are more likely to collide while using specific habitats like temporay small water points located in the along the road.
- Distribution of Brandt's vole/rodents and areas with potential supplying food

Sensitive sites could provide habitat for the following species:

- Breeding habitats for raptors which is Upland buzzard and Saker Falcon in mountains
- Stopover lakes/breeding ponds for waterbirds and shore birds, and cranes

Based on the above criteria, ***no sensitive areas have been identified*** for this study near along the road corridor 105km.

During the field survey several small ponds and river and ephemeral ponds identified along the Ulaanbaatar - Arvaikheer A0301 road corridor. Most small lakes and ephemeral ponds dry up under low rainfall conditions and are of little importance to birds.

However, the biggest and most important habitat is Tuul river valley along road corridor. Closest distance to the road alignment is 8.12 km's.

## 3. MAP IMPORTANT BIRD AREAS

**Bird species recorded in the road corridor (Ulaanbaatar-Arvaikheer 105 km)**

**Total species observed in the project area combined with historical data:** A total of 9 order, 21families, 92 species of birds were observed during the autumn Sep 2025 survey and previous survey conducted 2013-2017 years based on the summer field work survey data of 2013 and the eastern Mongolian waterbird survey result 2017.

Majority of the recoreded species were passage migrants (PM), which is 87 species (72%), followed by resident breeders (RB) 20 species (16%), and breeding visitors (BV) 15 species (12%) and other species.

There are a few classifications in the habitat use of birds in this area brief description: the Passage Migrants (PM- this group of birds include do not breed in the area, but migrating through the area by stops short time during a seasonal migration), the Resident Breeders (RB- this group of bird species that spend live, breed and do not migrate at their whole year), the Breeding Visitors (BV- this group of birds include that arrive in the spring, breed and spend the summer and return to their wintering ground in fall)

The majority of the species belong to passerine and perching birds (*Passeriformes* - 40%), shore birds (*Charadriiformes*-18%), waterfowl (*Anseriformes*-15%), hawks, eagles, vultures and kites (*Accipitriformes* 8%), falcons (*Falconiformes* - 4%) and (Figure 16) etc.

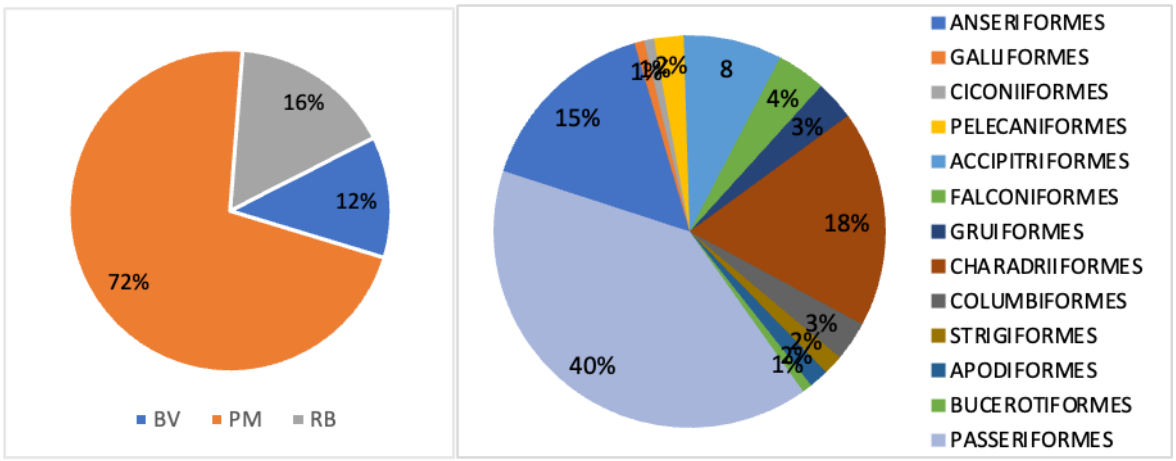


***Figure 17. Occurrence form of the species, b) Ratio of species by orders***

## 4. CONSERVATION STATUS

The majority of the species recorded during the survey have low conservation priorities according to the Regional and Global Red List status. Species with national status of Least Concern (LC) made up 90% and globally 92% (n=92) respectively of the total species recorded during the Autumn field survey.

### Globally or International Red List

The species with higher conservation status according to the IUCN Red Lists included Vulnerable (VU) Swan Goose (*Anser cygnoides*) and White-naped Crane (*Antigone vipio*). Near Threatened (NT) species of Falcated Duck (*Mareca falcata*), Ferruginous Duck (*Aythya nyroca*), Cinereous Vulture (*Aegypius monachus*) and Endangered (EN) Saker Falcon (*Falcon cherrug*) and Steppe Eagle (*Aquila nipalensis*) (Table 63).

*Table 60. Regionally and Internationally endangered birds*

| Common name | | Latin name | Red List Status | | Mongolian legal status | Occurence form | On Vantage Point | Off Vantage Point |
|---|---|---|---|---|---|---|---|---|
| | | | National | IUCN | | | | |
| 1 | Swan Goose | *Anser cygnoides* | NT | VU | No | PM | | + |
| 2 | Falcated Duck | *Mareca falcata* | NT | NT | RARE | PM | | + |
| 3 | Ferruginous Duck | *Aythya nyroca* | VU | NT | RARE | PM | | + |
| 4 | Cinereous Vulture | *Aegypius monachus* | LC | NT | No | RB | + | + |
| 5 | Steppe Eagle | *Aquila nipalensis* | LC | EN | No | PM | + | + |
| 6 | Saker Falcon | *Falco cherrug* | VU | EN | RARE | RB | + | + |
| 7 | Common Crane | *Grus grus* | NT | LC | RARE | PM | + | + |
| 8 | Eurasian Curlew | *Numenius arquata* | LC | NT | No | PM | | + |

### Regional or National Red List

The species with higher conservation status according to the National Red Lists include regionally Vulnerable (VU) Ferruginous Duck (*Aythya nyroca*), Saker Falcon (*Falcon cherrug*) and Near threatened (NT) species which is Swan Goose (*Anser cygnoides*), Falcated Duck (*Mareca falcata*), Common Crane (*Grus grus*), White-naped Crane (*Antigone vipio*) (Table 5).

There are several species, Falcated Duck (*Mareca falcata*), Ferruginous Duck (*Aythya nyroca*), White-naped Crane (*Antigone vipio*), Common Crane (*Grus grus*) are listed as 'Rare' by the Mongolian Law on Fauna (2012) among all species of birds recorded during the scoping study and VP survey.

## 5. FAUNA

During the field survey, the distribution and habitat conditions of fauna along the road alignment were recorded and documented. Observations identified bird species such as cranes, ducks, gulls, and sparrows, as well as other avian and mammalian fauna including hedgehogs, eagles, and falcons. Insect groups, particularly grasshoppers, were dominant, and burrows of small mammals such as voles were frequently observed in certain locations. These findings reflect the overall ecological diversity of the study area.

In addition, supplementary information on local fauna conditions was collected through interviews with road construction personnel. According to drivers and field staff, from 1 August onwards, no wildlife species other than those listed above were observed during daily travel along the road corridor. This suggests that wildlife density in the area is relatively low, and that human activities-particularly road traffic and ongoing rehabilitation works are likely influencing the movement patterns and natural behavior of wildlife in the vicinity of the project area.

***Table 61.* Fauna Occurring in the Study Area and Associated Risks**

| Group | Mongolian name | Latin name | Status* | Main habitat | Key road-related risks |
|---|---|---|---|---|---|
| **Mammals** | Чоно | *Canis lupus* | LC | Hills, steppe | Vehicle collisions during nocturnal movement |
| | Улаан үнэг | *Vulpes vulpes* | LC | Steppe, near settlements | Road collisions in low-crossing areas |

| | | | | | |
|---|---|---|---|---|---|
| | Хэрэм дорго (дааган дорго) | *Urocitellus undulatus* | LC | Grass steppe, non-wetlands | Movement across road embankments; habitat fragmentation |
| | Тарвага | *Marmota sibirica* | EN | Hill slopes, rocky steppe | Illegal hunting; population decline |
| | Туулай | *Lepus tolai* | LC | Undisturbed steppe | Night-time vehicle collisions |
| | Сүүлт суусар | *Mustela eversmanii* | NT | Grassland with high rodent density | Road mortality |
| | Хүчтэн бор барс (мануул) | *Otocolobus manul* | NT (IUCN) | Rocky steppe | Road collisions |
| | Хярс | *Vulpes corsac* | LC | Dry steppe | Night-time vehicle collisions |
| | Буга | *Cervus elaphus* | LC (MN) | Forest-steppe ecotone, valleys | Road crossing collisions; attraction to lighting |
| | Гөрөөс | *Capreolus pygargus* | LC | River valleys, shrublands | Road crossing barriers; entanglement in fencing |
| **Birds** | Хонин тоодог (great bustard) | *Otis tarda dybowskii* | EN | Open steppe | Vehicle collisions; nesting habitat disturbance |
| | Нөмрөг тас | *Aegypius monachus* | NT | Hills, cliffs | Collision with power lines; attraction to carcasses |
| | Хээрийн бүргэд | *Aquila nipalensis* | EN (IUCN) | Steppe, hills | Power line collisions; scavenging-related risks |
| | Хээрийн тогоруу | *Anthropoides virgo* | LC | Wet steppe, farmland edges | Road crossing collisions, especially during migration with juveniles |
| | Идлэг шонхор | *Falco cherrug* | EN | Steppe | Power line collision; illegal trapping |
| | Хээрийн бүргэд | *Aquila nipalensis* | EN | Steppe | Power line collision; illegal capture |

**LC – Least Concern; NT – Near Threatened; EN – Endangered (based on IUCN and National Red List classifications).*

Based on the results of the field survey, no mammalian species listed above were directly recorded within the administrative territories of the soums traversed by the project road alignment.

Wildlife movement within the road corridor of the project area is not characterized by large-scale or regular migratory routes. Instead, it is mainly expressed as short- to medium-distance movements associated with localized microhabitats that provide water, forage, shelter, and suitable breeding conditions.

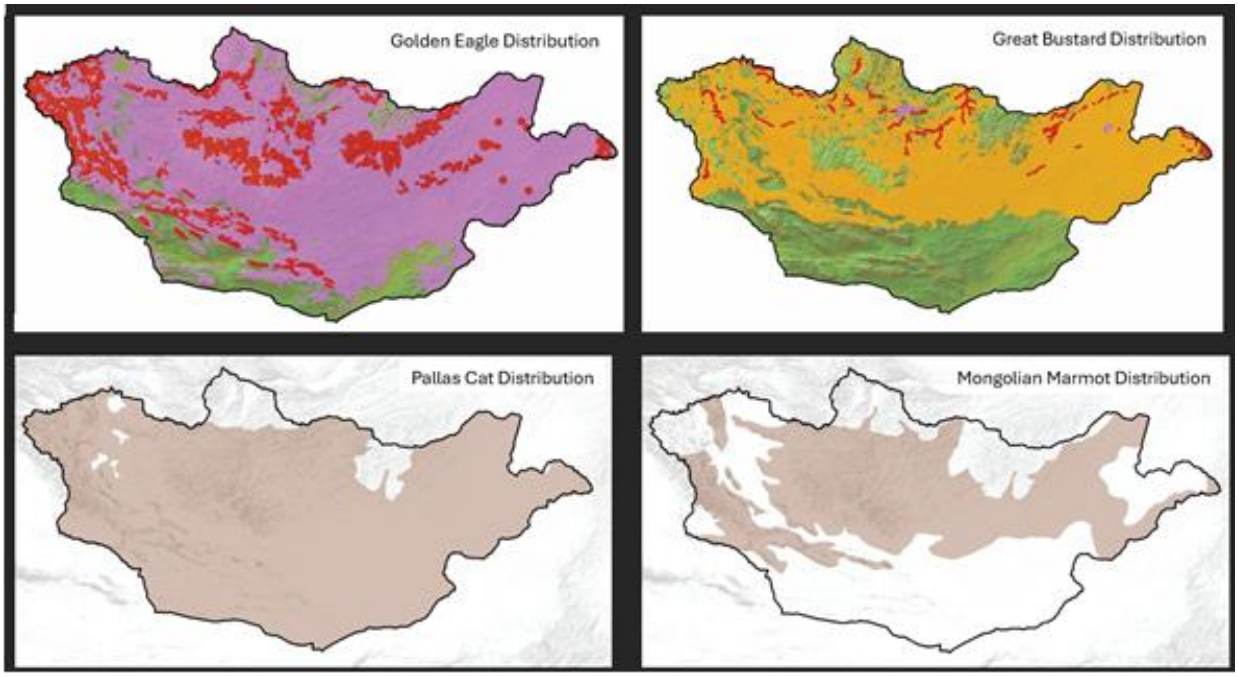


***Figure 18. Wildlife movement map***

***Figure 19. Mongolian gazelle that observed near project site***

During field surveys conducted in August and September 2025, no direct observations of wild animals were recorded within the project area. However, on 20 March 2026 at approximately 10:10 AM, a group of eight Mongolian gazelles (Procapra gutturosa) was observed near kilometer post 287 of the Ulaanbaatar–Arvaikheer road, within Khashaat soum of Arkhangai aimag. This observation indicates that wildlife movement may occur intermittently along this section of the corridor. If such occurrences are recorded repeatedly over time, it will be necessary to reassess traffic management measures, including speed control regimes, warning signage, and work scheduling arrangements, and to implement appropriate mitigation measures accordingly.

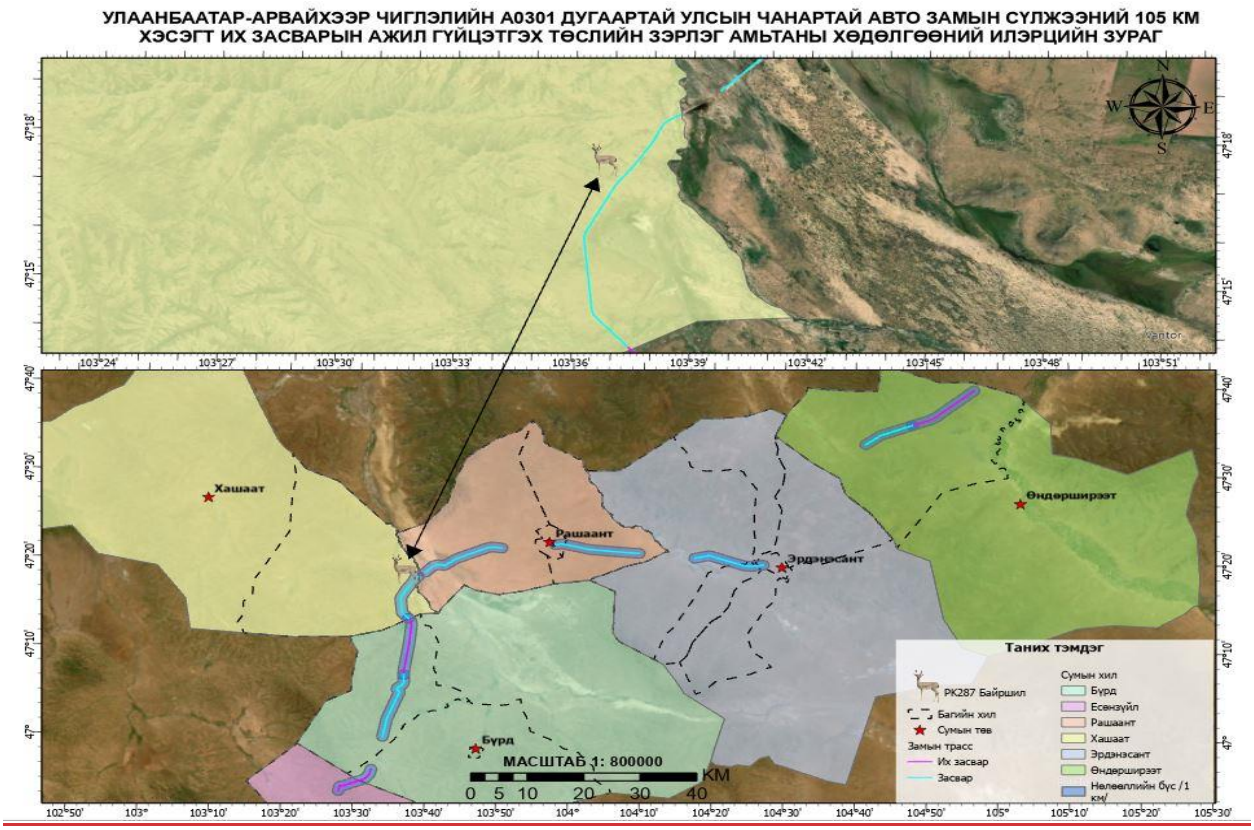


***Figure 20. Location of PK-287 point***

PK287 is identified within the project documentation as an area requiring special attention, and it is located approximately 2.2 km from the Khugnu Tarna National Protected Area-Complex. Therefore, any activities that may have adverse impacts on wildlife are strictly prohibited in this area.

Mongolian gazelle crossing events have been recorded in this section, indicating the need for continuous monitoring and systematic data recording of wildlife movement. This includes tracking animal footprints, droppings, road-crossing traces, near-miss incidents, and collision cases, as well as documenting movement direction, timing, and photographic evidence in a structured manner.

In addition, appropriate mitigation measures shall be implemented where necessary, including traffic management adjustments, installation of speed reduction measures, placement of warning signage, and reassessment of work scheduling arrangements.

## 2. PROTECTED AREAS

The project influence area has been defined within a 50 km radius. This is due to the fact that access to cultural heritage sites and specially protected areas is significantly influenced by road and transport conditions.

The project area includes portions of both locally protected areas and nationally designated protected areas, specifically the restricted zone of the Khugnu-Tarna National Protected Area.

Out of the six sections along the road corridor, 8.26 km of Section 3 and 0.13 km of Section 4 are planned to pass through the Khugnu-Tarna.

## 3. CONSTRUCTION STAGE

### Impact assessment

Construction impacts are those which may arise during the construction works, temporary use of land, movement of construction vehicles, presence of the construction camp and workers, and all other construction-related activities will may affect to the bird population. Potential impacts of construction activities include disturbance of birds from construction noise resulting in habitat avoidance and nest abandonment during breeding and migratory seasons. Effect of noise on birds can cause behavioral modifications in certain species of birds such as decreased foraging and mating success and avoidance of noisy areas.

The 2009 IECS report gives an illustrative overview of the effects of disturbance to waterbirds from different activities that may arise because of a construction project. Five levels of disturbance impact are defined for feeding and roosting.

***Table 62. Noise impact criteria***

| Level | Impact | Effect Level | dBA | Types of Noise |
|---|---|---|---|---|
| 1 | No impact | Low | Below 60 | Regular construction noise |
| 2 | Behavioural changes (alarm calls, heads up, change in feeding/roosting activity) | Moderate | Equal to or below 70 | Piling noise |
| 3 | Movement with zone | Moderate to high | Above 70 | Piling noise |
| 4 | Movement out of zone but remaining on site | High | Above 85 | Piling noise |
| 5 | Movement off site | High | Not defined | |

*Source (Review of Effects of Construction Noise on Birds in SSSI near Springs Road Exploratory Wellsite, 2018)*

## 4. SENSITIVE RECEPTORS

A total of five migratory passage species (Table 66) and four breeding visitor bird species (Table 67) have been identified as species of conservation concern under the IUCN and/or National Red List classifications. However, it should be noted that the inclusion of these species is based on previously conducted studies and historical biodiversity records rather than observations made during the 2025 field survey undertaken within the project area. None of the listed threatened or conservation-priority bird species were recorded within the direct project footprint or immediate area of influence during the 2025 field investigations. Accordingly, the current field survey did not identify evidence of regular use, breeding activity, or significant congregation of these species within the project corridor.

***Table 63. Migratory birds***

| WATERBIRDS | PHOTO VIEW | INFORMATION | IUCN RED LIST STATUS | MONGOLIAN STATUS |
|---|---|---|---|---|
| Waterbirds such us Common crane and ducks come to Galuut river and Buuruljuut valley end of April and stay in summer time feed in lake shore around. To see more details in Table 10, 11 | | | | |

| | | | | |
|---|---|---|---|---|
| Common Crane (*Grus grus*) |  | Food: Feeds on plants seed, roots, insects, aquatic invertebrates, amphibians, fishes and small rodents.<br>Habitat use: Lakes, wetland and river valleys.<br>Location: Buuruljuut Lake<br>Season: May-September | LC | NT |
| Ferruginous Duck (*Aythya nyroca*) |  | Food: Mainly aquatic vegetation by diving.<br>Habitat use: Shallow lakes with extensive emergent vegetation as well as river and shallow marshes.<br>Location: Buuruljuut and Galuut<br>Season: May-September | NT | VU |
| Falcated Duck (*Mareca falcata*) |  | Food: Aquatic plants by diving.<br>Habitat use: Aquatic habitats on migration duration. Location: Buuruljuut and Galuut<br>Season: May-September | NT | NT |
| **SHOREBIRDS** | **PHOTO VIEW** | **INFORMATION** | **IUCN RED LIST STATUS** | **MONGOLIAN STATUS** |
| Shorebirds such us Northern lapwing and curlew come to Galuut river and Buuruljuut valley early of May and stay few days around lake and feed along the shore. To see more details in Table 10,11. | | | | |
| Northern Lapwing (*Vanellus vanellus*) |  | Food: Feeds insects, worms, and molluscs.<br>Habitat use: Wet grassland and marshes, lakes and wetlands during migration duration.<br>Location: Buuruljuut and Galuut<br>Season: May-September | NT | LC |
| Black-tailed Godwit (*Limosa limosa*) |  | Food: Feeds on all kinds of invertebrates, worms.<br>Habitat use: Commonly occurs in river and lakes valleys, wetlands<br>Location: Buuruljuut and Galuut<br>Season: May-September | NT | LC |

## Breeding visitor bird's species information

***Table 64. Breeding visitors birds***

| WATERBIRDS | PHOTO VIEW | INFORMATION | IUCN RED LIST STATUS | MONGOLIAN STATUS |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Swan Goose (*Anser cygnoides*) |  | Food: Feeds on plants seed, roots, insects, aquatic invertebrates, amphibians, fishes, and small rodents.<br>Habitat use: Nests in island of lake with tall grass or reeds. Lakes, wetland, and river valleys also agricultural land.<br>Location: Buuruljuut and Galuut<br>Season: May-September | VU | NT |
| **Raptors** | **Photo view** | **Information** | **IUCN Red List status** | **Mongolian status** |
| Saker Falcon (*Falcon cherrug*) |  | Food: Feeds on small mammals which are Brandt's vole and birds. Density depends on populations of voles and larks.<br>Habitat use: Mountain hill and grassland, arid steppe<br>Season: May-September | EN | VU |
| Cinereous Vulture (*Aegypius monachus*) |  | Food: Feeds on wildlife and livestock carcasses.<br>Habitat use: Valleys of mountain and adjacent steppes where medium to large wild and domestic mammals are present in numbers.<br>Season: May-September | NT | LC |
| Steppe Eagle (*Aquila nipalensis*) |  | Food: Feeds on rodents, corsac fox, rabbit, voles, birds, livestock and also feeds on carrion and follows herds of gazelles during calving and migrations.<br>Habitat use: Found in grassland steppe, mountain steppe.<br>Season: May-September | EN | LC |

## 5. MITIGATION MEASURES FOR ADVERSE IMPACTS

**Construction noise sensitive areas identified along road alingment:** Noise impacts associated with construction activities will be temporary and localized to areas adjacent to the construction corridor. However, the Tuul River valley, associated wetlands, and small lakes and ponds located along the road alignment are ecologically sensitive habitats supporting globally threatened bird species, including important breeding, feeding, roosting, and migratory stopover sites. Biodiversity mitigation measures for the Project shall therefore be implemented in accordance with the mitigation hierarchy: avoidance, minimization, restoration, and offset/compensation, with clearly defined responsibilities, thresholds, and monitoring requirements.

Within the project scope, particular attention will be given to mechanical disturbance of vegetation cover, degradation of wetland vegetation, wildlife disturbance (including bird and

mammal collisions), barriers to animal movement, and risks associated with the movement of gazelles recorded around PK287.

- Particular attention shall be given to,
- Mechanical disturbance and loss of vegetation cover,
- Degradation of wetland habitats,
- Disturbance and collision risks affecting birds and mammals,
- Barriers to wildlife movement,
- Risks to gazelles recorded near PK287,
- Disturbance to breeding and nesting sites of sensitive fauna species.

**General principles for biodiversity impact mitigation measures:**

1. The boundaries of the work site shall be clearly defined in advance, and movement of machinery and vehicles outside designated corridors shall be prohibited.
2. Temporary access roads, material storage areas, camps, warehouses, and parking sites shall be located as far as possible from ecologically sensitive areas.
3. Prior to vegetation clearance, topsoil stripping, and works in gullies, wet depressions, and shrub-dominated areas, a biodiversity survey shall be conducted, and sensitive locations shall be identified and marked.
4. In the event that wildlife, nests, burrows, or signs of breeding are observed, work at the respective location shall be temporarily suspended, and appropriate protective measures shall be implemented under the guidance of an environmental specialist.
5. Additional restrictions shall be applied when working within protected areas and their buffer zones.
6. All employees, drivers, and subcontractors shall be provided with biodiversity protection training and required to acknowledge it by signature.

### 9.1. Avoidance measures

The primary objective of the Project is to avoid impacts on ecologically sensitive habitats, wildlife movement corridors, and breeding areas wherever feasible. Accordingly, temporary construction camps, material storage areas, fuel storage facilities, access roads, and other auxiliary infrastructure shall be located outside the Tuul River wetlands, associated ponds and small lakes, identified bird breeding habitats, gazelle movement areas near PK287, and protected area buffer zones.

Prior to commencement of construction works, qualified biodiversity specialists shall undertake pre-construction ecological surveys to identify:

- Bird nesting and breeding areas;
- Mammal burrows and denning sites;
- Wetland vegetation communities;
- Wildlife movement corridors and sensitive habitats.

All identified sensitive areas shall be clearly demarcated in the field and incorporated into construction planning. Vegetation clearance, blasting, excavation, and other high-noise activities

shall be prohibited within 500 m of confirmed bird nesting sites during the breeding season (April-July).

In addition, all machinery and vehicles shall remain within approved construction corridors and designated access roads. Off-road driving outside approved areas shall be strictly prohibited.

### 9.2. Minimization measures

Where impacts cannot be fully avoided, mitigation measures shall be implemented to minimize adverse effects on biodiversity during construction and transport activities. In cases where bird and wildlife species listed under the IUCN Red List categories Near Threatened (NT), Vulnerable (VU), or Endangered (EN) are detected or observed within the project area, special protection measures shall be applied to these species and their habitats.

All project personnel and subcontractors shall be strictly prohibited from hunting, trapping, chasing, feeding, or harming any wildlife. Mandatory environmental awareness training shall be provided to all workers and drivers prior to commencement of works, with specific emphasis on the sensitivity of NT, VU, and EN species and their habitats.

Traffic-related and operational impacts shall be minimized through speed restrictions in ecologically sensitive areas, installation of wildlife warning signage, and reduction of disturbance in high-activity zones such as wetlands and known wildlife corridors. Nighttime lighting shall be minimized, and where required, only directional, low-intensity lighting shall be used to reduce light spill into surrounding habitats.

A critical mitigation requirement applies to all works: if any bird nests, eggs, chicks, or mammal burrows are identified during construction, particularly those associated with IUCN-listed NT, VU, or EN species, a temporary exclusion buffer zone of 50-100 meters shall be immediately established depending on species sensitivity. All construction activities within this buffer shall be suspended without delay. Work shall only resume following formal clearance and written approval from a qualified environmental specialist.

***Table 65. Biodiversity impact minimization measures for construction and operation phases***

| Potential impact | Mitigation Measure |
|---|---|
| Impacts on NT, VU, EN listed species | Implement targeted protection measures and provide environmental awareness training to all workers |
| Wildlife collisions | Enforce vehicle speed limits and install warning signs in sensitive areas |
| Bird collision risk | Install bird diverters and use high visibility marking systems |
| Noise disturbance | Restrict high-noise activities during sensitive periods (e.g., dawn and dusk) |
| Light disturbance | Use downward-directed, low-intensity lighting to minimize spillover into habitats |
| Waste-related impacts | Store waste in sealed containers and ensure regular collection and disposal |

These measures are designed to ensure that sensitive species and habitats are protected in accordance with international conservation standards while maintaining safe and compliant construction operations.

### 9.3. Restoration measures

Areas temporarily disturbed during construction shall be progressively rehabilitated following completion of works. Temporary access roads, camps, storage areas, and work sites shall be cleaned and restored to conditions compatible with the surrounding environment.

Topsoil stripped during site preparation shall be separately stockpiled and reused during reinstatement activities. Disturbed wetland and steppe vegetation shall be restored using native plant species appropriate to the local ecological conditions. Exposed soils shall be stabilized through grading, reseeding, and erosion control measures to prevent land degradation.

Restoration performance shall be monitored annually for two years following completion of construction. Additional corrective measures shall be implemented if vegetation recovery remains below 70% of adjacent natural habitat conditions or if significant erosion and invasive species colonization are observed.

### 9.4. Offset and monitoring measures

To ensure the effectiveness of mitigation measures and to manage any residual impacts on biodiversity, a structured monitoring and adaptive management program shall be implemented throughout both the construction and operational phases of the Project. The primary objective of this program is to verify compliance with environmental safeguards, detect any unforeseen impacts at an early stage, and implement corrective actions where necessary.

Monitoring activities will focus on sensitive ecological receptors and key biodiversity components, including wildlife movement corridors, wetland habitats, bird migration pathways, and rehabilitated areas. Particular attention shall be given to collision-related mortality of birds and mammals, the effectiveness of installed mitigation infrastructure (e.g., bird diverters and warning signage), and the recovery of disturbed habitats.

Monitoring data shall be systematically collected, analyzed, and reported to relevant environmental authorities and financing institutions on an annual basis. Where necessary, more frequent reporting may be required for high-risk ecological zones.

Adaptive management will be applied in response to monitoring results. If predefined ecological thresholds are exceeded, additional mitigation measures shall be implemented without delay. These may include enhanced speed control measures, installation of additional bird diverters, reinforcement of fencing, modification of lighting systems, or the construction of additional wildlife crossing structures.

- Key performance triggers for adaptive management include:
- Repeated wildlife or bird collision hotspots along specific road segments;
- Failure of restored habitats to achieve expected vegetation recovery targets;
- Evidence of significant disturbance to sensitive species or habitats;
- Non-compliance with seasonal or spatial exclusion zones.

Where residual impacts cannot be fully mitigated through on-site measures, biodiversity offset or compensation measures shall be developed in consultation with relevant environmental authorities and in line with national regulations and international best practice. These measures will aim to achieve no net loss, and where possible a net gain, in biodiversity values affected by the Project.

## 6. MEASURES TO MITIGATE ADVERSE IMPACTS ON FAUNA

Within the project implementation area, species such as the great bustard, steppe eagle, saker falcon, cinereous vulture, demoiselle crane, steppe polecat, Pallas's cat, and corsac fox may be present and are potentially at risk from transport and construction activities. Therefore, the following mitigation measures shall be implemented during the construction phase:

1. Restriction of activities that directly affect wildlife
    - Any activities involving the disturbance, chasing, capture, injury, or hunting of wild animals within or near the worksite shall be strictly prohibited.
    - All workers shall receive environmental protection briefings to prevent both intentional and unintentional impacts on wildlife.
2. Waste management
    - Food waste, domestic waste, and animal carcasses shall not be left in open areas: it shall be collected in sealed containers and disposed of regularly.
    - Waste shall be centralized at designated disposal sites to prevent attracting wildlife to the project area.
3. Reduction of transport-related impacts
    - Vehicle speed limits shall be reduced during nighttime operations.
    - Drivers shall be regularly instructed on wildlife collision risks and provided with safety warnings.
    - Warning signs shall be installed along roads in areas with a high likelihood of animal crossings.
4. Protection of wildlife habitats
    - In cases where nests, eggs, offspring, or burrows are identified, a protective buffer zone of 50-100 meters shall be established, and all activities within the zone shall be temporarily suspended.
    - Work shall not resume without the approval of an environmental specialist.
5. Reduction of noise and lighting impacts
    - High noise levels and sudden explosive activities shall be restricted in areas frequently used by rare or predatory birds.
    - Nighttime lighting shall be minimized, and where necessary, directional lighting shall be used to reduce light spill into surrounding habitats.

Overall, based on the ornithological studies and with the application of the above-mentioned mitigation measures, the proposed road alignment is unlikely to pose significant impacts on birds. The use of diverters will reduce the collision risks, however, it is unlikely to eliminate the risks completely. Therefore, future monitoring will be undertaken of bird mortality along the road alignment. (Table 68).

***Table 69. Avifauna Monitoring Plan***

| Parameter/Activity | Location | Means of Monitoring | Monitoring indicator/ threshold limits | Frequency | Responsible agency | | |
|---|---|---|---|---|---|---|---|
| | | | | | Implementation | Supervision | Cost, USD |
| **CONSTRUCTION STAGE** | | | | | | | |
| Bird monitoring field surveys | Potential bird sensitive sites along | Birds monitoring survey report | Method/guideline recommended in the BMP | Once during breeding season (June) | Contractor Bird expert, Sub- | IPIU Env specialist | 5,000 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | the road alignment | | | | contractor | | |
| Wildlife monitoring field survey | Potential wildlife sensitive sites along the road alignment | Wildlifemonitoring survey report | Method/guideline recommended in the BMP | Once during breeding season (June) | Contractor wildlife expert, Sub-contractor | IPIU Env specialist | 8,000 |
| **OPERATION STAGE** | | | | | | | |
| Bird and wildlife monitoring field surveys | Potential wildlife sensitive sites along the road alignment | Birds and wildlifemonitoring survey report | Method/guideline recommended in the BMP | Once during breeding season (June) | Bird and wildlife experts, Sub-contractor | MECC, Local environmental department, The World Bank | 7,000 |

# Annex 6-3. Waste Management Plan

### 6-3.1 Purpose

The purpose of this Plan is to ensure that all waste generated by construction works, camps, maintenance activities, quarry/borrow operations, plants, storage areas, and other site activities is properly minimized, segregated, reused where possible, safely stored, transported, and disposed of through approved methods and facilities.

### 6-3.2 Scope

This Plan applies to all waste streams generated by the Project, including:

1. camp waste,
2. office and domestic waste,
3. construction debris,
4. surplus excavated material,
5. scrap metal, timber, and packaging,
6. used oil, filters, and oily rags,
7. batteries, chemical containers, and bitumen residues,
8. sewage and wastewater sludge, and
9. contaminated soil, where applicable.

### 6-3.3 Waste Management Hierarchy

Waste shall be managed in accordance with the following hierarchy:

1. Avoid / Reduce
2. Reuse
3. Recycle / Recover
4. Treat
5. Dispose at approved facility

### 6-3.4 Waste Classification

#### 6-3.4.1 General Domestic Waste

- food waste
- paper and cardboard
- packaging materials
- mixed domestic waste

#### 6-3.4.2 Non-Hazardous Construction Waste

- broken asphalt
- concrete, stone, and soil
- wood and metal
- inert debris

#### 6-3.4.3 Reusable / Recyclable Waste

- scrap metal
- timber
- clean packaging
- approved reusable materials such as milled asphalt or aggregate where technically suitable

#### 6-3.4.4 Hazardous Waste

- used oil
- oil filters
- oily rags / absorbents
- batteries
- solvents and paint residues
- chemical containers
- bitumen-contaminated waste
- hydrocarbon-contaminated soil

### 6-3.5 Roles and Responsibilities

#### 6-3.5.1 Contractor

The Contractor shall:

- prepare and implement site-specific waste management arrangements,
- establish waste segregation stations and label all bins and containers,
- maintain waste registers, transfer records, and manifests, and
- use licensed transporters and approved disposal facilities.

#### 6-3.5.2 Supervision Engineer

The Engineer shall:

- inspect waste storage, segregation, labeling, and recordkeeping,
- review disposal evidence, manifests, and receipts, and
- require corrective action in the event of non-compliance.

#### 6-3.5.3 IPIU

The IPIU shall:

- oversee overall compliance with waste management requirements, and
- address high-risk waste issues, illegal dumping, and repeated violations.

### 6-3.6 General Requirements

1. Waste segregation bins shall be placed at camps, workshops, work fronts, plant sites, and quarries.
2. All bins and containers shall be clearly labeled.
3. Open dumping and open burning shall be strictly prohibited.
4. Hazardous waste shall be stored on impermeable surfaces within bunded areas.
5. Different waste streams shall not be mixed.
6. Waste accumulation areas shall be kept clean and orderly.

### 6-3.7 Special Requirements for Hazardous Waste

- Used oil shall be stored in leak-proof, labeled drums.
- Batteries shall be stored upright in weather-protected areas.
- Oily rags and absorbents shall be stored in sealed bags or containers.
- Hazardous waste storage areas shall be bunded, covered, and signed.
- Spill kits and fire extinguishers shall be available.
- Hazardous waste shall be transported only by authorized transporters to approved facilities.

### 6-3.8 Construction Waste Management

- Reusable asphalt, concrete, and aggregate shall be assessed for technical reuse where feasible.
- Surplus excavated material shall only be taken to approved spoil disposal areas.
- Random dumping shall be prohibited.

### 6-3.9 Domestic Waste

- Waste from camp kitchens, canteens, and offices shall be collected daily.
- Food waste shall not be left exposed in open-access areas.
- Domestic waste shall be transported regularly to approved local waste facilities.

### 6-3.10 Wastewater and Sanitation Waste

- Portable toilets, septic tanks, or sealed holding tanks shall be used.
- Raw sewage discharge shall be prohibited.
- Desludging shall be undertaken only by authorized service providers.

### 6-3.11 Waste from Spill Response

- Contaminated absorbents, soil, and PPE generated during spill response shall be classified as hazardous waste.
- Such materials shall be separately bagged, labeled, temporarily stored, and disposed of through approved hazardous waste routes.

### 6-3.12 Monitoring

- Daily: housekeeping inspection
- Weekly: waste segregation check
- Monthly: waste inventory and disposal review
- Regular: hazardous waste storage inspection
- Regular: camp sanitation inspection

### 6-3.13 Records

The following records shall be maintained:

- waste register,
- hazardous waste inventory,
- transfer notes / manifests,
- disposal receipts,
- spill waste records,
- inspection checklists, and
- photo logs.

### 6-3.14 Demobilization and Closure

At the end of the Project:

- all waste shall be removed from the site,
- hazardous waste storage areas shall be dismantled,
- any contaminated surfaces shall be cleaned up, and
- conditions shall be achieved for clean closure certification.

# Annex 6-4. Chance Find Procedure

### 6-4.1 Purpose

This Procedure sets out the actions to be taken if archaeological objects, historical or cultural heritage materials, graves, human remains, monuments, sacred sites, ovoos, or any other objects of potential cultural significance are discovered during construction, earthworks, excavation, quarrying, borrow operations, temporary road works, drainage works, camp development, or any related activity. The purpose is to ensure that such finds are protected, reported, assessed, and handled lawfully, and that work is suspended and resumed only under proper authorization.

### 6-4.2 Scope

This Procedure applies to all:

- worksites,
- excavation zones,
- quarries,
- borrow pits,
- spoil areas,
- camp areas,
- temporary roads,
- drainage structures, and
- utility relocation zones.

### 6-4.3 What Constitutes a Chance Find

A chance find may include, but is not limited to:

1. archaeological artefacts, pottery, stone tools, bones, or buried objects,
2. graves, human remains, or burial-related structures,
3. items of historical, religious, or ceremonial significance,
4. monuments, carved stones, memorial objects, or culturally significant structures,
5. ovoos, sacred places, or other culturally sensitive sites, and
6. fossils or palaeontological remains.

### 6-4.4 Core Principles

1. Stop work immediately
2. Do not touch, move, clean, collect, or remove the find
3. Secure the area
4. Notify immediately
5. Resume work only after written clearance

### 6-4.5 Roles and Responsibilities

#### 6-4.5.1 Worker / Equipment Operator

The worker or operator shall:

- stop work immediately upon discovering a potential find,
- not touch or disturb the object, and
- report immediately to the foreman or supervisor.

#### 6-4.5.2 Contractor

The Contractor shall:

- secure the area using barriers, tape, or other means,

- notify the Engineer immediately, and in any case within 24 hours in writing,
- record photographs, GPS coordinates, and a brief description of the find, and
- not resume work without written authorization.

#### 6-4.5.3 Supervision Engineer

The Engineer shall:

- undertake an initial site verification,
- notify the IPIU without delay, and
- ensure that the protective suspension of works remains in place until appropriate instructions are received.

#### 6-4.5.4 IPIU

The IPIU shall:

- notify the competent cultural heritage authority,
- coordinate assessment and decision-making, and
- issue, or arrange for issuance of, written clearance or additional instructions.

### 6-4.6 Step-by-Step Procedure

#### 6-4.6.1 Step 1. Immediate Suspension of Works

All works at the location of the find, and in the surrounding area where the find may be affected, shall stop immediately.

#### 6-4.6.2 Step 2. Protection of the Site

- Temporary barriers or tape shall be installed.
- Unauthorized access shall be prohibited.
- The find shall not be moved, washed, cleaned, excavated, or otherwise disturbed.

#### 6-4.6.3 Step 3. Notification

The chain of notification shall be:
**Worker / Operator → Foreman / Supervisor → Contractor Environmental / Social Specialist → Engineer → IPIU**
Notification shall be made as soon as possible and no later than **24 hours** after discovery.

#### 6-4.6.4 Step 4. Preliminary Documentation

The Contractor shall record at minimum:

- date and time of discovery,
- exact location / chainage / GPS,
- brief description of the find,
- name of the person who discovered it,
- photo record, and
- protective measures taken.

#### 6-4.6.5 Step 5. Assessment by Competent Authority

The IPIU shall notify the competent authority, which shall determine the nature of the find, any required protection measures, and the appropriate next steps.

#### 6-4.6.6 Step 6. Written Instruction

The Engineer and IPIU may issue written instruction regarding:

- relocation of works,
- establishment of a protective buffer,

- salvage or documentation measures,
- design change, or
- permanent avoidance of the area.

#### 6-4.6.7 Step 7. Restart of Works

Work may resume in the affected area only after written clearance has been issued by the IPIU and the Engineer.

### 6-4.7 Discovery of Human Remains

If human remains or burial-related features are found:

- the area shall be protected over a wider perimeter,
- respectful handling principles shall apply,
- no movement or disturbance shall occur,
- the competent state authority and law enforcement authority shall be notified through the IPIU without delay, and
- no work shall resume until formal clearance is issued.

### 6-4.8 Training

- All workers, operators, and supervisors shall be briefed on the Chance Find Procedure before earthworks begin.
- The procedure shall be repeated during toolbox talks as necessary.
- Training records, attendance lists, and photo evidence shall be maintained.

### 6-4.9 Records

The following records shall be maintained:

- chance find register,
- incident notification form,
- photo log,
- authority correspondence,
- work suspension and restart record, and
- clearance letter.

### 6-4.10 Non-Compliance

Any failure to comply with this Procedure, including moving, damaging, concealing, or failing to report a chance find, shall be treated as a serious non-compliance. In such cases, contract-level disciplinary action and relevant legal measures shall apply.

# Annex 6-5. Workers' Code of Conduct

### 6-5.1 Purpose

This Code of Conduct (CoC) sets out the standards of behaviour required of all workers engaged under the Project, including employees of the main Contractor, employees of subcontractors, day labourers, and any other persons engaged in connection with the Project. It is a binding condition of employment. Each worker must receive a copy of this CoC in a language they understand, have its contents explained to them, and sign the acknowledgement at the end before commencing any work.

The CoC supports implementation of ESS2 (Labour and Working Conditions), ESS4 (Community Health and Safety), ESS6 (Biodiversity Conservation), and the World Bank's Good Practice Note on Addressing Sexual Exploitation and Abuse and Sexual Harassment in Investment Projects with Civil Works (2020).

### 6-5.2 Who Must Sign This CoC

The following categories of persons must sign this CoC before commencing work on any Project site or associated facility:

1. The main Contractor's employees -all roles, all levels
2. Subcontractors' employees -all roles, all levels
3. Temporary and casual workers
4. Labour broker employees assigned to the Project
5. Any other persons working under the direction of the Contractor

Subcontractors are responsible for obtaining signed CoC acknowledgements from all of their employees and providing copies to the main Contractor before those employees commence work.

### 6-5.3 Core Obligations -What Every Worker Must Do

1. Treat all people with dignity and respect. All workers, community members, and colleagues must be treated with courtesy, without discrimination on the basis of gender, age, ethnicity, nationality, religion, disability, sexual orientation, or any other characteristic.
2. Follow all applicable laws. Workers must comply with all applicable Mongolian laws and project requirements, including those relating to labour, safety, environmental protection, wildlife, and land use.
3. Comply with all safety requirements. Workers must use all required personal protective equipment (PPE), follow all site safety procedures, attend all mandatory safety inductions and toolbox talks, and report any hazard, near-miss, or incident immediately.
4. Report violations. Workers must report any suspected or known violation of this CoC to the Community Liaison Officer (CLO), the Supervision Engineer, the SEA/SH Focal Point, or through the Worker Grievance Redress Mechanism. Reporting in good faith will not result in retaliation.
5. Participate in mandatory training. Workers must attend all mandatory induction, OHS, SEA/SH awareness, protected area, and Code of Conduct refresher training sessions.

### 6-5.4 Prohibited Behaviours -Sexual Exploitation, Abuse, and Harassment (SEA/SH)

Zero tolerance applies to all of the following. Any violation will result in immediate suspension pending investigation and may result in dismissal and referral to law enforcement.

1. Sexual exploitation: any sexual act, or attempt to obtain a sexual act, by taking advantage of a position of vulnerability, differential power, or trust. This includes exchanging money, employment, goods, or services for sex.
2. Sexual abuse: actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions.
3. Sexual harassment: unwelcome sexual advances, requests for sexual favours, or other verbal or physical conduct of a sexual nature in a work or community setting, including verbal comments, gestures, images, and digital communications.
4. Solicitation or purchase of sexual services: prohibited at all times in the project area and surrounding communities.
5. Relationships that exploit power imbalance: any sexual or romantic relationship between a project worker and a project-affected community member that exploits the worker's relative position of power, income, or resource access.
6. Distribution of sexual content: sharing, displaying, or storing sexually explicit material in workplaces, camps, vehicles, or digital communications used in connection with the project is prohibited.
7. Grooming behaviour: any approach, contact, or communication designed to gain the trust of a minor or vulnerable person for the purpose of exploitation.

### 6-5.5 Prohibited Behaviours -Child Safeguarding

Zero tolerance applies to all of the following. Any violation will result in immediate dismissal and referral to law enforcement.

1. Sexual contact with a minor: absolutely prohibited under all circumstances. A minor is any person under 18 years of age.
2. Grooming: any behaviour designed to gain the trust of a minor, their family, or their community for purposes of exploitation.
3. Employment of minors on hazardous tasks: no person under 18 years may be employed or directed to perform any hazardous construction activity. No person under 15 years may be employed in any capacity under the Project.
4. Photography of minors: workers may not photograph or share images of children without the explicit written consent of the child's parent or guardian.

### 6-5.6 Prohibited Behaviours -Community Interaction

1. Entry into community households: workers may not enter a herder's ger, private residence, or community building without an explicit invitation from the occupant. Entry is not permitted on the basis of work-related reasons without the occupant's prior consent.
2. Unauthorized commercial transactions: workers may not purchase goods, services, or food directly from community households except at designated soum market facilities during authorized rest periods. This restriction does not apply to formal businesses (shops, petrol stations, restaurants).

3. Alcohol and substances in community settings: consumption of alcohol or controlled substances in or adjacent to community settlements, during working hours, or during transit through community areas is prohibited.
4. Weapons: workers may not carry weapons of any kind (firearms, knives, traps) in community areas.
5. Intimidation, threats, and violence: no worker may threaten, intimidate, or commit violence against any community member, colleague, or other person in connection with the project.
6. Privacy violations: photography or recording of community members, households, or community spaces without explicit individual consent is prohibited.

### 6-5.7 Prohibited Behaviours -Natural Resources and Protected Areas

The project corridor passes through or adjacent to the Khugnu-Tarna National Protected Area and the Batkhaan Mountain Nature Reserve. Violations in or near protected areas may constitute criminal offences under Mongolian law in addition to project-level consequences.

1. Hunting and poaching: workers may not hunt, trap, snare, poison, or capture any wild animal at any time during the project. This prohibition applies to all species including birds, reptiles, and small mammals, not only protected species.
2. Unauthorized entry into protected areas: workers may not enter the Khugnu-Tarna National Protected Area or the Batkhaan Mountain Nature Reserve outside the approved construction corridor without written authorization from the IPIU Environmental Specialist.
3. Collection of natural resources: unauthorized collection of firewood, plants, soil, water, gravel, or any other natural resource from areas outside approved quarries, borrow sites, and haul routes is prohibited.
4. Fishing: workers may not fish in any stream, river, or water body within the project area of influence without a valid personal fishing licence. Fishing using poison, explosives, or electric shock is prohibited under all circumstances.
5. Littering and dumping in natural areas: waste disposal in streams, natural water bodies, pastureland, or protected areas is prohibited. All waste must be managed through the arrangements specified in Annex 6-3.

### 6-5.8 Prohibited Behaviours -Occupational Conduct

1. Alcohol and drugs on site: workers may not consume, be under the influence of, or bring alcohol or controlled substances onto any construction site, camp area, quarry, plant area, or project vehicle.
2. Ignoring safety requirements: failure to use required PPE, disregarding safety instructions, or bypassing safety controls is a violation of this CoC and Mongolian OHS law.
3. Tampering with safety equipment: workers may not disable, remove, or tamper with safety devices, emergency exits, fire extinguishers, speed governors, or any other safety equipment.
4. Document falsification: falsifying inspection records, attendance sheets, incident reports, training records, or any other project document is prohibited.
5. Bribery and corruption: workers may not offer, accept, or solicit bribes, gifts, or improper payments in connection with the project.

### 6-5.9 Reporting Violations and Whistleblower Protection

Workers who observe or suspect a violation of this CoC are expected to report it. The following reporting channels are available:

*Table 66. Worker GRM channels and confidentiality*

| Channel | How to Access | Who Manages It | Confidential? |
|---|---|---|---|
| Community Liaison Officer (CLO) | Personal approach; phone call | CLO | Yes -report may be verbal |
| Worker GRM drop-box | Drop-box at camp and work fronts; written or drawn note | Supervision Engineer; IPIU | Yes -anonymous accepted |
| Worker GRM hotline | Dedicated phone number posted at camp and all work fronts | Supervision Engineer; IPIU | Yes -anonymous accepted |
| SEA/SH confidential channel | Dedicated hotline number; drop-box managed by female Focal Point | SEA/SH Focal Point | Yes -no cross-reporting to general GRM |
| Supervision Engineer | Approach directly or via written note | Supervision Engineer | Yes |
| IPIU Social Specialist | Contact via CLO or directly | IPIU | Yes |

Non-retaliation: Any worker who reports a CoC violation in good faith is protected against retaliation. Retaliation against a whistleblower is itself a serious CoC violation and may result in immediate dismissal of the retaliating party. Anonymous reports are accepted through the Worker GRM drop-box and hotline.

### 6-5.10 Consequences of Violations

*Table 67. Violations of this CoC will be addressed according to their severity*

| Violation Category | Examples | Consequence |
|---|---|---|
| Minor | Failure to wear required PPE (first offence); minor littering; failure to attend a scheduled training (with no prior record) | Verbal warning; corrective action; documented in personal record; mandatory repeat training |
| Moderate | Repeated PPE non-compliance; unauthorized absence from site; disrespectful behaviour toward a community member (not involving physical contact) | Written warning; temporary suspension (1–3 days without pay); mandatory additional training; documented in personal record |
| Serious | Harassment of a community member; unauthorized entry into a protected area; unauthorized hunting or resource collection; alcohol on site; document falsification | Written warning + suspension pending investigation; may result in dismissal; mandatory reporting to IPIU |
| Gross misconduct | Any form of SEA/SH; sexual contact with a minor; violence against any person; bribery; confirmed poaching of endangered species; forced labour or document confiscation; second serious violation | Immediate dismissal without notice or severance; referral to Mongolian law enforcement; IPIU notified within 24 hours; case documented in permanent project record |

The Contractor may apply a more stringent consequence at any severity level where the circumstances of the violation warrant it. The Supervisor Engineer and IPIU shall be notified in writing within 24 hours of any dismissal or referral to law enforcement arising from a CoC violation.

### 6-5.11 Worker Rights

This CoC establishes obligations for workers. It does not diminish the rights to which workers are entitled under Mongolian law and the Project's Labour Management Procedure (LMP). Workers have the right to:

1. written employment contracts in a language they understand before commencing work;
2. wages paid on time, in the agreed amount, to their personal bank account;
3. maximum working hours and voluntary overtime with premium pay as required by Mongolian Labour Law;
4. a safe workplace, adequate PPE, and access to first aid;
5. submit a grievance without fear of retaliation;
6. request a copy of this CoC at any time;
7. communicate through an interpreter when required;
8. freedom from forced labour, debt bondage, or document confiscation; and
9. freedom from any form of harassment, intimidation, or abuse by supervisors or colleagues.

### 6-5.12 Roles and Responsibilities

1. Contractor

- Distribute this CoC to all workers and subcontractor workers before their first day on site in all relevant working languages (Mongolian; Chinese).
- Explain CoC contents verbally for workers with limited literacy; use an interpreter where needed; note interpreter's name in the signature record.
- Obtain a signed acknowledgement from every worker before first day; maintain a signed CoC register and provide copies to the Supervision Engineer before the Commencement Notice.
- Conduct quarterly CoC refresher sessions for the duration of construction; record attendance.
- Investigate alleged violations, apply appropriate consequences, and report to the Supervision Engineer and IPIU within 24 hours of any serious or gross misconduct.
- Ensure subcontractors comply with all CoC requirements and provide signed acknowledgements to the main Contractor.

2. Supervision Engineer

- Verify that signed CoC acknowledgements are on file for 100% of workers before issuing the Commencement Notice for any section.
- Conduct unannounced spot checks to verify CoC compliance in the field.
- Receive incident reports of alleged violations and non-conformity notices for non-compliance.
- Report CoC violations of a serious or gross nature to the IPIU within 24 hours.

IPIU

- Maintain oversight of CoC implementation; review Contractor compliance reports quarterly.
- Ensure that the SEA/SH Focal Point and the Worker GRM are operational before any worker commences work.
- Report confirmed CoC violations involving SEA/SH or criminal conduct to the World Bank within 48 hours in accordance with the SEA/SH Prevention and Response Plan (Annex 6-6).

### 6-5.13 Worker Acknowledgement - Signature Form

I, the undersigned, confirm that:

- ✓ I have received a copy of this Code of Conduct in a language I understand;
- ✓ I have had the contents explained to me (verbally, and with interpretation where applicable);
- ✓ I understand my obligations and the consequences of any violation;
- ✓ I agree to comply with this Code of Conduct for the duration of my engagement under this Project; and
- ✓ I understand that my signature does not waive any of my rights as a worker under Mongolian law or the Project's Labour Management Procedure.

| Item | Worker (to fill or dictate) |
|---|---|
| Full name (printed) | |
| Worker ID / Contract number | |
| Position / Role | |
| Section(s) assigned to | |
| Employer (Contractor or Subcontractor name) | |
| Language in which CoC was explained | |
| Date of signature | |
| Signature / Thumb impression | _____ |

| **Worker signature block** | **Witness / Interpreter** |
|---|---|
| Signature: _____ | Signature: _____ |
| Name (printed): _____ | Name (printed): _____ |
| Date: _____ | Role / Language: _____ |

*Note: A completed and signed copy of this form must be retained in the Contractor's personnel file for this worker and a copy provided to the worker. A signed copy register must be submitted to the Supervision Engineer before the Commencement Notice is issued for any section. Signed forms must be made available for inspection by the Supervision Engineer, IPIU, or World Bank at any time.*

# Annex 6-6. Sexual Exploitation, Abuse, and Sexual Harassment (SEA/SH) Prevention and Response Plan

### 6-6.1 Purpose

This SEA/SH Prevention and Response Plan (SEA/SH-PRP) sets out the prevention measures, accountability framework, survivor protection arrangements, referral pathways, and monitoring requirements to address the risk of sexual exploitation and abuse (SEA) and sexual harassment (SH) arising from the Project's construction workforce. It applies throughout the construction phase and the Defects Notification Period.

This Plan is prepared in accordance with the World Bank's Good Practice Note on Addressing Sexual Exploitation and Abuse and Sexual Harassment in Investment Projects with Civil Works (September 2020), ESS2 (Labour and Working Conditions), ESS4 (Community Health and Safety), and the Project's Environmental and Social Framework commitments.

### 6-6.2 Scope

This Plan applies to:

- all construction workers employed by the Contractor and subcontractors;
- any person working under the direction of the Contractor, including security personnel and camp service providers;
- community members in the six soums within the Project's area of influence (Undurshireet, Erdenesant -Tuv Province; Rashaant -Bulgan Province; Khashaat - Arkhangai Province; Burd, Yesunzuil -Uvurkhangai Province); and
- the Project's associated facilities (worker camps, quarries, plant areas, and haul routes).

### 6-6.3 SEA/SH Risk Assessment

#### 6-6.3.1 Risk Factors Specific to This Project

The following project-specific factors elevate the SEA/SH risk above the baseline:

- Workforce composition: the peak workforce of up to 181 workers includes a significant proportion of external migrant workers and workers from outside the project area, including non-Mongolian nationals. Labour influx into remote pastoral communities creates conditions of unequal power between workers (who have income and resources) and community members (particularly women in isolated herder households).
- Remote work locations: the 105 km corridor traverses six soums across four provinces. Several sections are in remote areas with limited access to law enforcement, GBV services, or support networks. This remoteness reduces the perceived risk of detection for potential perpetrators and increases barriers to reporting for survivors.
- Gender dynamics in the project area: the social baseline identifies female-headed households, elderly women living alone, and women who are isolated during the day while male household members are herding. These households are more exposed to contact with workers and less able to seek immediate assistance.

- Community economic vulnerability: construction employment provides significantly higher income than herder livelihoods in the project area. This income differential creates conditions in which community members, particularly women, may feel unable to refuse or report unwanted contact with workers.
- Prior incident data: soum administration data should be reviewed before works commence to establish a quantitative baseline of registered GBV incidents in each soum. This baseline must be recorded before the first worker is deployed and updated quarterly throughout construction.

#### 6-6.3.2 SEA/SH Risk Rating

Based on the factors above, the project-level SEA/SH risk is rated Moderate for construction sections in remote soum areas, consistent with the ESMP's assessment in Table 51 Row 8. The relatively higher risk sections are those where workers are stationed in or adjacent to herder communities (Sections 1, 8, and 10 -rehabilitation sections).

### 6-6.4 Prevention Measures

#### 6-6.4.1 Code of Conduct

All workers must sign the Code of Conduct (Annex 6-5) before commencing work. The CoC explicitly prohibits all forms of SEA/SH and defines consequences up to and including immediate dismissal and referral to law enforcement. The Contractor is responsible for obtaining signatures and maintaining a signed register.

#### 6-6.4.2 Mandatory SEA/SH Training

- Content: definitions and examples of SEA, SH, and GBV; project-specific Code of Conduct provisions; reporting channels and procedures; consequences of violations; survivor rights and protection; cultural sensitivity in herder community settings.
- Coverage: 100% of workers (Contractor and all subcontractors) before first day on site; 100% of security personnel; all camp management staff.
- Language: delivered in Mongolian and Chinese; interpreter used where required; training slides and handouts translated into all relevant languages.
- Delivered by: SEA/SH Expert (listed in Workforce Planning Table 7); supported by a qualified external facilitator if needed.
- Refresher: mandatory quarterly refresher for all workers; attendance recorded; workers absent from a mandatory session must complete a catch-up session before returning to site.
- Records: attendance registers (name, role, date, signature) maintained by Contractor; submitted to Supervision Engineer quarterly.

#### 6-6.4.3 Community Awareness Sessions

- Purpose: inform community members about: the project's CoC obligations for workers; available reporting channels (including the confidential SEA/SH channel); survivor support services; and the project's zero-tolerance policy.
- Format: gender-segregated sessions (women-only sessions must be held in each soum); facilitated by a female CLO or female community liaison; conducted in Mongolian; culturally appropriate language.

- Timing: at least one session per soum before works commence in that soum section; additional sessions if the workforce size increases significantly or a SEA/SH incident is reported.
- Records: attendance sheets (disaggregated by gender); session notes; summary of concerns raised and responses given; submitted to IPIU within 7 days of each session.

#### 6-6.4.4 Camp Management Rules

- Workers must reside in designated camp facilities. Residing in community households or gers is prohibited under any circumstances.
- Camp access is controlled by the Camp Manager. Unauthorized entry by non-project persons and unauthorized exit by workers during curfew hours are prohibited.
- Evening curfew applies: workers may not leave camp in community directions after 21:00 without Camp Manager authorization; any authorized exit must be logged.
- Alcohol is prohibited within camp. Workers returning to camp under the influence of alcohol will be disciplined under the CoC.
- The Camp Manager maintains a daily movement log.

#### 6-6.4.5 Worker Movement Restrictions

- Outside working hours, worker movement is restricted to the approved construction corridor, camp area, and designated soum market areas during authorized rest periods.
- Workers assigned to sections adjacent to or within the Khugnu-Tarna National Protected Area buffer zone (Sections 5 and 6) may not enter protected area boundaries without Environmental Specialist escort.
- Workers may not approach or linger near community households without an explicit invitation from the occupant.

### 6-6.5 Confidential Reporting Channel

#### 6-6.5.1 Channel Structure

A dedicated, confidential SEA/SH reporting channel is established separately from the general community GRM and the Worker GRM. This channel must be operational before the first worker is deployed at any section.

| Channel Element | Specification |
|---|---|
| Dedicated hotline number | A single, dedicated phone number posted at all camp entry points, all section GRM notice boards, all soum administration offices, and soum health centre noticeboards. The number must not be the same as the general GRM hotline. |
| Physical drop-box | Located at each soum administration office and at each camp; managed exclusively by the female SEA/SH Focal Point; checked daily; key held only by Focal Point |
| Female SEA/SH Focal Point | Named individual appointed before first worker deploys; name and direct contact posted at all channels; trained in survivor-centred approaches; responsible for first-stage receipt of all SEA/SH complaints |
| Anonymous submissions | Accepted through both the hotline (caller may withhold name) and the drop-box (no identifying information required) |
| Language accessibility | Complaint submission accepted in Mongolian; assistance available in other languages through interpreter |
| Separation from general GRM | No SEA/SH complaint may be entered into the general community GRM register; no SEA/SH information shared with the Contractor or general project team without the survivor's explicit consent |

### 6-6.5.2 Who Manages the Channel

The SEA/SH confidential channel is managed exclusively by the IPIU Social Specialist in coordination with the female SEA/SH Focal Point. The Contractor has no access to the channel's records except in relation to its own procedural compliance (e.g., confirming that the hotline is active and the Focal Point is reachable). Case details are never shared with the Contractor except where required by law or for disciplinary proceedings against a named accused worker, and then only on a strictly need-to-know basis.

### 6-6.6 Survivor-Centred Response Framework

All response to SEA/SH complaints is guided by the following principles:

- Safety first: the immediate safety of the survivor is the first priority in all response actions.
- Confidentiality: the survivor's identity is protected at all stages. No identifying information is shared without the survivor's explicit informed consent.
- Informed consent: the survivor is informed of available options (reporting to police, accessing support services, pursuing internal investigation, or taking no action) and makes their own choices. The survivor's decision is respected.
- Non-discrimination: the survivor's account is taken seriously regardless of the perpetrator's seniority, nationality, or length of service.
- Do-no-harm: response actions must not expose the survivor to further risk, stigma, or retaliation. Joint reporting or mediation with the alleged perpetrator is not permitted.
- Access to support: the survivor is connected to medical, psychological, and legal support within 24 hours of making a complaint, whether or not a formal investigation is initiated.

### 6-6.7 Incident Response Procedure

***Table 68. Notification Timeline***

| Time from complaint receipt | Action required | Responsible party |
|---|---|---|
| Immediate (within 1 hour) | SEA/SH Focal Point receives complaint; ensures survivor is in a safe location; confirms what support the survivor needs; does NOT question the survivor beyond what is needed for immediate safety | SEA/SH Focal Point |
| Within 3 hours | SEA/SH Focal Point contacts IPIU Social Specialist; survivor connected to nearest support service on referral pathway list | SEA/SH Focal Point; IPIU Social Specialist |
| Within 24 hours | IPIU Social Specialist notifies World Bank Task Team (aggregated, de-identified notification); Contractor is notified that a complaint has been received involving one of their workers (name not disclosed at this stage); accused worker suspended from site pending investigation | IPIU Social Specialist |
| Within 48 hours | World Bank receives formal written notification from IPIU (survivor-anonymous); IPIU initiates investigation by qualified independent person or team | IPIU Social Specialist; World Bank |
| Within 10 working days | Investigation completed; findings reported to IPIU; disciplinary action taken; survivor informed of outcome and further options | IPIU Social Specialist; qualified investigator |
| Ongoing | Case remains open in confidential register until survivor confirms satisfactory outcome; World Bank receives updates in each biannual E&S monitoring report (aggregated data only) | IPIU Social Specialist |

6-6.7.2 Investigation Principles

- Investigations are conducted by a person with training in survivor-centred investigation methods, independent of the Contractor.
- The survivor is not required to participate in the investigation. Their account, as recorded at first contact, forms the basis of the investigation.
- The accused worker is suspended from site -not dismissed -pending the outcome of the investigation. Dismissal follows if the investigation confirms the allegation.
- Where the allegation involves a criminal offence under Mongolian law, the matter is referred to law enforcement. Referral is made in coordination with the survivor and, where the survivor has given consent, in parallel with the internal investigation.
- No mediation, joint meeting, or face-to-face contact between the survivor and the accused is arranged as part of the response process.

### 6-6.8 Referral Pathway

#### 6-6.8.1 Referral Principles

The SEA/SH Focal Point maintains an up-to-date referral pathway map before works commence in each soum. Each service provider on the list must be contacted and confirmed as available before works commence in their geographic area. The list is updated whenever works advance to a new section.

***Table 69. GBV/SEA-SH Service Providers and Referral Pathways by Project Section***

| Service Type | Provider / Contact (to be confirmed before works commence in each soum) | Coverage Area |
|---|---|---|
| National 24-hour GBV hotline | National Centre Against Violence -hotline 107 (24 hours; free; Mongolian) | All provinces |
| Provincial Family and Child Development Centre | Tuv Province Family and Child Development Centre -[contact to be confirmed before mobilisation at Sections 1 and 2] | Sections 1, 2, 3 (Tuv Province) |
| Provincial Family and Child Development Centre | Bulgan Province Family and Child Development Centre -[contact to be confirmed before mobilisation at Sections 4, 5, 6] | Sections 4, 5, 6 (Bulgan Province) |
| Provincial Family and Child Development Centre | Arkhangai Province Family and Child Development Centre -[contact to be confirmed before mobilisation at Section 7] | Section 7 (Arkhangai Province) |
| Provincial Family and Child Development Centre | Uvurkhangai Province Family and Child Development Centre -[contact to be confirmed before mobilisation at Sections 8, 9, 10] | Sections 8, 9, 10 (Uvurkhangai Province) |
| Soum health centre (emergency medical) | Medical contacts per Table 50 of the main ESMP body (Burd; Yesunzuil; Rashaant; Khashaat; Undurshireet; Erdenesant soum health centres) | All sections -nearest soum |
| Law enforcement | Soum police posts -contacts to be confirmed before works commence in each soum; list maintained by CLO and posted at each section notice board | All sections |
| Legal aid | Mongolian Bar Association legal aid service -[contact to be confirmed] | All provinces |

*Note: The IPIU Social Specialist is responsible for confirming all referral pathway contacts before works commence in each soum, updating the list if contacts change, and ensuring the*

*SEA/SH Focal Point has tested each contact before works begin. Untested referral pathways are not compliant with this Plan.*

### 6-6.9 Roles and Responsibilities

***Table 70. GBV/SEA-SH Service Providers and Coverage by Project Section***

| Service Type | Provider / Contact (to be confirmed before works commence in each soum) | Coverage Area |
|---|---|---|
| National 24-hour GBV hotline | National Centre Against Violence -hotline 107 (24 hours; free; Mongolian) | All provinces |
| Provincial Family and Child Development Centre | Tuv Province Family and Child Development Centre -[contact to be confirmed before mobilisation at Sections 1 and 2] | Sections 1, 2, 3 (Tuv Province) |
| Provincial Family and Child Development Centre | Bulgan Province Family and Child Development Centre -[contact to be confirmed before mobilisation at Sections 4, 5, 6] | Sections 4, 5, 6 (Bulgan Province) |
| Provincial Family and Child Development Centre | Arkhangai Province Family and Child Development Centre -[contact to be confirmed before mobilisation at Section 7] | Section 7 (Arkhangai Province) |
| Provincial Family and Child Development Centre | Uvurkhangai Province Family and Child Development Centre -[contact to be confirmed before mobilisation at Sections 8, 9, 10] | Sections 8, 9, 10 (Uvurkhangai Province) |
| Soum health centre (emergency medical) | Medical contacts per Table 50 of the main ESMP body (Burd; Yesunzuil; Rashaant; Khashaat; Undurshireet; Erdenesant soum health centres) | All sections -nearest soum |
| Law enforcement | Soum police posts -contacts to be confirmed before works commence in each soum; list maintained by CLO and posted at each section notice board | All sections |
| Legal aid | Mongolian Bar Association legal aid service -[contact to be confirmed] | All provinces |

### 6-6.10 Monitoring Indicators

***Table 71. Monitoring Framework for SEA/SH Risk Mitigation and Response***

| INDICATOR | BASELINE | TARGET | FREQUENCY | REPORTED BY |
|---|---|---|---|---|
| Workers with signed CoC before deployment | 0 (pre-construction) | 100% | Before Commencement Notice; verified quarterly | Contractor; verified by SE |
| No. of SEA/SH training sessions held; total attendance disaggregated by gender | 0 | ≥1 session per section before works; quarterly refreshers | Quarterly | SEA/SH Expert |
| No. of community awareness sessions held; attendance disaggregated by gender | 0 | ≥1 per soum before works; ≥1 women-only per soum | Before works; quarterly thereafter | CLO; IPIU |
| SEA/SH confidential channel operational (hotline active; Focal Point reachable; drop-box installed and checked daily) | Not operational (pre-construction) | Confirmed operational before first worker; verified monthly | Monthly | Supervision Engineer; IPIU |
| No. of SEA/SH complaints received (aggregated; anonymised -survivors | 0 (establish soum-level baseline before works from admin records) | Zero incidents; 100% handled through confidential channel | Biannual (reported to WB in aggregated, anonymised form) | IPIU SEA/SH Focal Point |

| | | | | |
|---|---|---|---|---|
| not identified) | | | | |
| % of SEA/SH complaints where survivor was connected to support services within 24 hours | N/A | 100% | Biannual | IPIU |
| % of accused workers suspended from site pending investigation within 24 hours of confirmed complaint | N/A | 100% | Biannual | IPIU; Supervision Engineer |
| Quarterly anonymous community safety survey -% of female respondents reporting perceived safety improvement | Baseline survey before works | ≥60% positive response by end of construction Year 1; ≥75% by end of construction Year 2 | Quarterly | CLO; SEA/SH Expert |
| No. of referral pathway contacts verified and current in each active soum | 0 (pre-construction) | 100% of contacts verified before works commence in each soum; reviewed monthly | Monthly | IPIU Social Specialist; SEA/SH Focal Point |

### 6-6.11 Records

The following records shall be maintained by the IPIU Social Specialist and SEA/SH Focal Point throughout the project:

- Signed CoC register (maintained by Contractor; copy submitted to Supervision Engineer before each Commencement Notice)
- SEA/SH training attendance registers -disaggregated by gender; date; section
- Community awareness session attendance records -disaggregated by gender; soum; date; concerns raised
- Confidential SEA/SH case register -maintained exclusively by the SEA/SH Focal Point and IPIU Social Specialist; not accessible to the Contractor except for disciplinary proceedings
- Referral pathway contact verification records -confirming each service provider was contacted and confirmed as available before works commenced in their area
- Anonymous quarterly community safety survey instruments and aggregated results
- Investigation reports -maintained confidentially; not included in general project monitoring reports
- World Bank notification records -copies of all notifications submitted within 48 hours
- Biannual E&S monitoring report SEA/SH sections -aggregated and anonymised

*Confidentiality note: All records relating to individual SEA/SH cases (case register; investigation reports; survivor support records) must be stored in a secure, locked location accessible only to the SEA/SH Focal Point and the IPIU Social Specialist. These records must not be stored in the general project file, shared with the Contractor, or disclosed in any project report without explicit written consent from the survivor.*

### 6-6.12 Plan Review and Update

This SEA/SH-PRP shall be reviewed and updated in the following circumstances:

- ✓ Before works commence in each new soum section (referral pathway update; community risk profile review)
- ✓ Following any confirmed SEA/SH incident (review of prevention measures and response timeline)
- ✓ If the workforce composition changes significantly (major influx of new workers or subcontractors)
- ✓ If quarterly community safety survey results indicate deteriorating safety perception among female respondents
- ✓ If the World Bank task team requests an update following supervision

The IPIU Social Specialist, in coordination with the SEA/SH Expert and the Supervision Engineer, is responsible for conducting reviews and submitting updated versions of this Plan to the World Bank for information.