

# Safeguards Due Diligence Report

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Project Number: 41193-019  
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## Mongolia: Western Regional Road Corridor Investment Program - Tranche 2

Prepared by the Project Implementation Unit (Ministry of Roads and Transport Development) for the Government of Mongolia and the Asian Development Bank.

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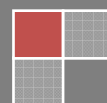
2021

# ENVIRONMENTAL DUE DILIGENCE REPORT

Western Regional Road Corridor  
Investment Program: Construction of  
access road to Khovd soum

Project Implementation Unit

20/10/2021



## CONTENTS

CONTENTS .....	2
1.0 INTRODUCTION.....	5
1.1 Background.....	5
1.2 About the report .....	6
1.3 Environmental responsibilities.....	6
2.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK.....	7
2.1 National environmental policy framework.....	7
2.2 Environmental Impact Assessment Requirements .....	9
2.2.1 Environmental Assessment Requirements of ADB.....	9
2.2.2 Environmental Assessment Requirements of Mongolia .....	10
2.3 National Environmental Standards.....	12
2.4 Climate Change Policy.....	13
2.5 Specially Protected Areas .....	14
3.0 PROJECT DESCRIPTION.....	14
3.1 Location of the project.....	14
3.2 Design specifications .....	15
3.3 Road structures .....	16
4.0 DESCRIPTION OF ENVIRONMENT .....	18
4.1 Project Area of Influence.....	18
4.2 Geography and Topography .....	18
4.2.1 Geography.....	18
4.2.2 Topography .....	18
4.3 Soil .....	18
4.4 Permafrost .....	19
4.5 Climate .....	20
4.6 Air quality.....	23
4.7 Surface water.....	24
4.7.1 Surface water resources in the project region .....	24
4.7.2 Surface water bodies along the project road corridors .....	24
4.7.3 Water quality.....	26
4.8 Ground water.....	27
4.9 Plant cover.....	28
4.10 Wildlife .....	28

4.11	Special Protected areas .....	30
4.12	Cultural heritage .....	31
4.13	Climate change .....	36
4.14	Socio-economy .....	37
4.14.1	Territory and land use .....	38
4.14.2	Demographics .....	38
4.14.3	Key social statistics .....	38
4.14.4	Economy and livelihood .....	38
5.0	ALTERNATIVE ANALYSIS .....	39
5.1	No Action Alternative .....	39
5.2	Location Alternative .....	39
6.0	ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES .....	40
6.1	Design and pre-construction phase .....	40
6.2	Construction phase .....	46
6.2.1	Impact on Physical Resources .....	46
6.2.2	Impact on Biological Resources .....	51
6.2.3	Impacts on Cultural Resources .....	55
6.2.4	Impacts on Human Environment .....	55
6.3	Operation phase .....	57
6.3.1	Physical resources .....	57
6.3.2	Biological resources .....	57
6.3.3	Socio-economy .....	58
6.3.4	Unanticipated Impacts during Construction and Operation .....	58
7.0	PUBLIC CONSULTATION .....	59
8.0	GRIEVANCE REDRESS MECHANISM .....	61
8.1	The existing grievance redress system .....	61
8.2	GRM steps and timeframe .....	61
9.0	CONCLUSION AND RECOMMENDATIONS .....	63
9.1	Project Context .....	63
9.2	Major Environmental Impacts and Mitigation Measures .....	63
9.3	Overall Conclusion .....	64
10.0	ENVIRONMENTAL MANAGEMENT PLAN .....	66
10.1	KEY OBJECTIVES .....	66
10.2	LEGAL REQUIREMENTS .....	66

10.3	IMPLEMENTATION PERIOD .....	66
10.4	EMP IMPLEMENTATION COST SUMMARY.....	67
10.5	Mitigation measures plan .....	68
10.6	Cultural heritage protection plan .....	81
10.7	ENVIRONMENTAL MONITORING PROGRAM.....	82
10.7.1	Key objectives.....	82
10.7.2	Monitoring spots .....	82
10.8	STAKEHOLDER ENGAGEMENT PLAN.....	85
APPENDIX 1. NATIONAL ENVIRONMENTAL STANDARDS.....		86
APPENDIX 2. HEALTH AND SAFETY MANAGEMENT PLAN IN RESPONSE TO THE COVID-19 PANDEMIC .....		90

## 1.0 INTRODUCTION

### 1.1 BACKGROUND

1. **The multitranche financing facility** (MFF 0065-MON) was approved by the ADB Board on 9 December 2011 with an aggregate amount of \$170 million from a blend of ADB's Asian Development Fund (ADF) and ordinary capital resources (OCR) on 9 December 2011 with an availability period until 30 November 2021. The approval documents noted that subject to availability of or access to ADF funds, subsequent tranches might include ADF or concessional financing.
2. **Tranche 1** (Loan 2847-MON) was approved for \$45 million (SDR28.381 million) from ADF by the ADB President on 22 December 2011. The loan agreement was signed on 20 March 2012, and the loan became effective on 3 May 2012. The loan was financially closed on 14 February 2020.
3. **Tranche 2** (Loan 3129-MON) was approved for \$125 million from ordinary capital resources by the ADB President on 14 May 2014. The loan agreement was signed on 2 June 2014, and the loan became effective on 31 August 2014. The outputs of the project are (i) 189.7 kilometers (km) of paved road constructed between Khovd and Ulaanbaishint; (ii) three bridges (0.49 km) and 14.9 km of urban roads rehabilitated in the towns of Khovd and Ulgii; (iii) two road maintenance units established and equipped with trained staff; and (iv) project management, consulting services, and capacity development for maintenance planning, civil works, and procurement. The loan was to be completed by 30 June 2019. On 14 June 2019, ADB approved the extension of the loan closing date from 30 June 2019 to 31 December 2020 and then to 30 November 2021. A minor change in project scope was approved on 8 August 2019 utilizing loan savings to provide a new 19 km bypass to divert heavy trucks and passing traffic to the west of Ulgii City Center to improve traffic safety and efficiency.
4. **Implementation arrangements.** The EA is the MRTD. The Road Policy Implementation and Coordination Department of MRTD is the implementing agency. The PIU established in MRTD is in charge of implementing the projects.
5. **Impact and outcome.** The impact will be inclusive economic growth promoted by enhanced local and regional connectivity in the remote western region of Mongolia. The outcome will be improved transport accessibility within the project area and between countries.
6. **Cost estimates and financing plan. The project was estimated to cost \$262.00 million** at appraisal of MFF. The MFF envisaged ADB financing of 64.9% at appraisal.
7. **Implementation period.** The MFF was to be implemented from April 2012 to 30 November 2021. For Tranche 2, the original completion and loan closing dates are 31 December 2018 and 30 June 2019, respectively. The loan closing date of Tranche 2 was extended on 14 June 2019 by 18 months to 31 December 2020, but was extended by 6 months of period to 30 November 2021.

## **1.2 ABOUT THE REPORT**

8. This Environmental Due Diligence Report is prepared for an 18.755 km access road between Khovd-Ulgui AH 4 road and Khovd soum center. The project area is located in Khovd province in western Mongolia and construction activities are planned to be commenced in 2022.
9. This report provides information about the project area, project activities and impacts and environmental management measures described as below:
  - (i) Chapter One provides general information about the program, its implementation phases and environmental requirements.
  - (ii) Chapter Two provides detailed information on the project location and road design plannings.
  - (iii) Chapter Three describes baseline environmental condition of the project area, including topography, climate, soil cover, surface and ground water, flora and fauna.
  - (iv) Chapter Four assessed potential environmental and social impacts of construction.
  - (v) Chapter Five provides environmental management plan which includes mitigation measures plan and environmental monitoring plan.

## **1.3 ENVIRONMENTAL RESPONSIBILITIES**

10. The project is project required to meet requirements of both ADB's Safeguard Policy Statement (SPS 2009) and domestic environmental laws and regulations.
11. The Detailed Environmental Impact Assessment for Tranche 2 was approved by the Ministry Environment and Tourism in November 2016. Initial Environmental Examination (IEE) for WRRICIP Tranche 2 was prepared and posted on ADB website in November 2013.
12. Environmental Department of the Khovd province has issued a General Impact Assessment for the access roads in January 2021, which concludes that no DEIA is needed and the project may proceed with specific conditions (EMP is needed).
13. As required by the General Impact Assessment, Environmental Management Plans for both access roads prepared by the PIU will be submitted to the Environmental Department of Khovd province for review and approval before commencement of construction.
14. Civil works contractors for both access roads are responsible for implementation of the EMP, including mitigation measures, environmental monitoring program and GRM mechanisms, under supervision of the PIU environmental monitoring specialist.
15. Semi-annual environmental monitoring reports prepared by the PIU environmental monitoring specialist will be submitted to ADB for review and approval.

## 2.0 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

### 2.1 NATIONAL ENVIRONMENTAL POLICY FRAMEWORK

16. Mongolia has enacted a comprehensive policy and legal framework for environmental assessment and management. It has policies, legislation and strategies in place to manage the protected estate, to satisfy its international obligations, and to protect the quality of the environment for the health and well-being of its citizens. The hierarchy of policies and legislative provisions for environmental management in Mongolia comprises five layers ranging from the Constitution to international treaties, and to environment and resources protection laws<sup>1</sup>.
17. The main policy documents are the National Biodiversity Program 2015-2025 and a set of environmental laws that were amended in May 2012 including the Law on EIA. The Government of Mongolia has adopted Green Development Policy in 2014 which aims to advance Mongolia's national development in an environmentally sustainable manner, building the conditions for future generations to benefit and gain in the long term and to ensure environmental sustainability through creation of growth based on green development concepts and through citizen's participation and inclusiveness. It seeks to ensure green development for Mongolia through achieving six main objectives: (i). Promote resource efficient, low carbon production and consumption with emphasis on waste reduction. (ii). Maintain ecosystem balance and reduce environmental degradation while intensifying reclamation activities and environmental protection. (iii). Promote investment in environmental protection, human development and clean technology and leverage tax, credit and incentive mechanisms to finance green economy. (iv). Promote green jobs, reduce poverty and promote green lifestyle. (v). Make education, science and technology and innovation accelerators of green development by promoting environmentally adapted style and cultural values. (vi). Plan and implement human settlement adapted to climate change, and natural resources carrying capacity.
18. The key principles of the Green Development Policy are: (i). harmony between sectorial policies and planning are consistent with green development concepts, (ii). support for clean advanced technologies, (iii). citizens' participation and inclusiveness in green growth, (iv). environmentally friendly attitudes, habits and competencies, (v). transparency, accountability and liability and (vi). efficient, effective and rational use of resources.
19. The health of Mongolia's natural ecosystems and populations of wild species is of both national and global importance. The country forms an important part of the global ecosystem where the ecoregions of the Siberian taiga, the Central Asian steppe, the high Altai Sayan, and the Gobi desert converge. The Project area is in the Altai Sayan ecoregion. In recognition of its global responsibilities, Mongolia has acceded to a number of international environmental conventions and the key ones are tabulated below (**Table 1**).
20. Each of these conventions places obligations on signatory governments ranging from the provision of a legislative basis for implementation, to adherence to the requirements and conditions of each convention, to monitoring implementation performance on a regular basis, to reporting on a regular basis to the conference of parties.

<sup>1</sup> UNDP. 2008. *Institutional Structures for Environmental Management in Mongolia*. Ulaanbaatar and Wellington.



**Table 1. International Environmental Conventions Signed by Mongolia**

Convention	Year of Accession
Convention on Biological Diversity (CBD)	1993
UN Framework Convention on Climate Change (UNFCCC)	1994
Kyoto Protocol	1999
UN Convention on Combating Desertification (UNCCD)	1996
Convention on the Protection of Wetlands of International Importance (Ramsar)	1998
Vienna Convention for the Protection of the Ozone Layer	1996
Montreal Protocol (regulating substances that deplete the ozone layer)	1996
Convention on International Trade in Endangered Species of Fauna and Flora (CITES)	1996
Convention on the Transboundary Movement of Hazardous Waste (Basel)	1997
Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	2000
Stockholm Convention on Persistent Organic Pollutants (POPs)	2004
World Heritage Convention	1990

21. The Government of Mongolia undertook a major environmental law reform in 2012 including the law of land, protected areas, water, forest, wildlife, and native flora resources. The legislation base is extensive as evidenced by the following table of key environmental legislation (**Table 2**).

**Table 2. National environmental laws**

Law	Enacted and Amended
Law on Development Policy Planning	November 2015
Law on Legal Status of the Capital City	Enacted in 1994 and amended in February 2013
Law on Environmental Protection	Enacted in 1995 and amended in May 2017
Law on Environmental Impact Assessment	Enacted in January 1998 and last amended in May 2012.
Law on Land (revised)	Enacted in 2013 and amended in 2018
Law on Soil protection and prevention from desertification	Enacted in 2012 amended in 2015
Law on Water (revised)	Enacted in 2012 and amended in 2017
Law on Fees for Water Pollution	Enacted in 2012 and amended in 2017
Law on Air (revised)	Enacted in 2012 and amended in 2018
Law on Fees for Air Pollution	Enacted in 2010 and amended in January 2018
Law on Hygiene (revised)	Enacted in 2016 and amended in 2017

Law	Enacted and Amended
Law on Waste	Enacted in 2017
Law on Toxic and Hazardous Chemicals	Enacted in 2006 and amended in January 2018
Law on Disaster Protection	Enacted in 2003 and amended in 2012 and 2017
Law on Re-development of Urban Settlements	Enacted in 2015
Law on Land Privatization	Enacted in 2002 and amended in June 2018
Law on Land Fees	Enacted in 1997 and amended in 2012
Law on Construction	Enacted in 2016 and amended in 2017
Law on Sanitation	Enacted in 2011 and amended in 2017
Law on Labor	Enacted in 1999 and amended in 2017
Law on Labor Safety and Hygiene	Enacted in 2008 and amended in 2018.
Law on Fire Safety	Enacted in 2015

## 2.2 ENVIRONMENTAL IMPACT ASSESSMENT REQUIREMENTS

22. The project is subject to the environmental requirements of both Mongolia and ADB. These requirements are defined in the next two sections.

### 2.2.1 Environmental Assessment Requirements of ADB

23. Safeguard requirements for all projects funded by ADB are defined in ADB SPS (2009). SPS 2009 establishes an environmental review process to ensure that projects undertaken as part of programs funded through ADB loans are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. SPS 2009 is underpinned by the ADB Operations Manual, Bank Policy (OM F1, 2010). The policy promotes international good practice as reflected in internationally recognized standards such as the *World Bank Group's Environmental, Health and Safety Guidelines*<sup>10</sup>.
24. SPS 2009 environmental assessment requirements specify that:
- (i) At an early stage of project preparation, the borrower/client will identify potential direct, indirect, cumulative and induced environmental impacts on and risks to physical, biological, socioeconomic, and cultural resources and determine their significance and scope, in consultation with stakeholders, including affected people and concerned NGOs. If potentially adverse environmental impacts and risks are identified, the borrower/client will undertake an environmental assessment as early as possible in the project cycle. For projects with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, the borrower/client will examine alternatives to the project's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks;
  - (ii) The assessment process will be based on current information, including an accurate project description, and appropriate environmental and social baseline data;
  - (iii) Impacts and risks will be analyzed in the context of the project's area of influence;

- (iv) Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including preconstruction, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration;
  - (v) The assessment will identify potential trans-boundary effects as well as global impacts; and
  - (vi) Depending on the significance of project impacts and risks, the assessment may comprise a full-scale environmental impact assessment (EIA) for category A projects, an initial environmental examination or equivalent process for category B projects, or a desk review.
25. Other key requirements of SPS 2009 include:
- (i) Environmental Management Plan. The borrower/client will prepare an environmental management plan (EMP) that addresses the potential impacts and risks identified by the environmental assessment.
  - (ii) Consultation and Participation. The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation.
  - (iii) Information *disclosure*. The borrower/client will submit to ADB the following documents for disclosure on ADB's website: (i) a draft full EIA (including the draft EMP) at least 120 days prior to ADB Board consideration; (ii) the final EIA; (iii) a new or updated EIA and corrective action plan prepared during project implementation, if any; and (iv) semi-annual environmental monitoring reports.
  - (iv) Grievance Redress Mechanism. The borrower/client will establish a mechanism to receive and facilitate resolution of affected people's concerns, complaints, and grievances about the project's environmental performance.
  - (v) Monitoring. The borrower/client will monitor and measure the progress of implementation of the EMP.

### **2.2.2 Environmental Assessment Requirements of Mongolia**

26. The EIA requirements of Mongolia are regulated by the Law on Environmental Impact Assessment (1998, amended in 2012). The terms of the law apply to all new projects, as well as rehabilitation and expansion of existing industrial, service or construction activities and projects that use natural resources. The purpose of this law is to protect the environment, prevent ecological imbalance, ensure minimal adverse impacts on the environment from the use of natural resources, and regulate relations that may arise in connection with the assessment of environmental impacts of and approval decisions on regional and sectorial policies, development programs and plans and projects. Table 10 lists all classes of projects that require GEIA according to the Mongolian law. The Tranche 3 falls in the category No.7 in the table below.
27. The EIA requirements of Mongolia are regulated by the Law on EIA (<sup>2</sup> enacted 2012). The terms of the law apply to all new projects, as well as rehabilitation and expansion of existing industrial, service or construction activities and projects that use natural resources. law revised in 2012 and brought into force in 2013, implemented through a new Environmental Impact Assessment Regulation.<sup>3</sup> The 2012 revision introduces a requirement for Strategic

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<sup>2</sup> Law of Mongolia on Environmental Impact Assessments (1998, amended in 2002). Unofficial translation available from <http://cdm-mongolia.com>.

<sup>3</sup> The new EIA Regulation revokes 2 Regulations and 1 Guideline document which do not meet the requirements of the EIA Law. The revoked legislation is: Regulation on the Environmental Impact

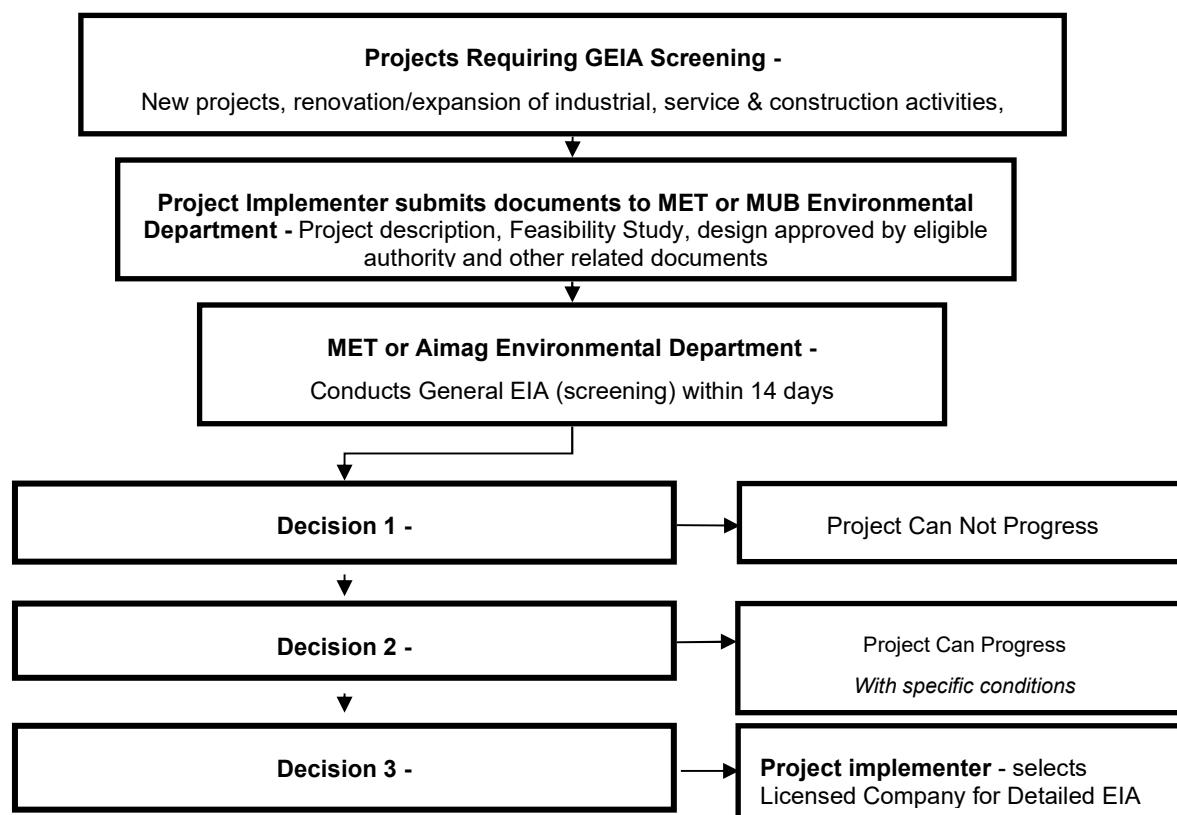
Environmental Assessment for policy documents, and increases emphasis on public participation during a general EIA.

28. The purpose of the EIA law is environmental protection, the prevention of ecological imbalance, the regulation of natural resource use, the assessment of environmental impacts of projects and procedures for decision-making regarding the implementation of projects. The EIA process in Mongolia is summarized in Figure 2.
29. There are two types of EIA's defined under the Law on Environmental Impact Assessment (2012), as follows:
  - General EIA (GEIA): To initiate a GEIA, the project proponent submits to the MET or Aimag government a brief description of the project, including feasibility study, technical details, drawings, baseline description of the project environment, and a written opinion of the Soum governor. These documents form the basis of the GEIA and MET's assessment, which will have one of three conclusions: (a) project is rejected due to non-conformity with national laws and/or the severity of impacts; (b) project may proceed, subject to specific conditions, and (iii) a detailed EIA (DEIA) is necessary. Assessment by MET generally takes 14 working days.
  - Detailed EIA. The scope of the DEIA is defined in MET's response for the GEIA. The DEIA is prepared by an accredited national entity. The DEIA is submitted by the project proponent to MET and Aimag government. The reviewer(s) of the GEIA also review the DEIA, generally within 18 working days, and present the findings to the MET. Based on the content of the DEIA, reviewer conclusions, and any additional comments by MET departments, MET issues a decision on whether to approve or reject the project.

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Assessment Committee (2006); Guidelines on Formulating EPPs and EMPs (2000); and Regulation on Detailed EIA Appraisal (2006). These regulations are superseded by the EIA Law.

Figure 1. Environmental Impact Assessment Process in Mongolia



Source: Law on EIA of Mongolia, 2012.

30. The DEIA procedure guide lined by the method approved by the Minister's order A-117 of MET in April 2014 and it is required to contain the following chapters: (i) environmental baseline data; (ii) analysis of extent and distribution of adverse impacts; (iii) measures to minimize, mitigate, and/or avoid impacts; (iv) alternative methods and technology; (v) risk assessment; (vi) environmental management plan (EMP); and (vii) stakeholder consultations, including potentially affected communities.
31. In compliance with Mongolia's environmental safeguard policy, GEIA for the proposed road to Khovd was issued by Environmental Department of Khovd Province in January 2021. The GEIA came up with the Decision 2: Project Can Progress with specific conditions. It means that detailed EIA is not required, the project may proceed with EMP only, considering the situation that the project road is located sufficiently distant from potential impact receptors and environmentally sensitive areas.

## 2.3 NATIONAL ENVIRONMENTAL STANDARDS

32. "Mongolian National Standards" prescribe effluent/wastewater standard, ambient air, noise, water quality, soil quality, industrial effluent discharge, boiler emission etc.
33. Key standards applied for this project include the following: (i) Water quality general requirement (MNS 4586:1998); (ii) Air quality. General technical requirements (MNS

4585:2016); (iii) Drinking water. Hygiene requirements, evaluation of quality and safety (MNS 0900:2018), (iv) Waste water quality supplied to sanitation network (MNS 6561-2015), (v) Determining disposal location of waste water (MNS 6230-2010), (vi) Occupational hygiene and work condition (MNS 4990-2015), (vii) General Requirements on personal protective equipment (MNS 4931-2000), (viii) General requirement on fire safety (MNS 4244-1994), (ix) General requirement on transportation of domestic waste (MNS 5344-2011), (x) Planning of public utility facilities and distance from green areas (MNS 5973-2009), (xi) General requirement for parking space (MNS 5342-2007) and the WHO Guidelines for Drinking-water Quality, Fourth Edition (2011); (xii) Soil Quality, Soil Pollutant Elements and Substances Standard (MNS 5850:2008); (xiii) Ambient Noise Standard (MNS 4585:2016); and (xiv) Labor safety and hygiene. General requirement for noise level and occupational safety (MNS 5002:2000). Requirements of the national environmental standards and WHO EHS Guidelines are listed in **Appendix section 1** for reference.

34. Occupational health and safety standard (MNS 5002:2000). Article 16 of the National Constitution of Mongolia states that every employee has the right to 'suitable conditions of work'. The government adopted a National Program for Occupational Safety and Health Improvement in 2001 and national standards are also adopted such as the National Standard on Occupational Health and Safety MNS 5002:2000 which support the Occupational Safety and Health Law 2008 which sets out policies, rules and regulations on occupational safety and health, and the most common requirements for workplace safety.

## **2.4 CLIMATE CHANGE POLICY**

35. Mongolia has joined 14 environment-related UN Conventions and Treaties, including the UN Framework Convention on Climate Change (UNFCCC). Nationally, the Mongolian Action Programme for the 21st Century (MAP 21) includes considerations and recommendations related to climate change adaptation and the mitigation of Greenhouse gas (GHG) emissions.
36. In order to comply with the obligations and commitments under the UNFCCC as well as to address challenges relevant to climate change, Mongolia has developed its National Action Programme on Climate Change, which received Government approval in 2000 and was updated in 2010. The action programme includes the national policy and strategy to tackle impacts of climate change and to mitigate GHG emissions. It also sets priorities for action and to integrate climate change concerns into other national and sectoral development plans. In order to fulfill the requirements of the National Programme on Climate Change, an interdisciplinary and inter-sectoral National Climate Committee has been established by the government and is led by MNET. The Committee coordinates and guides national activities and measures aimed at adapting to climate change and mitigating GHG emissions.
37. Regarding climate change mitigation, the government has undertaken to mitigate GHG emissions through a range of strategies for sustainable development covering different sectors. In the transportation sector, the strategy is 'Efficient management of transportation'. The policies and measures to implement this are: (i) Enhancement of national transportation system (railway enhancement and electrification; setting up transit logistics centers) and (ii) Eco-transport strategy (efficient traffic management; expansion of public transportation; and promotion of fuel efficient cars).<sup>14</sup>
38. Regarding climate change adaptation, the government has outlined strategies relating to the following sectors: animal husbandry, arable farming, water resource, human health, and forestry. Each sector has a number of strategies and policies and measures relating to the strategy. In the water resource sector, one of the strategies is "improved water resource

management” and the measure to implement it is “developing and implementing integrated river basin management policy and plans in the river basins and at national level, coping with desertification”. There is no specific strategy relating to transport, however the range of measures relating to protection of water supplies, such as “Improved water resource management” are relevant to the project as the WRRICIP traverses an area in which surface waters in particular are relied upon by both people and livestock.

39. ADB Guidelines for Climate Proofing Investment in the Transport Sector state that climate proofing options can be either engineering (structural) options (subsurface conditions, material specifications, cross section and standard dimensions, drainage and erosion, and protective engineering structures), and/or non-engineering options (maintenance planning and early warning, alignment, master planning and land use planning, and environmental management). In relation to the climate change related vulnerabilities, the risk of “permafrost retreat” is the most relevant concern to a transport project.

## 2.5 SPECIALLY PROTECTED AREAS

40. **Specially Protected Areas.** In 1994, the protected area system was consolidated and formalized through the Law on Special Protected Areas. Under this law, Mongolia has a national system of protected areas, called Special Protected Areas, covering 22 million hectares, equivalent to almost 14% of the country. The Law on Special Protected Areas provides for four categories of protected areas: Strictly Protected Areas; National Parks; Nature Reserves; and National Monuments.
41. Nature Reserves are further classified into four sub-categories: Ecological Reserves; Biological Reserves; Paleontological Reserves; and Geological Reserves. In addition, the Law on Buffer Zones requires the establishment of Buffer Zones outside Strictly Protected Areas. In addition, local *soum* authorities may establish Buffer Zones around Nature Reserves and Natural Monuments.<sup>15</sup>

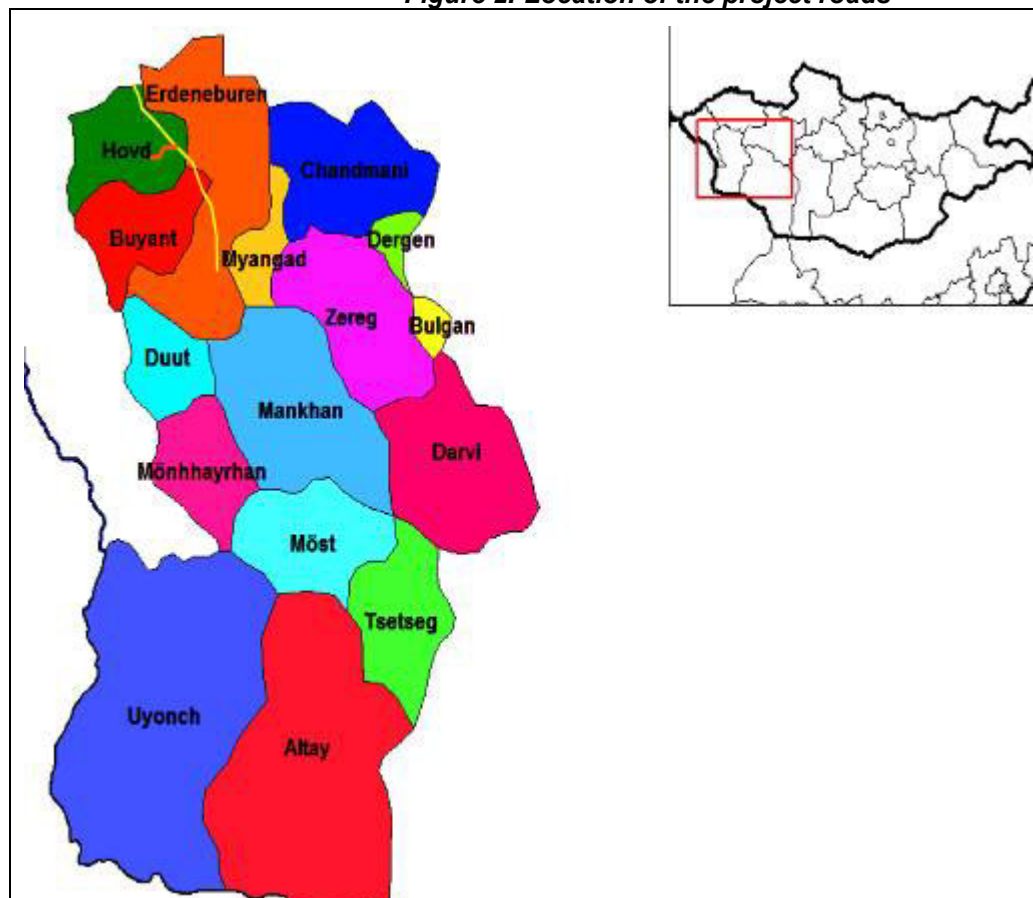
## 3.0 PROJECT DESCRIPTION

### 3.1 Location of the project

42. Detailed engineering design for the access road to Khovd soum was prepared by MCPC gr LLC in Q4 of 2020. The starting point of the proposed road alignment starts at STA.23+150 at the Khovd-Ulgii AH 4 road and ends in the Khovd soum center. Total length of the road is 18.755 kilometers.



Figure 2. Location of the project roads



Source: PIU Consultant, 2021

### 3.2 Design specifications

43. The access road to Khovd soum center is a 2-lane local road. Total width of the embankment is 7 meters for most parts and widened to 8 meters at sections where the embankment height is above 1.2 meters to ensure traffic safety. Width of passing lane is 4 meters and width of shoulder is 1.5 meters on each side. Key design specifications for the access road to Khovd soum is provided in the table below.

Table 3. Design Specifications for access road to Khovd soum

No.	Descriptions	Parameters for the access road to Khovd soum
1	Road classification and grade	Road grade 3B. Local road.
2	Design norm	3Б-ХО3-БХ-1-40
3	Estimated speed km/h	40 km/h
4	Operation period	10-15 years
5	Traffic type	D & E
	Width of embankment	7.0 m - 8.0 m
6	Width of passing lane	4.0 m



No.	Descriptions	Parameters for the access road to Khovd soum
7	Width of shoulder	1.5 m – 2.0 m
8	Traffic density	Below 100/day

Source: Detailed Engineering Design, MCPC gr LLC, 2020

### 3.3 Road structures

44. The key structures planned in the detailed design for the access road to Khovd soum include level crossings for livestock at 2 points, road junction at 1 point, 2 rest areas and square shaped concrete culverts at 27 points.
45. In order to prevent from impact/change in natural drainage path of the area, the design consultant has carried out a hydrological survey to crossing points with ephemeral streams, flood channels and riverbeds. Square shaped culverts are planned at all of the 27 crossing points determined by the survey. Location of square culverts are shown in below table.

**Table 4. Location of square culverts**

No.	Location (STA.)	Height & width of square culvert	No.	Location (STA.)	Height & width of square culvert
1	2+000	1.0m x 1.0m	15	12+700	1.0m x 1.0m
2	2+600	1.0m x 1.0m	16	12+990	1.0m x 1.0m
3	3+000	1.0m x 1.0m	17	13+180	1.0m x 1.0m
4	4+400	1.0m x 1.0m	18	13+260	1.0m x 1.0m
5	4+880	1.0m x 1.0m	19	13+380	1.0m x 1.0m
6	5+240	1.0m x 1.0m	20	14+000	1.5m x 1.5m
7	6+150	1.5m x 1.5m	21	16+000	1.0m x 1.0m
8	6+400	1.5m x 1.5m	22	16+740	1.0m x 1.0m
9	7+300	1.0m x 1.0m	23	17+040	1.5m x 1.5m
10	9+850	1.0m x 1.0m	24	17+680	1.0m x 1.0m
11	10+640	1.0m x 1.0m	25	17+848	1.0m x 1.0m
12	11+120	1.0m x 1.0m	26	18+180	1.5m x 1.5m
13	11+750	1.0m x 1.0m	27	18+590	2.0m x 1.5m
14	12+500	1.0m x 1.0m			

Source: Detailed Engineering Design, MCPC gr LLC, 2021

46. Location of the junction, level crossings for livestock and rest areas are provided in the table below.

**Table 5. Location of junction, exits and parking points**

No.	Description	Location	Details
1	Road junction	STA.0+000	Intersection of the access road to Khovd soum and STA.23+150 at the Khovd-Ulgyi AH-4.
2	Level crossing 1	STA.7+500 L&R	Width 7 meters
3	Level crossing 2	STA.14+900 L&R	Width 7 meters

4	Parking 1	STA.8+600 L	Width 3.5 meters
5	Parking 2	STA.8+760 R	Width 3.5 meters

Source: Detailed Engineering Design, MCPC gr LLC, 2021

47. Total length of the side ditches planned for the access road to Khovd soum is 20.34. Out of which, 9.18 km side ditches planned on the left side and 11.16 km long side ditches planned on the right side. Side ditches with average depth of 0.4 m are located in 1.0-2.0 m distance from the embankment at 9 locations on the left side and at 19 locations on the right side of the road.
48. The road alignment overlaps with existing power transmission cable line at STA.18+661, fiber optic cable line at STA.1+228 and communication lines at STA.18+429, STA.18+487, STA.18+643 and STA.18+695, respectively. All of the crossings of existing infrastructure occur in the Khovd soum center nearby the end of the road. These existing lines will be relocated by professional entities and related costs are included in the construction budget.

**Table 6. Bill of quantity for construction works of access road to Khovd soum**

No.	Description of work	Measuring unit	Quantity
<b>Temporary structures</b>			
1	Water reservoir tank installation, 10 tons	pcs	1
2	Temporary fences	meter	400
3	Toilets	pcs	2
4	Installation of Aggregate Crushing and Classifying Equipment	Set	1
5	Installation of Crushed Aggregate Mixer	Set	1
6	Concrete Plant Installation	Set	1
7	Asphalt Plant Installation	set	1
<b>Site clearance</b>			
8	Road Stakeout	km	18.76
9	Topsoil removal	m <sup>3</sup>	40,062.3
<b>Earthworks</b>			
1	Embankment Application from Borrow Materials	m <sup>3</sup>	112,167.5
2	Excavation (regular soil)	m <sup>3</sup>	16,416.5
3	Excavation (hard soil)	m <sup>3</sup>	4,104.1
4	Side Ditch Excavation Using a Grader	m <sup>3</sup>	5,083.1
5	Open Borrow Pit and Quarry	m <sup>3</sup>	9060.0
6	Land Rehabilitation on Borrow Pits and Quarries	m <sup>3</sup>	10,998.8
7	Haulage route (using a grader)	km	18.8
<b>Traffic signs</b>			
1	Warning posts	pcs	148
2	Traffic sign and km mark sign installation	pcs	259
3	Curb installation	meter	176

## 4.0 DESCRIPTION OF ENVIRONMENT

### 4.1 PROJECT AREA OF INFLUENCE

49. The environmental description is prepared with particular attention paid to sensitive environmental receptors such as water bodies and wildlife habitats; sensitive human receptors; cultural and heritage sites; and the right of way which in Mongolia extends to 50 m either side of the road centerline.

### 4.2 GEOGRAPHY AND TOPOGRAPHY

#### 4.2.1 Geography

50. The project area is located within the Altai Sayan Eco-Region that includes Mongolia, China, Russia and Kazakhstan. In terms of natural zone division of Mongolia, the road corridor falls in the semi-arid low hills-steppe subzone within the Mongol Altay Range natural zone.

#### 4.2.2 Topography

51. The proposed road alignments primarily pass through small hills and plain steppes. The access road to Khovd soum traverses through plain steppes on southern side of the Haalgach mount, Southern Shar Nuur hills and steppes on north side of Dund Us river. There are no any mountain passes and elevated sections along the road.

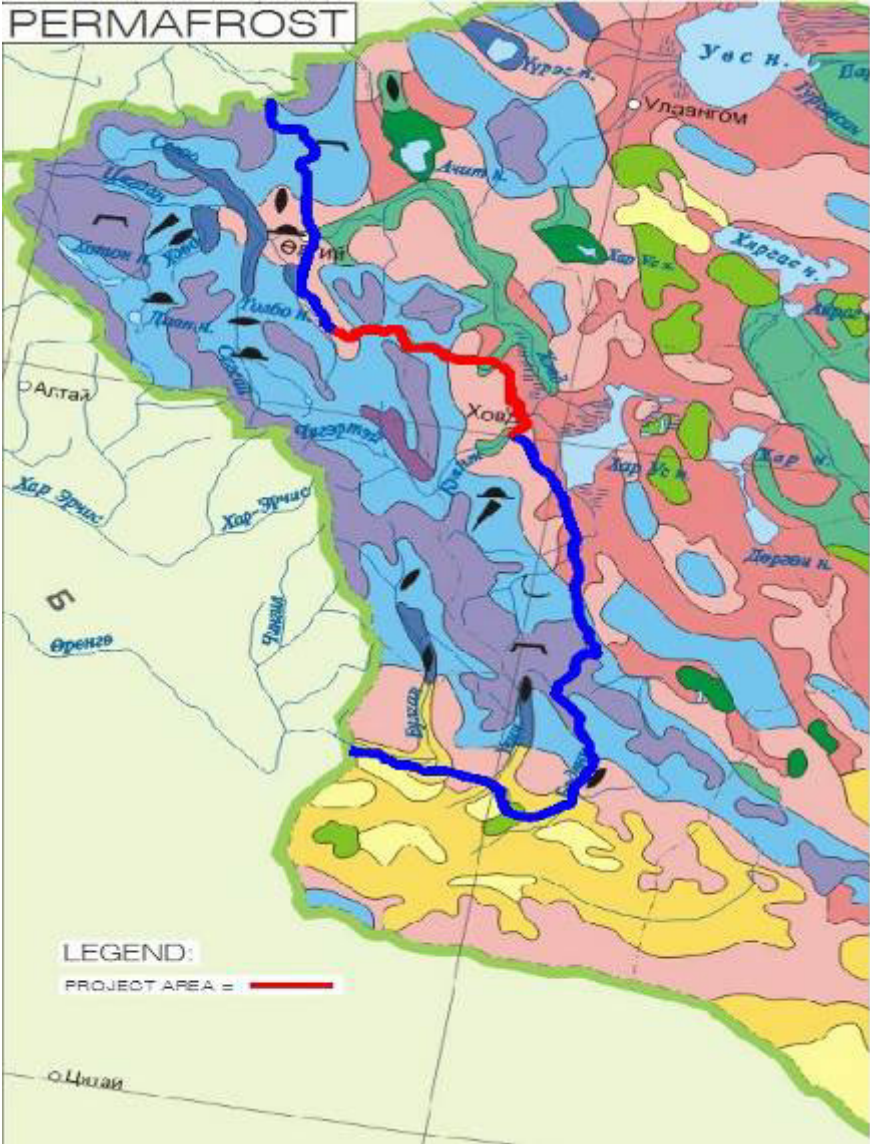
**Figure 3. Topographical map of the project area**



Source: PIU Environmental Consultant, 2021

### 4.3 SOIL

52. In terms of soil-geographical division of Mongolia, the road corridor belongs to the Hungui range subzone within the Mongol Altai soil-geographic zone in western Mongolia.

50.  $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$ 



MULTI YEAR PERMAFROST					
Water-parting, Mountain side	Bottom of Concave	Annual Average Temperature	Prevalent Thickness	Prevalent depth of melting, m	
		-2 - -5	Greater than -100	Water-parting, Mountain side	Bottom of Concave
		0 - -2	Lower than -100	1.0 - 3.5	1.3 - 2.5
		0 - -1	Lower than -50	1.5 - 4.5	1.5 - 4.0
		0 - +2	Greater than -100	3.0 - 4.5	1.7 - 3.0
		0 - +3	Lower than -100	2.5 - 4.5	2.5 - 5.0
		-2 - +5	Lower than -50	2.0 - 4.1	1.5 - 4.5

Permafrost process, phenomenon

- Multiyear permafrost burial
- Bank
- Heat huddle
- Permafrost slide
- Soil slide
- Permafrost flattening

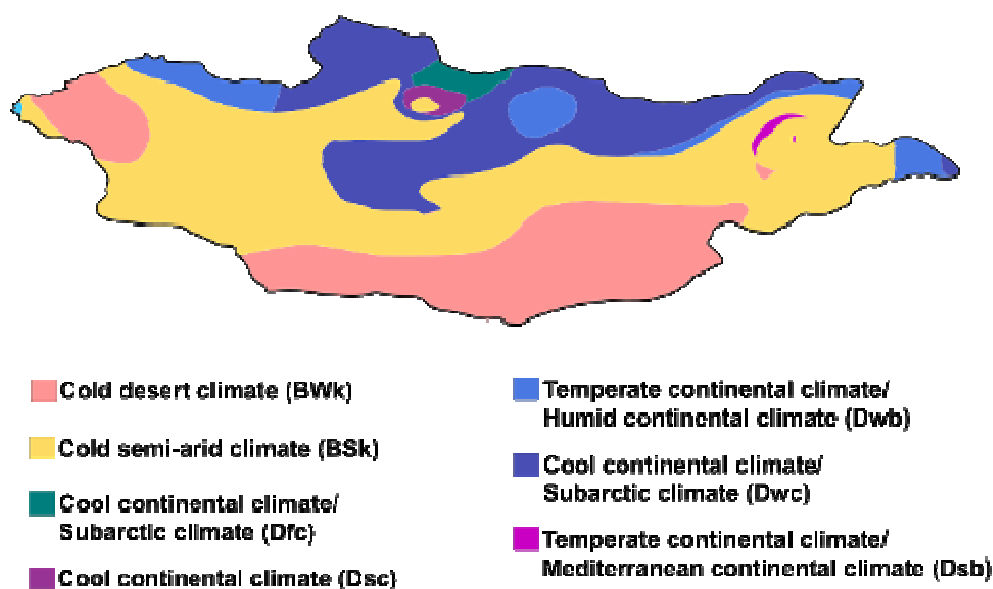
Source: Administration of Land Affairs. 2004. Geodesy and Cartography. Geographic Atlas of Mongolia. Ulaanbaatar.

#### 4.5 CLIMATE

54. Based on the Koppen climate classification of Mongolia, the project area falls in the cold semi-arid climate zone (BSk). It has harsh continental climate which is characterized by cold and long winters (between December and February), windy, dry and cold spring (March to May), dry and warm summer (June to August) and dry and cool autumn (September to November). Annual average air temperature in the project area is 1.3°C.

Figure 5. Koppen Climate Classification map of Mongolia

Mongolia map of Köppen climate classification

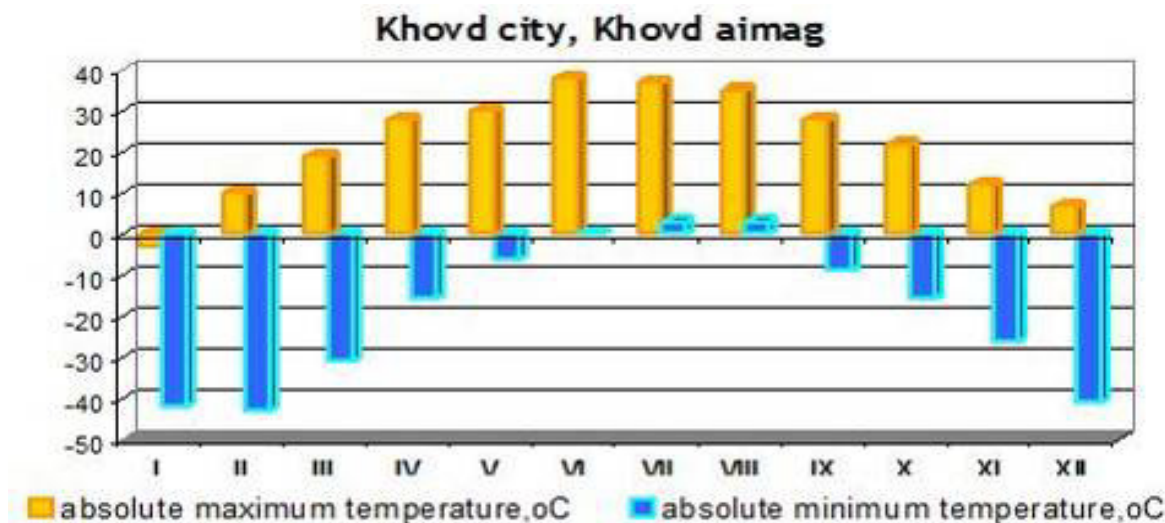


Source: Open source

### Air temperature

55. The western regions of Mongolia have a severe continental climate, with temperatures ranging from approximately -35 °C to +30 °C. The region is also prone to severe winters, known as *zud* which means any condition that stops livestock getting to pasture. The air temperature data for Khovd province shows a large range of temperature fluctuation (around 70 degrees) across a year (see Figure 6 5). During the last 10 years, the absolute maximum air temperature reaches 38 °C in the summer months of July and the absolute minimum air temperature was -40 °C in the winter months of December and January.

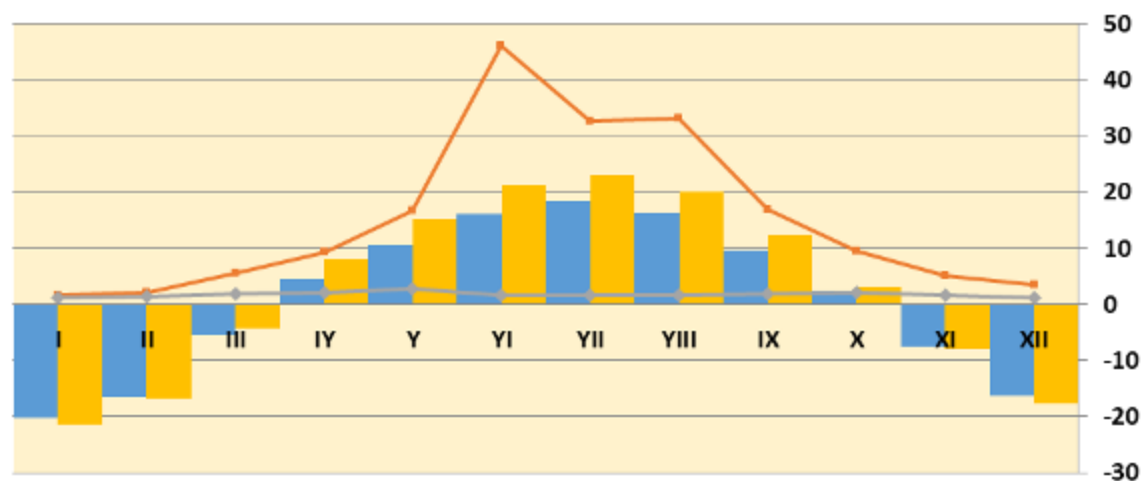
**Figure 6. Absolute Maximum/Minimum Air Temperature, °C (2010-2020)**



Source: Institute of Meteorology.

56. The mean annual air temperature ranges from 0.2 °C to 1.3 °C in the project area. Multi-year monthly average air temperature recorded in Khovd soum are shown in the figure below.

**Figure 7. Monthly average air and soil temperatures in Khovd soum, °C, 2010-2020**

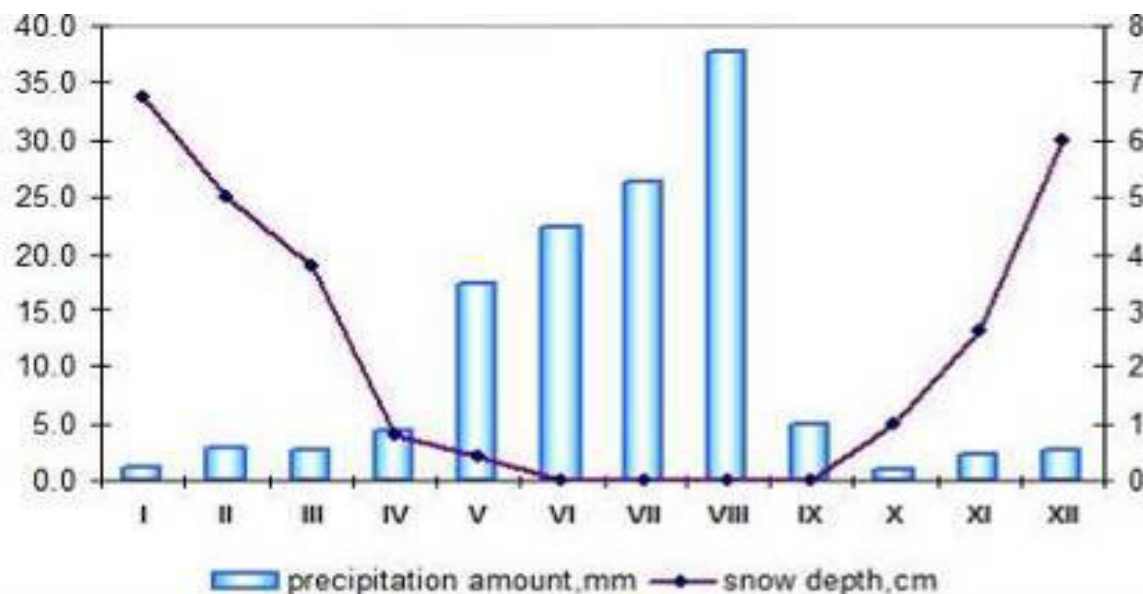


Source: Institute of Meteorology.

## Precipitation

57. Total annual precipitation in the project area fluctuate between 75-175 mm. About 80% of total precipitation falls during the summer season in July and August. Below table shows monthly average precipitation levels recorded within the last 10 years in Khovd aimag.
58. The mean annual precipitation level in Khovd soum is 173.8 mm. The maximum daily precipitation level recorded during the last 10 years is 49.3 mm on 21 June 2013.

**Figure 8. Monthly average precipitation level in Khovd aimag, mm, 2010-2020**



Source: Institute of Meteorology.

## Wind

59. The dominant wind direction is from the west and northwest, with maximum wind speed of up to 28 m/s in the project area. When wind speed exceeds 12 m/s, dust storms, snowstorms, or other severe weather phenomena are generally observed. Wind speed is relatively high during the spring months of March, April and May. Seasonal average wind speed in the project area is shown in below table.

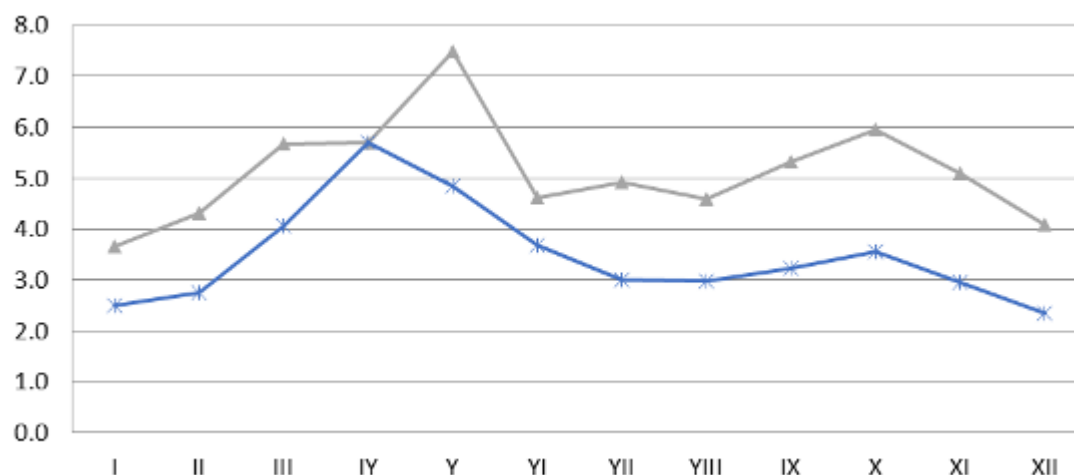
**Table 7. Seasonal average wind speed, m/sec, 2010-2020**

Soums	Seasonal average wind speed, m/sec			
	winter	spring	summer	autumn
Khovd soum	1.6-4	3-7	2-4	2.5-5.5

Source: Institute of Meteorology

60. Wind speed is relatively high during the spring months of March, April and May and autumn month of October. Monthly average wind speed in the project area is shown in below figure.

Figure 9. Monthly average wind speed, m/sec



Remarks: Blue line represents monthly average wind speed recorded in Khovd aimag center and the grey line represents Khovd soum.

Source: Institute of Meteorology of Mongolia, 2019

#### 4.6 AIR QUALITY

61. There are no air pollution sources, including mining or industrial project, exist within road corridor to the Khovd soum. The corridors for the project roads are currently a sparsely populated grazing area. Thus, it can be concluded that there is no air pollution in the project area.
62. Laboratory under the Institute of Meteorology of Khovd province has carried out baseline air quality measurements at 2 spots along the proposed access road corridor to Khovd soum on 14 October, 2021. Currently, there is no air pollution in the project area as shown with the air quality measurement results provided in the table below.

Table 8. Air quality measurement results for access road route to Khovd soum

Air quality measurement parameters	Measured air quality values for 20-minute duration, $\mu\text{g}/\text{m}^3$		MNS 4585:2016 Max allowed levels $\mu\text{g}/\text{m}^3$
	STA.8+000	STA.18+755	
Nitrogen dioxide, $\text{NO}_2$	13	15	200
Sulfur dioxide, $\text{SO}_2$	5	8	450
Dust concentration level $\text{PM}_{10}$	73	91	100
Dust concentration level $\text{PM}_{2.5}$	49	51	50

63. Measured noise levels along the proposed road route is provided in the table below.

Table 9. Measured daytime noise levels along access road route to Khovd soum

Noise measurement spot	Measured noise level /dB/	MNS 4585:2016 Max allowed levels, dB
STA.8+000	14.1	55
STA.18+755	37.8	



## 4.7 SURFACE WATER

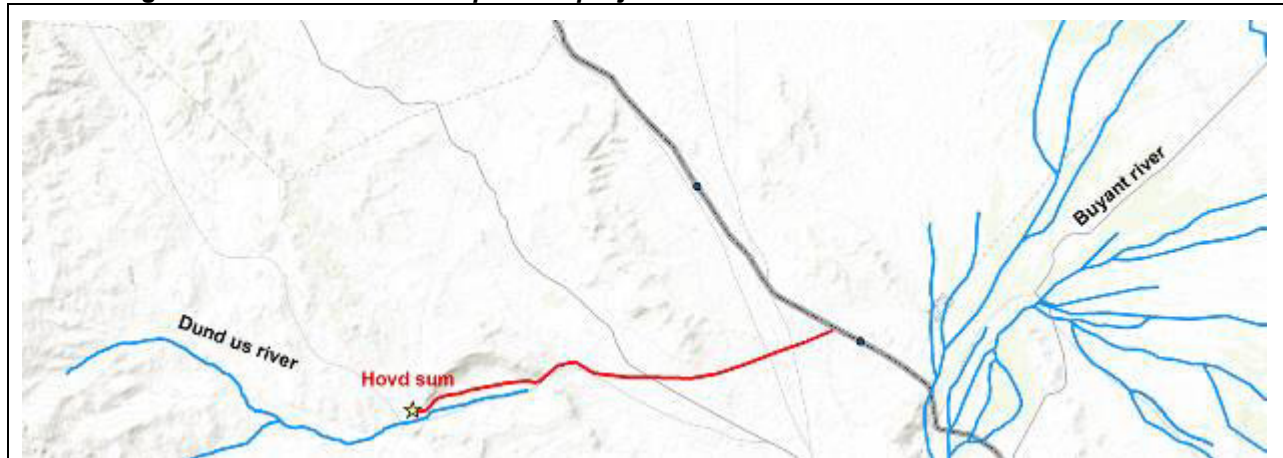
### 4.7.1 Surface water resources in the project region

64. The project area is located within the Central Asian Internal Drainage basin and is on the far western edge of the Great Lakes Depression. Unlike water hydrological regimes in the North and East of Mongolia which drain to the ocean, the project area is in an internal drainage basin where surface waters drain to inland terminal locations where the water evaporates or seeps into the ground.
65. Specifically, the project area is in the Khar lake-Khovd river basin, a sub-basin of the Great Lakes' Depression and is considered unique not only in Mongolia, but also in the world with its high mountains distributed by glaciers and permanent snow cover, canyons, valleys, and ecological zones such as forest steppe, steppe, gobi and desert regions. The basin area is 86,120.8 sq. km and is divided into three water balance units: Khovd river, Buyant river and Khar Us-Durgun lake basins according to the hydrological network. The Khovd river passes through Olgii and the Buyant river through Khovd.
66. Surface water bodies along the project road corridors
67. below summarizes the surface water resources of Khovd and Bayan-Olgii *aimags*.
68. The Khovd river, which is 516 km long, originating from the south-east glacier of Tavan Bogd, the highest peak of Mongol–Altai mountain range, and runs through Olgii town, is the biggest river in western Mongolia. The dominant source of river flow is glacial ice and snow melt. The Khovd river has watershed area of 58,000 km<sup>2</sup> which includes tributary rivers such as the Tsagaan, Sogoot, Sagsai, and further downstream the Buyant River. The mean annual water flow of the river is 63 m<sup>3</sup>/s in the middle reach (at Bayannuur), and 90 m<sup>3</sup>/s at its inflow into the Khar-Us Lake (at Miyangad).
69. **Seasonal Flooding.** The rivers in the project area flow from the Altai Mountains. Spring floods in these rivers generally start in the middle of April, with peak flow occurring in late June and continuing for 110–150 days. The spring flood flow is 60–90% of total annual flow of Altai Mountain Rivers and the main source of water is from melting snow and glaciers. Summer flow is significant because rainfall run off combines with the spring flood waters from the Altai Mountain Rivers.

### 4.7.2 Surface water bodies along the project road corridors

70. Significant surface hydrological features in the project road corridors include:
- Permanent surface streams and rivers
  - Ephemeral streams which are seen during periods of intense rainfall or snow melt.

**Figure 10. Surface water map of the project area**



Source: Khar Lake and Khovd River Basin Administration

71. Dund Us river flows adjacent to the access road to Khovd soum in 50-80m distance between STA.14 and STA.18. The access road crosses ephemeral streams at 27 points. Concrete culverts with dimensions of 1.0-1.0m and 1.5-1.5m have been planned at the crossing points that are designed to allow seasonal and temporary water flows.

**Figure 11. Dund Us river**



72. There are 2 small ponds located in 105-meters distance from the road alignment at STA. and STA. Given the distance between the ponds and the road alignment, it is possible to avoid any disturbance on the ponds if proper protection measures (discussed in Section 6) will be implemented.

**Figure 12. Shar nuur pond**



#### 4.7.3 Water quality

73. Dund us river which flows adjacent to the road alignment and Shar pond which is located in 105-meters distance from the alignment are the main surface water bodies in the road corridor to Khovd soum. Water quality samples taken from the surface water bodies are tested at the laboratory of Institute of Meteorology of Khovd province in October 2021. Water quality test results are presented in the table below.

**Table 10. Heavy metals contamination analysis for Dund us river, October 2021.**

Parameters	Measuring unit	Tested valued for sample from Shar nuur pond	Tested valued for sample from Dudn Us river	MNS 0900:2005 Requirements
Turbidity	mg/l	>1.5	>1.5	1.5
pH	mg/l	8.53	8.32	6.5-8.5
Hardness	mg/l	3.85	3.18	7
HCO <sub>3</sub>	mg/l	244	218	-
Cl	mg/l	29.1	11.3	350
SO <sub>4</sub>	mg/l	181.2	65.8	500
Ca	mg/l	46.3	37.9	100
Mg	mg/l	18.7	15.7	30

Parameters	Measuring unit	Tested valued for sample from Shar nuur pond	Tested valued for sample from Dudn Us river	MNS 0900:2005 Requirements
TSS	mg/l	6.2	8.8	-
NH <sub>4</sub>	mg/l	2.21	1.9	1.5
NO <sub>2</sub>	mg/l	0.124	0.117	1
NO <sub>3</sub>	mg/l	1.78	1.39	50
F	mg/l	5.9	5.36	0.7-1.5
Fe	mg/l	1.67	1.41	0.30

Source: Environmental Laboratory under Khovd province Institute of Meterology, 2021.

74. Based on the water quality test results provided above, it can be concluded that the surface water bodies in the project area are free of pollution.

#### 4.8 Ground water

75. Groundwater resources are limited and its distribution uneven in the Khar lake-Khovd river basin. Within the basin, groundwater generally accumulates close to tributaries of rivers and around lake depressions.<sup>4</sup> Groundwater in the Altai mountainous region is known to exhibit mineralization and hardness characteristics of 640 mg/l and 4.8 mg-eqv/l respectively, and the water for the region is salty and fluorinated.<sup>5</sup>

76. Groundwater resources in the project area are shown in table below.

**Table 11. Groundwater Resources in the Project Area**

Description	Khovd river basin	Buyant river basin
Volume million m <sup>3</sup>	786	139
Ground water use as % of total by 2021	0.67%	2.9%

Source: Integrated Water Resource Management Plan for Khar Lake–Khovd River Basin (2011).

77. The IWRMP projections show that the project area river basins have adequate groundwater resources given current and projected (up to 2021) demands. However, it is clear from measures proposed in the river basin IWRMP that groundwater is considered a resource which requires conservation, particularly in urban areas, where it is noted that groundwater is used wastefully. Therefore, the IWRMP proposes addressing the overuse of groundwater by installing water meters in *aimag* centres and restricting the use of groundwater. Groundwater vulnerability is seen throughout Mongolia where overuse of groundwater resources and climate change has led to lowering of the groundwater table, which has caused some springs, lakes and their associated ecosystems to dry up.<sup>6</sup>

<sup>4</sup> Khovd Buyant River Basin Council. Integrated Water Resource Management Plan For Khar Lake–Khovd River Basin. Phase I: 2011–2015; Phase II: 2016–2021.

<sup>5</sup> Chuluunkhuyag, S. The Impact of Climate Change and Human Activity on Mongolian Water Resources.

<sup>6</sup> UNFAO AquaStat Mongolia. See [http://www.fao.org/nr/water/aquastat/countries\\_regions/MNG/CP\\_MNG.pdf](http://www.fao.org/nr/water/aquastat/countries_regions/MNG/CP_MNG.pdf).

#### 4.9 PLANT COVER

78. In terms of plant-geographic division, the road corridor belongs to the northern gobi semi-desert-steppe subzone of the semi-desert-steppe zone in western Mongolia. The road corridor comprises grasses-undershrub community and undershrub and shrub community of dry steppe, desert-steppe zones which has sparse natural vegetation. No trees will be affected or removed by the construction activity.
79. Below table presents the dominant species of flora in the project area.

**Table 12: Dominant Flora in the Project Area**

Zone Names	Dominant Species
Dry steppe	<i>Festuca lenensis</i> , <i>Agropyron cristatum</i> , <i>Krylovia eremophylla</i> , <i>Peucedanum histrix</i> , <i>Allium edaurdii</i> , <i>Potentilla sericea</i>  <i>Caragana bundei</i> , <i>Caragana pugmaea</i> , <i>Stipa krylovii</i> , <i>S.kirghisorum</i> , <i>Festuca valesiaca</i> , <i>Agropyron cristatum</i> , <i>Artemisia dolosa</i> , <i>Melandrium</i> <i>viscosum</i> , <i>Saussurea pricei</i>
Desert steppe	<i>Stipa gobica</i> , <i>Agropyron nevskii</i> , <i>Agropyron cristatum</i> , <i>Artemisia frigida</i> , <i>Arenaria capillaries</i> , <i>Caragana leucophloea</i> , <i>Eurotia ceratoides</i>  <i>Stipa glareosa</i> , <i>S.sibirica</i> , <i>Agropyron cristatum</i> , <i>Cleistogenes squarrosa</i> , <i>Allium equardii</i> , <i>Artemisia rutifolia</i> , <i>Caragana bundei</i> , <i>Lophanthus chinensis</i>
Grasses – undershrub desert	<i>Nanophyton grubovii</i> , <i>Eurotia ceratoides</i> , <i>Stipa glareosa</i> , <i>Artemisia</i> <i>gracilescens</i> , <i>Reamurea songorica</i>  <i>Anabasis brevifolia</i> , <i>Stipa glareosa</i> , <i>Arthemisia xerophytica</i> , <i>A.hanthochroa</i> , <i>Ajania fruticosa</i> , <i>Zygophyllum pterocarpum</i> , <i>Ephedra sinica</i>
Undershrub and shrub desert	<i>Euratia certoides</i> , <i>Reamurea songorica</i> , <i>Haloxylon ammodendron</i> , <i>Artemisia terrae-albae</i> , <i>Anabasis salsa</i> , <i>A. truncata</i>  <i>Haloxylon ammodendron</i> , <i>Anabasis brevifolia</i> , <i>Zygophyllum</i> <i>xanthoxylon</i> , <i>Reamurea songorica</i> ,

Source: DEIA Study Report for Tranche 2, 2016.

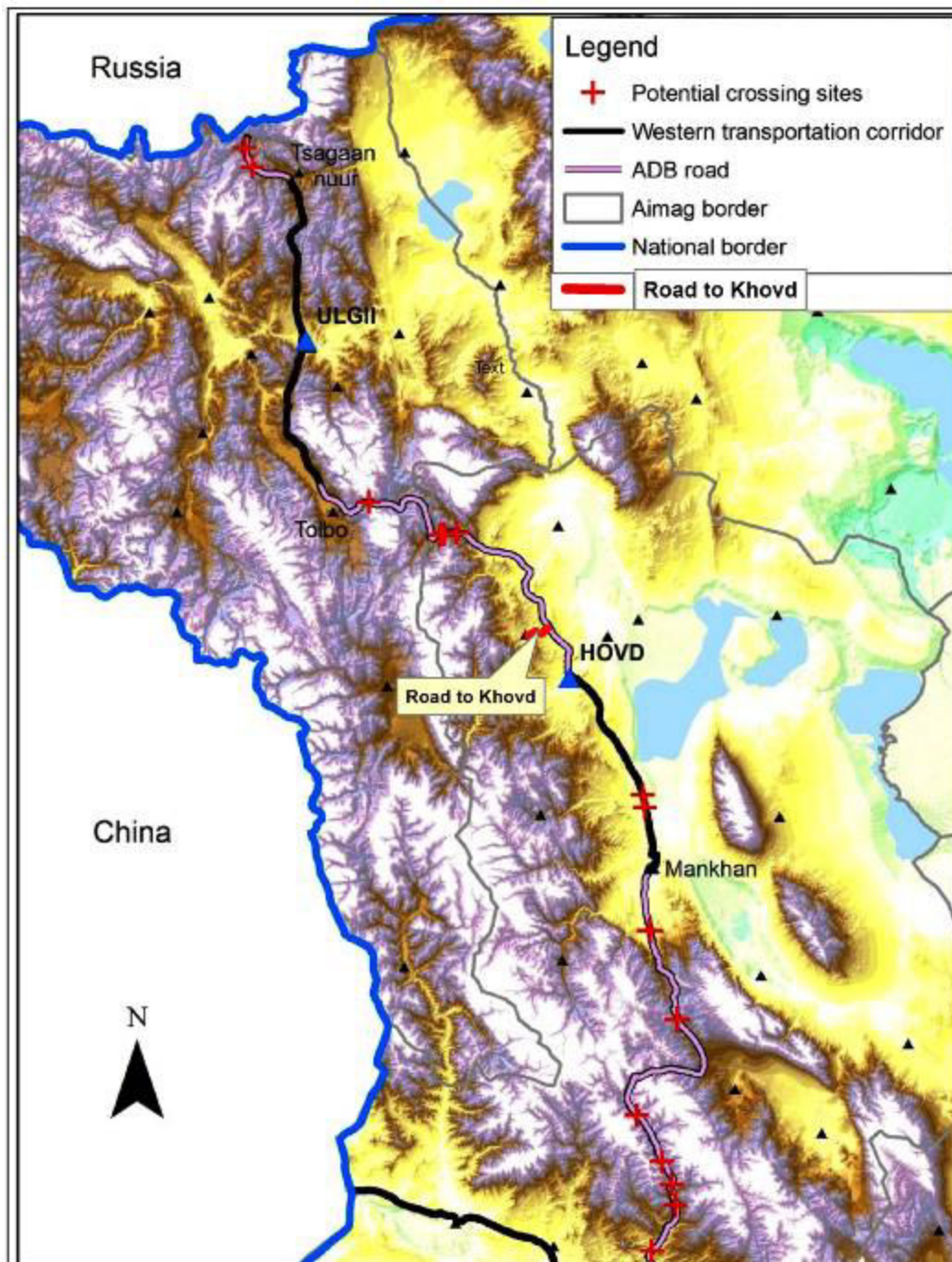
80. Over 80 species of plants listed in the Mongolian Red Book can be found in Khovd *aimag*. However, field surveys and consultations with experts result in the conclusion that no Red Book species are located within the road alignment corridor.
81. **Forest.** There are no forests within the project area.

#### 4.10 WILDLIFE

82. Since the proposed road strictly follows the existing dirt tracks that have been used for decades, there are no wildlife species in the vicinity of the road corridors. Mr. Buuveibaatar, a wildlife expert at Wildlife Conservation Society, has conducted wildlife movement survey for the western regional road corridor in 2015. Based on the survey, he identified 11 wildlife movement routes as shown in Figure 14 below. There are no wildlife movement routes identified in the vicinity of the proposed road to Khovd soum as the closes wildlife movement routes are Tsambagarav mount-Hongio river valley (in 35km distance on northwest of the road) and Khar Us lake-Jargalant Khaikhan mount (in 80km distance on southeast).



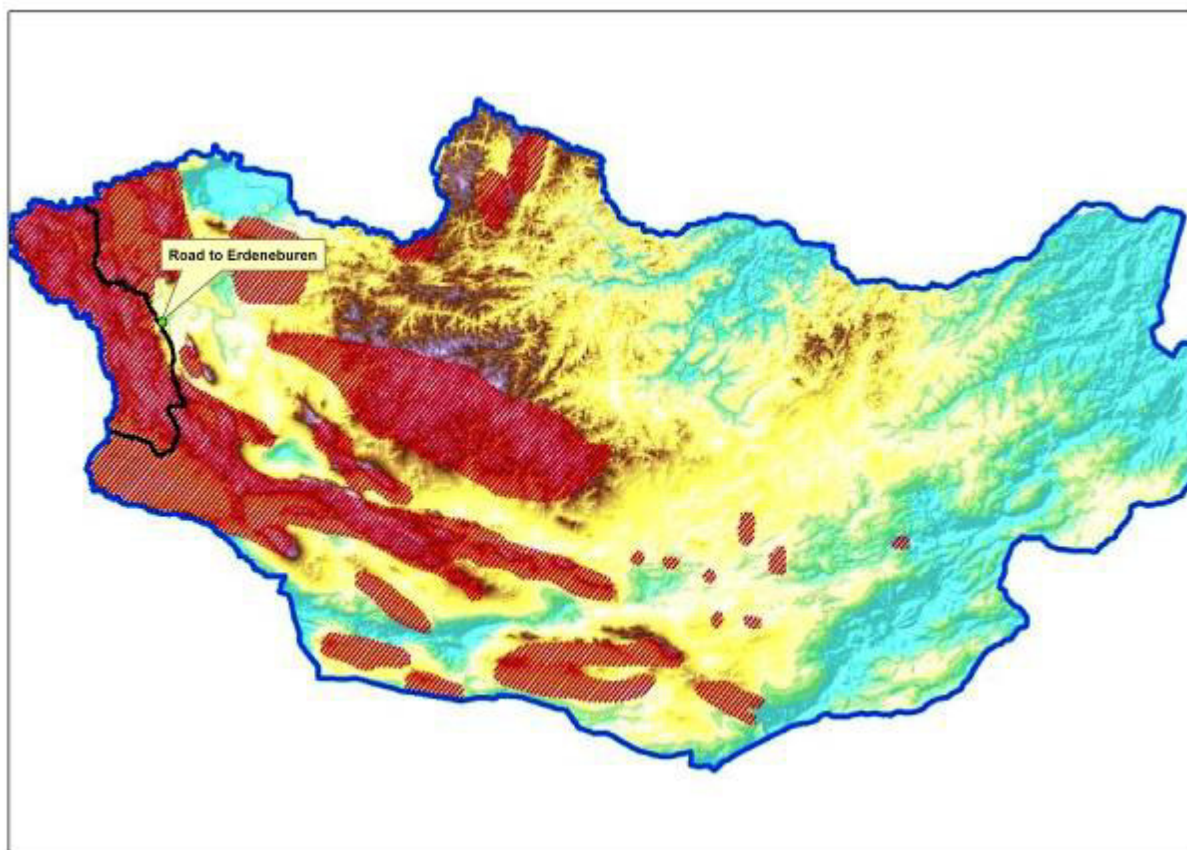
Figure 13. Wildlife movement routes along the Asian Highway Route 4 corridor



83. The wider project region which is called The Mongolian Altai–Sayan region, contains rare and endangered mammals such as Snow Leopard (*Uncia uncia*), Argali Wild Sheep (*Ovis ammon*), Siberian Ibex (*Capra sibirica*), Mongolian Saiga (*Saiga tatarica mongolica*), Musk Deer (*Moschus moschiferus*) Pallas' cat (*Felis manul*) or Manul, Black Tailed Gazelle (*Gazelle subgutturosa*), Wild Boar (*Sus scrofa nigripes*), Stone Martin (*Martes foina*), Marbled Polecat (*Vormela peregusna*), Elk (*Cervus elaphus*) or Red Deer. It is also a

habitat for steppe and semi-desert fauna such as wolves, foxes, martens, weasels, marmots, corsac foxes, manul cats, and marbled polecat. There are 44 species of small mammals, including mice, squirrels, hamsters, voles, shrews, jerboas, rabbits, and badgers that are distributed throughout the Altai–Sayan Eco-region, depending on the type of habitat present. However, the proposed road to Khovd soum does not fall within the distribution zone for the aforementioned endangered species as shown in the figure below.

**Figure 14. Distribution zones for endangered wildlife species, including ibex, snow leopard, saiga and argali sheep.**



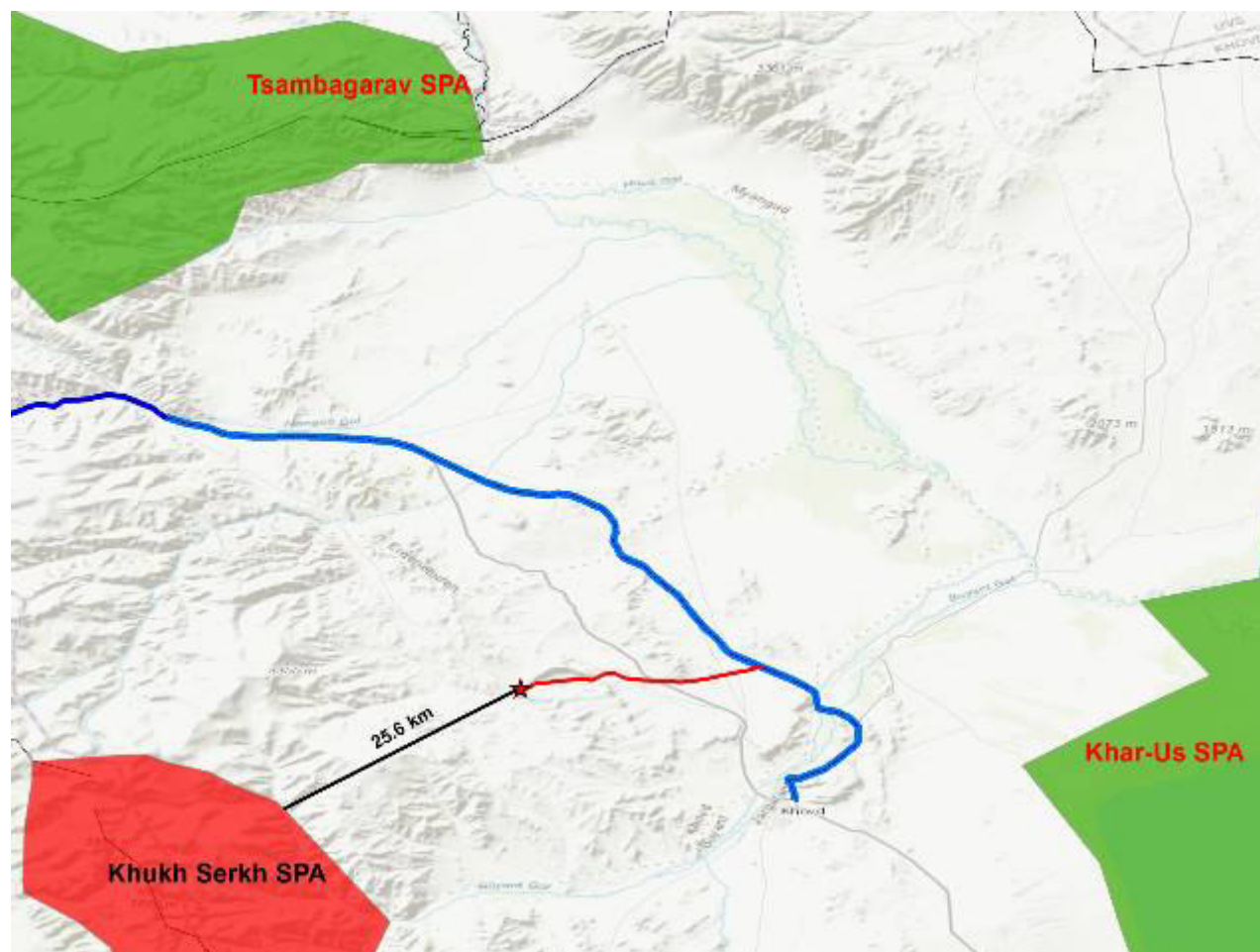
Source: Mongolian Academy of Science, Institute of Biology, 2015.

#### 4.11 SPECIAL PROTECTED AREAS

84. There are no special protected areas in the vicinity of the road corridor. The closest protected area Huh Serh Mountain SPA is located in 25.6 km distance from the project road, thus will not be affected by the construction (Figure 13).



Figure 15. Location of protected areas



#### 4.12 Cultural heritage

85. The project road alignments pass through an area which has evidence of settlement from the Palaeolithic and Neolithic eras. The key cultural resources in the area are: (i) Ancient tombs and (ii) Petroglyphs.
86. MRTD has contracted with the Institute of Archaeology of Mongolia, the only qualified agency in Mongolia for archaeological survey and excavation to conduct baseline archaeological survey for the access road corridor to the Khovd soum in September 2021. As a result of the baseline survey, the 14 cultural heritage sites have been found in the road corridor which includes ancient tombs at 13 locations and petroglyphs at 1 location. Location coordinates and distance from the road alignment for the cultural heritage sites are shown in the table and maps below.
87. The 13 ancient tombs are located within 9-86 meters distance from the road alignment which leads to a concern that these sites might be affected by construction activities. The PIU has engaged the Institute of Archaeology and Khovd aimag administration to discuss rescue excavation. Action Plan on Rescue Excavation (Appendix 2) prepared by the Institute Archaeology provides planned actions, time frame and necessary budget to conduct the rescue excavation and removal of the ancient tombs at 13 sites before commencement of



construction in 2022 spring. The Action Plan on Rescue Excavation is reviewed and approved by the Governor of Khovd province (Appendix 3).

88. A petroglyph which is located in 1.5 km distance from the road alignment is unlikely to be affected by construction. However, precautionary measures such as erection of visibility fencing and warning sign is recommended (discussed Section 6).

**Table 13: Location of cultural heritage sites along the road corridor to Khovd soum**

No	Coordinates	Description	Which side of alignment	Distance from alignment in meters
1	N 48.07.27.17, E 91.23.13.87	Ancient tomb	right	21
2	N48.07.27.22, E 91.23.10.39	Ancient tomb	right	47
3	N 48.07.28.58, E 91.23.17.68	Ancient tomb	right	29
4	N 48.07.28.58, E 91.23.17.64	Ancient tomb	right	29,5
5	N 48.07.31.83, E 91.23.27.12	Ancient tomb	left	9
6	N 48.07.34.34, E 91.23.30.42	Ancient tomb	left	10
7	N 48.07.34.37, E 91.23.30.42	Ancient tomb	left	10
8	N 48.07.42.45, E 91.23.46.03	Ancient tomb	left	36
9	N 48.07.27.17, E 91.23.13.87	Ancient tomb	right	21
10	N 48.07.44.79, E 91.23.47.26	Ancient tomb	right	16
11	N 48.07.48.75, E 91.24.54.75	Ancient tomb	left	62
12	N 48.07.59.30, E 91.27.19.37	Ancient tomb	right	19,5
13	N 48.07.53.09, E 91.32.09.88	Ancient tomb	right	86
14	N 48.07.20.14, E 91.35.13.74	Petroglyphs	left	1531



Figure 16. Location of cultural heritage sites, Nos 1-11



Figure 17. Location of cultural heritage sites, Nos 12-14



#### 4.13 CLIMATE CHANGE

89. In 2017, Mongolia was ranked 81st in the list of CO<sub>2</sub> emitting countries, contributing around 0.07% to global emissions.<sup>7</sup>
90. Climate modelling for Mongolia is projecting changes which include increased air temperatures, increased precipitation in some areas and a reduction of water resources in other areas.<sup>8</sup> Potential evapo-transpiration increase would be higher than precipitation increase. This is supported by Mongolia's Second National Communication on Climate Change.<sup>9</sup> The climate analyses in the National Communication shows where Mongolia is vulnerable to climate change and what the changes may be, as shown in **Error! Reference source not found**.16.

**Table 14. Climate Change Vulnerabilities**

Vulnerability	Impact
Ecosystem	In 2080, forest-steppe and steppe areas will decrease, as a result of a decrease in rainfall and an increase in temperature in the growing season
Rangeland	The pasture biomass will decrease in almost all areas
Desertification	Future temperature increases during the growing season, the increase of potential evapotranspiration, a precipitation decrease in most areas
Water Resources	The projected increase in evaporation from open surface water will exceed the increase in runoff by much higher rates in different basins, leading to dryer conditions; and Increased tendency to flooding
Cryosphere	The area of stable snow cover will be decreased in future periods; and Permafrost will retreat in mountainous areas, and eventually the higher geographical classes of permafrost will be replaced with lower ones

Source: Mongolia's Second National Communication on Climate Change.

91. The report notes that the reasons for hydrological changes are complex and include climate factors such as the effects of melting glaciers and permafrost as well as anthropogenic influences such as watershed management. The most vulnerable areas for the country are in the agricultural, livestock, land use, water resources, energy, tourism and residential sectors. This indicates that future climate changes are expected to negatively impact Mongolia meaning that climate change adaptation is a significant issue for the country.
92. Climate change risks in Mongolia are described as below.
93. **Extreme seasonal temperature variations:** Mongolia has long adapted to extreme temperature changes in its establishment of construction standards, materials and

<sup>7</sup> United Nations Statistics Division, Millennium Development Goals Indicators. Available at <http://mdgs.un.org/unsd/mdg/SeriesDetail.aspx?srid=749&crid=>

<sup>8</sup> United Nations Environment Program (2009) Mongolia: Assessment Report on Climate Change 2009.

<sup>9</sup> MNET (2010) Mongolia's Second National Communication on Climate Change; Under the United Nations Framework Convention on Climate Change (UNFCCC).



technologies. This places thermal stress on all exposed construction which will increase with projected increases in temperature spreads.

94. **Increased summer temperatures:** Mongolia is projected to experience some of the world's highest summer temperature increases due to climate change, as much as 6°C (GCF Country Climate Profile). This will increase thermal stresses on all construction materials and structures. It will also increase the potential for heat waves with related health threats to residents, particularly the elderly and other vulnerable groups. Urban heat sink phenomena are more likely to be experienced. Damage to landscape and agricultural vegetation can be expected. Water evaporation rates will increase.
95. **More severe and unpredictable precipitation events:** Flooding is identified as the greatest threat to project investments and the well-being of project communities. A projected increase in the frequency of thunderstorms and short, high-intensity rainfall events will increase the number and severity of flood events causing increased asset loss/damage, increased health risks from overflowing pit latrines until they are entirely replaced, and more disease from standing water. Overall annual levels of precipitation are projected to increase slightly but primarily with increased amounts of winter snow fall. More snow will mean more dangerous roads, more icing and more structural loading on buildings and other exposed infrastructure.
96. **Increased threat of droughts and dzhuds:** Temperature increases and more erratic precipitation events will increase the number and severity of droughts. Higher temperatures will accelerate evaporation of Mongolia's already limited and diminishing natural water resources. More droughts will lead to an increase in dust storms which are already a serious health and comfort issue throughout much of the country. Winter temperatures are not projected to increase as much as summer temperatures, but increased snowfall is projected and may increase the severity of dzhuds and their impacts on traditional grazing and herds. This in turn will lead to more rural-urban migration and even greater challenges for ger area infrastructure and services, and further increase the need for ger area redevelopment.
97. **Depletion of water resources:** This is a national climate change impact that is affecting water supply and therefore development throughout Mongolia. Glaciers, lakes, rivers and aquifers are drying up. A shortage of water supply will eventually impact Ulaanbaatar and have negative impacts on the on-going operation of proposed water supply and waste water networks. It also mandates that all possible due care be taken to conserve and re-cycle water usage in the sub-centers in all of the project's investments.
98. **Roads:** higher summer temperatures will require attention to expansion joint construction and ensured quality of asphalt. Roads are most vulnerable to increased flooding and cross-section designs must accommodate both increased on-surface drainage and runoff from adjacent neighborhoods. The innovative use of "sponge" infrastructure is suggested wherever possible in place of traditional non-porous structures. This will reduce the damage caused by high-speed storm water runoff and provide opportunities for re-use of that water for roadside green irrigation which in turn stabilizes soil, reduces dust and contributes to urban cooling. This is fully in-line with ADB's current push to maximize the use of nature-based infrastructure as a climate change adaptation and resource conservation mechanism. Regular maintenance is always the key to asset preservation and increased maintenance budgets should be planned for.
99. **Bridges:** will require more robust design and construction of abutments to handle more severe storm events, and expansion joints designed to handle a wider temperature range.

#### **4.14 SOCIO-ECONOMY**

100. In terms of administrative division of Khovd province, the access road locates within the territory of Khovd soum. Key socio-economic information for the Khovd soum is provided in this section.

#### 4.14.1 Territory and land use

101. The soum center is located in 30 km distance from Khovd city and 1508 km distance from Ulaanbaatar city. Territory of Khovd soum is located in northwestern part of Khovd province and occupies 2,830 km<sup>2</sup> area. Majority of the soum territory (273,000 hectares or 99.3%) is being used as grazing land by local herders. Administratively, Khovd soum is divided into 5 bag units, named Bayanbulag, Tsagaan Burgas, Baruun Salaa, Ulaan Buraa and Dund Us, respectively.

#### 4.14.2 Demographics

102. Total population of Khovd soum is 3701 people belonging to 701 households. Majority of the Khovd soum population (96%) is ethnic Kazakh people while ethnic Mongol people constitute 4% of the soum population. In terms of age groups, 46.6% of the soum population is aged under 18, 48.3% is aged between 18-60 and 5.1% is aged over 60. 18.7% of the soum population resides in the soum center while 81.3% nomadic herders residing in rural areas.
103. Population information for each bag is presented in the table below.

**Table 15. Population information by bags, Khovd soum**

No.	Name of bag administration units	Population (individuals)	Number of households
1	Bayanbulag	618	133
2	Tsagaan Burgas	653	143
3	Baruun Salaa	639	152
4	Ulaan Buraa	606	143
5	Dund Us	591	130
<b>Soum total:</b>		<b>3701</b>	<b>701</b>

#### 4.14.3 Key social statistics

104. Average life expectancy in Khovd province is at 72.63 years (68.94 for males and 75.85 for females) which is 2.74 years higher than national average of 69.89 years.
105. Vulnerable social groups of Khovd soum includes 4 orphan children, 69 households that are led by single mothers, and 88 disabled persons. There are 2477 households in Ulgii city who live in poverty as of 2018.

#### 4.14.4 Economy and livelihood

106. Economy of Khovd soum mainly depends on its agricultural sector, particularly livestock-breeding sector.
107. Khovd soum has 179,518 heads of livestock, including 5972 heads of horses, 7488 heads of cows, 631 heads of camels, 55278 heads of sheeps and 110149 heads of goats. 1200 hectares of land is being used for crop planting in Khovd soum. Main types of crops include vegetable, wheat and livestock fodder. Farmers in Khovd soum has harvested 3884.2 tons of vegetable and 1502.4 tons of livestock fodder in 2018.

## 5.0 ALTERNATIVE ANALYSIS

### 5.1 NO ACTION ALTERNATIVE

108. The “No Action Alternative” addresses the likely consequences of not undertaking the proposed action. For this project, the failure to develop the access road to Khovd soum would mean the current condition with poor infrastructure and access to services retained for the soum residents and the soum center whose territory the Asian Highway route 4 traverses through for about 55 kilometers remain unconnected to the regional road network.

109. The existing multiple tracked earth road to Khovd soum center continue to be a source of dust emission whenever a vehicle passes by. The eroded land surface and highly disturbed plant cover will not recover with the constant movement of passenger vehicles travelling between the soum and Khovd city. Ecologically, the 18km corridor will remain a highly disturbed area affected by vehicle movement and transport.

110. Due to dust emission and a lack of basic road structures such as traffic signs and designated crossings, the existing multiple tracked earth road remains to be a concern for traffic safety for local herders and other passengers who travel the route. Without a paved road, travel time, fuel consumption and vehicle maintenance costs remain high for the residents of Khovd soum and access to health, educational and other services remain less convenient. The soum will benefit less from the future increase in regional economic cooperation and trade turnover along the Asian Highway route 4 and CAREC Corridor 4a. In terms of social and economic development, the Khovd soum remain an underdeveloped, remote area which has a poorly developed infrastructure.

111. Therefore, it can be determined that the “No Action Alternative” is not a reasonable option if the overall poverty, socio-economic and environmental situations in the Khovd soum is not improved.

### 5.2 LOCATION ALTERNATIVE

112. The proposed road alignment follows the existing right of way where several earth tracks are currently being used, the alignment is within the tracked area. Given the favorable topographic condition for road construction which allows the alignment traverse through plain desert-steppes without any mountain passes, river crossings and permanent dwellings, the road design consultant was not forced to consider alternative alignment routes.

113. Selection of the road alignment which follows through the existing multiple tracked earth road can be justified with following reasons. These include:

- (i) Since the existing earth road has been used for decades, a right of way has been created along the route which provides a situation where there are no any buildings, structures and objects in the right of way. There is no land acquisition and resettlement issue here.
- (ii) With highly disturbed land surface and eroded soil, the existing earth road is prone to dust emission whenever a vehicle passes by. And this discourages local herders to have permanent dwellings adjacent or close to the existing earth road. There is no permanent dwelling within 200m distance of the alignment which will help to reduce magnitude of potential construction impacts on potential receptors.
- (iii) There are no environmentally sensitive areas such as natural habitats, wildlife movement routes, lakes, forest reserves and specially protected areas in the vicinity of the proposed road alignment. The closest such areas exist in 20-50km distance from the alignment.



## 6.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

114. Anticipated environmental impacts during the design/pre-construction, construction and operation phases are discussed in this section. Mitigation measures are proposed for each impact.

### 6.1 DESIGN AND PRE-CONSTRUCTION PHASE

115. Key impacts associated with the project design are:

116. **Road crossings for local residents and livestock:** local nomadic herders move seasonally following to availability of grass and water. Road embankment without crossings planned will make it tougher for them to cross the road.

117. **Mitigation measures.** Based on consultations with local authorities and residents, the design consultant has determined key livestock movement routes and planned livestock crossings. Location of the planned crossings are presented in the table below. 7-meters wide ramps and warning signs are provided on both side of the embankments at the crossing points.

**Table 16: Level crossings planned for the access road to Khovd soum**

No.	Description	Location	Details
1	Road exit 1	STA.7+500 L&R	Width 7 meters (Figure 3)
2	Road exit 2	STA.14+900 L&R	Width 7 meters

118. **Flood protection measures and planning of culverts:** Although the project road do not cross any permanent rivers, there are several ephemeral streams along the roads.

119. **Mitigation measures.** The design consultant has conducted hydrological surveys along the project road to determine intersection points with ephemeral streams. Based on the hydrological survey results, square shaped concrete culverts are planned at 27 points along the access road to Khovd soum.

120. Additionally, based on the hydrological survey results, the design consultant has planned side ditches with average depth of 0.4 m for both roads to ensure the road embankment is protected from potential flood events. Total length of the side ditches planned for the access road to Khovd soum is 20.34 with 9.18 km side ditches planned on the left side and 11.16 km long side ditches planned on the right side.

121. Spillage inspection for vehicles and machineries that are operated at the bridge construction points will be conducted on daily basis in order to prevent from pollution to surface water.

122. **Disruption to existing utility lines:** There is potential concern that the access road to Khovd soum overlaps with power transmission cable lines, communication lines and fiber optic cable lines in soum centers.

123. **Mitigation measures.** The design consultant has reviewed existing infrastructure map during the design development to determine potential overlapping points. The road alignment to Khovd soum overlaps with existing power transmission cable line at STA.18+661, fiber optic cable line at STA.1+228 and communication lines at STA.18+429, STA.18+487, STA.18+643 and STA.18+695, respectively. The existing infrastructure lines will be relocated by professional entities and related costs are included in the construction budget.

124. **Potential damage to cultural heritage sites.** The project region, northern part of Khovd province, is rich in cultural heritage sites, most notably ancient tombs and petroglyphs. As a result of a baseline archaeological survey conducted by the Institute of Archaeology of Mongolia in September 2021, 14 cultural heritage items including 13 ancient tombs and 1 petroglyph have been found along the proposed road corridor. Construction activities might cause damage to the physical cultural items.

125. **Mitigation measures.** The 13 ancient tombs that are located within 9-86 meters distance from the road alignment will be removed by the professional entity before commencement of construction in 2022 spring. The petroglyphs which is located in 1.5 km distance from the road alignment will be protected with visibility fencing and warning signs.

126. **Extreme weather events,** such as flooding, caused by climate change need to be factored in the project design.

127. **Mitigation measures.** Hydrologists of the design consultant MCPC gr LLC have conducted hydrological calculations for the proposed road corridors in accordance with the national standard "Norms and guidelines for hydrological calculations". Maximum flood flows for the riverbeds, ephemeral streams and flood channels were calculated based on maximum daily rainfall estimations. Maximum daily rainfall estimations are calculated using the last 20-year precipitation data recorded at the weather station in Khovd province. Statistically processed precipitation data using the momentum method shows that maximum daily rainfall is at 81.9 mm for the project area. However, as specified in the guideline book "Geo-physical and climate indicators for construction", the maximum daily rainfall in the project area (northern part of Khovd province) is at H1%=104.0 mm. Therefore, the latter figure which has greater value is used for further calculations of maximum flood flows.

128. Maximum flood flow with 1%, 2% and 5% frequency for the riverbeds, ephemeral streams and flood channels in the road corridor is calculated 100-year return period using below formula.

$$QN\% = qN\% \cdot \varphi \cdot H1\% \cdot \delta \cdot \lambda\% \cdot F$$

Where as:

QN% - frequency of maximum flood flow / m<sup>3</sup>/sec /

qN% - frequency of max flood flow module / l/sec / km<sup>2</sup> /

φ – flood flow coefficient

HN% - maximum daily rainfall with N% frequency / mm /

δ – coefficient for lakes, forest and marshland

λ% - conversion coefficient for 1% frequency

F – catchment area / km<sup>2</sup> /

129. As required by the national standard for road design "33БН6Д22-004-2016", the road components including the culverts are designed to be in good working condition for the next 25-50 years. Therefore, dimensions of the culverts are determined based on calculations of maximum flood flows with various frequency levels in 100-year return period for the riverbeds, ephemeral streams and flood channels as shown in the below table. There are no bridges planned for the access roads to Khovd soum.

**Table 17. Hydrological calculations of culvert dimension for access road to Khovd soum**

<b>№</b>	<b>Location of culverts (STA)</b>	<b>F (catchment area in km<sup>2</sup>)</b>	<b>L (length in km)</b>	<b>φ</b>	<b>φH<sub>1%</sub></b>	<b>q<sub>1%</sub></b>	<b>Q<sub>1%</sub></b>	<b>Q<sub>2%</sub></b>	<b>Q<sub>5%</sub></b>	<b>Dimensions of culverts (meters)</b>
1	2+000	2.607	1.430	0.09	9.79	0.0443	<b>1.130</b>	<b>0.983</b>	<b>0.779</b>	<b>1.0m x 1.0m</b>
2	2+600	0.696	1.021	0.19	20.12	0.0567	<b>0.794</b>	<b>0.691</b>	<b>0.548</b>	<b>1.0m x 1.0m</b>
3	3+000	0.696	1.021	0.19	20.12	0.0567	<b>0.794</b>	<b>0.691</b>	<b>0.548</b>	<b>1.0m x 1.0m</b>
4	4+400	2.690	2.630	0.15	15.18	0.0365	<b>1.491</b>	<b>1.297</b>	<b>1.029</b>	<b>1.0m x 1.0m</b>
5	4+880	0.737	2.070	0.25	25.71	0.0644	<b>1.219</b>	<b>1.061</b>	<b>0.841</b>	<b>1.0m x 1.0m</b>
6	5+240	0.880	2.080	0.24	25.46	0.0624	<b>1.397</b>	<b>1.216</b>	<b>0.964</b>	<b>1.0m x 1.0m</b>
7	6+150	0.880	2.080	0.24	25.46	0.0624	<b>1.397</b>	<b>1.216</b>	<b>0.964</b>	<b>1.5m x 1.5m</b>
8	6+400	0.247	0.740	0.18	19.07	0.0735	<b>0.346</b>	<b>0.301</b>	<b>0.239</b>	<b>1.5m x 1.5m</b>
9	7+300	5.442	4.347	0.14	14.71	0.0300	<b>2.405</b>	<b>2.092</b>	<b>1.659</b>	<b>1.0m x 1.0m</b>
10	9+850	3.187	2.880	0.13	13.86	0.0348	<b>1.536</b>	<b>1.337</b>	<b>1.060</b>	<b>1.0m x 1.0m</b>
11	10+640	1.011	0.843	0.16	16.40	0.0565	<b>0.937</b>	<b>0.815</b>	<b>0.647</b>	<b>1.0m x 1.0m</b>
12	11+120	0.099	0.286	0.44	45.27	0.2000	<b>0.896</b>	<b>0.780</b>	<b>0.619</b>	<b>1.0m x 1.0m</b>
13	11+750	0.115	0.308	0.41	42.31	0.1850	<b>0.900</b>	<b>0.783</b>	<b>0.621</b>	<b>1.0m x 1.0m</b>
14	12+500	0.135	0.317	0.40	41.17	0.1729	<b>0.961</b>	<b>0.836</b>	<b>0.663</b>	<b>1.0m x 1.0m</b>
15	12+700	0.100	0.593	0.61	63.13	0.2297	<b>1.443</b>	<b>1.255</b>	<b>0.996</b>	<b>1.0m x 1.0m</b>
16	12+990	0.100	0.593	0.61	63.13	0.2297	<b>1.443</b>	<b>1.255</b>	<b>0.996</b>	<b>1.0m x 1.0m</b>
17	13+180	0.074	0.475	0.63	65.52	0.2608	<b>1.265</b>	<b>1.100</b>	<b>0.873</b>	<b>1.0m x 1.0m</b>
18	13+260	0.074	0.445	0.67	69.48	0.2758	<b>1.418</b>	<b>1.234</b>	<b>0.979</b>	<b>1.0m x 1.0m</b>
19	13+380	0.287	0.700	0.59	61.78	0.1950	<b>3.457</b>	<b>3.007</b>	<b>2.385</b>	<b>1.0m x 1.0m</b>
20	14+000	0.460	0.791	0.53	54.86	0.1554	<b>3.921</b>	<b>3.412</b>	<b>2.706</b>	<b>1.5m x 1.5m</b>
21	16+000	0.190	0.225	0.29	29.94	0.0993	<b>0.565</b>	<b>0.491</b>	<b>0.390</b>	<b>1.0m x 1.0m</b>
22	16+740	0.057	0.172	0.37	38.45	0.2063	<b>0.452</b>	<b>0.393</b>	<b>0.312</b>	<b>1.0m x 1.0m</b>
23	17+040	0.451	0.771	0.47	48.89	0.1412	<b>3.113</b>	<b>2.708</b>	<b>2.148</b>	<b>1.5m x 1.5m</b>

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**WRRICIP: Construction of access road to Khovd soum**

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24	17+680	0.107	0.368	0.57	59.68	0.2528	<b>1.614</b>	<b>1.404</b>	<b>1.114</b>	<b>1.0m x 1.0m</b>
25	17+848	0.061	0.304	0.68	71.09	0.3143	<b>1.363</b>	<b>1.186</b>	<b>0.940</b>	<b>1.0m x 1.0m</b>
26	18+180	0.083	0.318	0.66	68.16	0.2951	<b>1.669</b>	<b>1.452</b>	<b>1.152</b>	<b>1.5m x 1.5m</b>
27	18+590	12.379	5.680	0.12	12.94	0.0276	<b>4.414</b>	<b>3.840</b>	<b>3.046</b>	<b>2.0m x 1.5m</b>

130. **Permits.** Once civil works contract is awarded, the selected contractor will need to go through following approval process in order to obtain necessary environmental permits from relevant domestic authorities as described in the table below during pre-construction period when they arrange preparatory works for construction.

**Table 18. Domestic approval procedures for environmental permits**

No.	Environmental permits to apply for	Granted by	Approval process / procedures to follow
1	Permission on use of land for establishment of workers' campsite	Governor of Khovd soum	<ol style="list-style-type: none"> <li>1. Selection of a proposed site for workers' camp site by the civil works contractor</li> <li>2. Contractor to submit a request letter to Khovd soum administration for permission on land use</li> <li>3. Site inspection by the soum's environmental officer</li> <li>4. Permit granted with a "Soum Governor's Order"</li> </ol>
2	Permission on use of borrow pits and quarry site	Governor of Khovd soum	<ol style="list-style-type: none"> <li>1. Selection of proposed sites for borrow pits and quarry site by the civil works contractor</li> <li>2. Lab test analysis to verify quality of the aggregate material, approval by the Construction Supervision Consultant</li> <li>3. Contractor to submit a request letter to Khovd soum administration for permission on use of borrow pits and quarry site</li> <li>4. Site inspection by the soum's environmental officer</li> <li>5. Permit granted with a "Soum Governor's Order"</li> </ol>
3	Permission on water use	Khar Lake and Khovd River Basin Authority	<ol style="list-style-type: none"> <li>1. Contractor to submit a request letter to the basin authority for permission on water use. Estimation on water consumption for drinking and construction purposes shall be attached.</li> <li>2. The basin authority grants permit on water use which defines water supply source</li> </ol>
4	Permission for waste disposal and landfill site	Governor of Khovd soum	<ol style="list-style-type: none"> <li>1. Contractor to submit a request letter to Khovd soum administration for permission on waste disposal and landfill site</li> <li>2. Permit granted in the form of a Waste Disposal Agreement signed between the contractor and the soum authority. Landfill site, waste disposal fees will be specified in the agreement.</li> </ol>

131. **Other pre-construction requirements.** Tender documents and civil works contract include EMP requirements. Before the construction starts, the Contractor will prepare a number of mitigation plans and method statements consistent with the EMP for review and approval by MRTD and/or MET as appropriate. Approval will be required one month prior to construction commencing. Contract documents shall explicitly indicate the requirement of these plans that construction cannot start until all documents are approved and also state that all environmental protection measures should be included in the bid price. These management plans are needed



in order to address the following issues:

- (i) **Soil Erosion Management Plan** will include measures to be taken during earthworks to avoid/mitigate erosion arising from cut and fill, stockpiling, and stabilization.
- (ii) **Aggregate, Borrow Pits and Spoil Management Plan** will describe work activities; technology, potential environmental impacts, and mitigation measures for aggregate/borrow pits. It should specify that borrow pits and quarries should not be in a protected area. Contractors will ensure that (i) borrow areas will be located outside the road corridor avoiding valuable pasture/grazing land, (ii) after use, borrow pit areas will be graded to ensure drainage and visual uniformity, (iii) borrow pit restoration will follow the completion of works in full compliance with all applicable standards and specifications, and (vi) topsoil from borrow pits will be saved and used during restoration.
- (i) **Spill Management Plan** will document the specific requirements, protocols, responsibilities, and materials necessary to implement an emergency spill response following an incident.
- (ii) **Construction Camp Management Plan** will propose preventive/mitigation measures for environmental impacts of construction camp and work sites including fuel storage, filling station and vehicle washing sites.
- (iii) **Waste Management Plan** for operation of construction camp and work sites will provide procedures for management of household type waste, hazardous waste, and sewage. It will evaluate the type and quantities of waste matter, as well as detail arrangements for storage and transportation of the waste to its disposal point. It will include agreements with the *aimag* authorities for management of waste from the construction camps.
- (iv) **Water Use and Management Plan** will detail the predicted water requirements for the construction camp and construction sites. It will include relevant permissions from *soum* authorities for water extraction and water conservation measures which will be implemented at construction sites and for domestic water use in construction camps.
- (v) **Water Resources Protection and Risk Prevention Plan** will set out requirements to establish water protection zones around the nearby surface water bodies, agenda of awareness enhancing training for construction workforce and details of provision of personal protective equipment to workers to reduce risk associated with this work environment.
- (vi) **Health and Safety Management Plan (HSMP)**. For management of Occupational Health and Safety, the contractor will prepare a HSMP for the construction workers based on the EMP. It will be submitted to the DOR for review. The detailed HSMP will include the following provisions:
  - a) *Clean water*. Provide a clean and sufficient supply of fresh water, for construction and for all houses, camps, offices, laboratories and workshops.
  - b) *Sewage and wastewater*. Provide an adequate number of latrines and other sanitary arrangements at the site and work areas, and ensure that they are cleaned and maintained in a hygienic state.

- c) *Solid waste.* Provide garbage receptacles at construction site and camps, which will be periodically cleared.
- d) *Liquid chemical waste.* Provide receptacles in suitably banded for the storage of liquid chemical waste prior to disposal. Include clear warnings with health risks.
- e) *Personal protection.* Provide personal protection equipment (PPE), such as safety boots, helmets, gloves, protective clothing, goggles, and ear protection, in accordance with relevant health and safety regulations, for workers.
- f) *Emergency Preparedness and Response.* An emergency response plan to take actions on accidents and emergencies, including public health emergencies associated with hazardous material spills and similar events will be prepared. Emergency phone contacts with hospitals in the nearest *soum* or *aimag* will be established. A fully equipped first-aid base in each construction camp will be organized.
- g) *Records Management.* A Records Management System that will store and maintain easily retrievable records protected against loss or damage should be established. It will include documenting and reporting occupational accidents, diseases, and incidents. The records will be reviewed during compliance monitoring and audits.
- h) *Safety communication.* Ensure that safety, rescue and health matters are given a high degree of publicity to all persons regularly at active construction sites. Posters in Mongolian and any other language appropriate for the contractors drawing attention to relevant health regulations will be made or obtained from the appropriate sources and will be displayed prominently at the site.
- i) *Training, awareness and competence.* Train all construction workers in health care issues, general health and safety matters, and on the specific hazards of their work. Implement HIV/AIDS and other communicable diseases awareness and prevention program to target the local community and construction workers.

## **6.2 CONSTRUCTION PHASE**

### **6.2.1 Impact on Physical Resources**

132. **Air Quality.** Given the relatively small scale and short duration of the construction project, anticipated impacts on air quality impacts during the construction stage of the project would be moderate and temporary in nature. Following impacts on air quality are anticipated during construction period:

- (i) Emissions from construction machinery and equipment, movement of haulage trucks
- (ii) Asphalt paving will produce fumes containing small quantities of toxic and hazardous chemicals such as volatile organic compounds (VOC);
- (iii) Fugitive dust from earthworks such as establishment and use of borrow pits, creation of embankments and cutting and filling activities;
- (iv) Fugitive dust from loading, unloading and haulage of spoil for disposal and

construction materials from borrow pits;

- (v) Fugitive dust from concrete batching plants; and
- (vi) Dust created from unprotected surfaces by wind.

133. **Mitigation Measures.** Proposed mitigation measures to protect sensitive receptors from air quality issues are:

- (i) **Asphalt plants and concrete batching plants** shall be located at least 1 km downwind from the nearest dwellings in order to reduce the impact of fumes on humans and to be fitted with necessary equipment such as bag house filters to reduce fugitive dust emissions.
- (ii) **Stockpiles** must be managed to reduce dust emissions. The location of the stockpile must be downwind of sensitive receptors.
- (iii) **Water spray.** Water will be sprayed on construction sites and material handling routes where fugitive dust is generated. Where haul roads are within 300 m of sensitive receptors, they will be sprayed with water before vehicle movements begin.
- (iv) **Limit vehicle speed** nearby settlement areas and warning signs will be erected.
- (v) **Transport of materials.** Trucks carrying earth, sand or stone will be covered with tarpaulins or other suitable cover. Construction vehicles and machinery will be maintained to a high standard to minimize emissions
- (vi) **Clean up.** The contractor will immediately clean up any mud or dusty materials which are on or around public roads and fine dust particles at crusher sites.

134. **Noise.** Construction activities are expected to produce noise due to movement of construction vehicles, the haulage of construction materials to the construction sites, and other construction activities.

135. Construction activities are expected to produce noise levels up to 90 dB(A) within 5 m of the machinery as shown in **Table 19** which indicates noise levels for construction machinery. For the project, no receptors other than construction workers will be this close to the machinery, and construction workers will use appropriate PPE. The existing multiple tracked earth road to Khovd soum produces a huge amount of dust whenever a vehicle passes by, thus there is no permanent dwelling within 200-meters distance on on both sides of the proposed road alignment. Based on the diminishing level of noise spread as indicated Table 19, dwellings locate more than 200 m distance from the machinery will sense noise level less than 55 decibels which meets the requirements on daytime noise level both by WHO Guidelines and the national standard. The construction works will be carried out during the daytime only, thus no noise will be generated by the project activities during night time.

**Table 19: Construction Machinery Noise**

Machine Type	Distance to Machinery									
	5 m	10 m	20 m	40 m	60 m	80 m	100 m	150 m	200 m	300 m
Loader	90	84	78	72	68.5	66	64	60.5	58	54.5
Vibratory Road Roller	86	80	74	68	64.5	62	60	56.5	54	50.5
Bulldozer	86	80	74	68	64.5	62	60	56.5	54	50.5

Machine Type	Distance to Machinery									
	5 m	10 m	20 m	40 m	60 m	80 m	100 m	150 m	200 m	300 m
Land Scraper	90	84	78	72	68.5	66	64	60.5	58	54.5
Excavator	84	78	72	66	62.5	60	58	54.5	52	48.8
Roller	87	81	75	69	65.5	63	61	57.5	55	51.5
Mixing Equipment	87	81	75	69	65.5	63	61	57.5	55	51.5

Source: Government of Mongolia. 2011. Initial Environmental Examination (IEE) of the proposed Regional Logistics Development Project.

136. Given the remote nature of the project location and sparse population along road corridor, noise produced during construction will have minimal impact on the local community. Noise emission from construction machineries will be temporary and localized.

137. **Construction Noise Mitigation.** The potential noise impacts will be mitigated through a number of activities defined in the EMP, which will be incorporated in the bid documents and construction contracts:

- (i) Source control: Maintain all exhaust systems in good working order; undertake regular equipment maintenance;
- (ii) Ensure the construction workers, who are the main receptors of noise impact, use appropriate PPE such as ear muffs and ear plugs all the time at construction sites.
- (iii) Locate sites for concrete-mixing and similar activities at least 500 m away from sensitive areas;
- (iv) Operate between 8am-6pm only and reach an agreement with nearby residents regarding the timing of heavy machinery work, to avoid any unnecessary disturbances;
- (v) Provide advance warning to the community on timing of noisy activities. Seek suggestions from community members to reduce noise annoyance. Public notification of construction operations will incorporate noise considerations; information procedure of handling complaints through the Grievance Redress Mechanism will be disseminated.
- (vi) Ensure noise monitoring is undertaken near sensitive receptors, particularly dwellings.

138. Potential sensitive receptors will be exposed to short term impacts. With the above mitigation measures in place, potential noise quality impacts during the construction stage are anticipated to be acceptable. There will be no residual impacts from construction activities.

139. **Vibration.** Site clearing and soil compaction activities will be performed with vibration-inducing equipment such as excavators, dozers, loaders, and large trucks. Based on a study on the subjective response of humans to vibrations, performed by the United States Bureau of Mines (USBM), vibrations were classified as being “barely perceptible” to humans at levels as low as 0.011 in/sec. Vibration generated by road compaction works will be temporary in nature and not anticipated to cause any damage to any dwellings. The project road traverses through sparsely populated grassland without any settlement areas, thus there are no any buildings or structures near (within 200m distance) to the proposed road alignment as the end point of the project road is in 300-meters distance from the Khovd soum center.

140. **Mitigation of Construction Vibration.** Road compaction works will be conducted only during daytime between 09:00am and 18:00pm and shall not be allowed during the nighttime in order to avoid disturbance on nearby dwellings. Local residents will be notified prior to road compaction works.

141. **Water Quality.** The project may have temporary impact on surface water quality of Dund Us river and Shar nuur pond through accidental contamination (oil spills) or irresponsible human activities (vehicle washing nearby the river) during the construction period.

142. **Mitigation of Impacts on Surface and Groundwater:**

- (i) Water protection zones for Dund Us river and 2 small ponds shall be established in advance of construction and demarcated to ensure machinery does not encroach on them;
- (ii) To limit the spill of materials into water bodies during the construction, conduct technical inspection and timely maintenance;
- (iii) There will be designated spots for vehicle washing and machinery maintenance workshop where water collection basins and sediment traps will be installed;
- (iv) No materials will be stored within 300 m of a water course, including soil, spoil, aggregates, chemicals or other materials used during construction.
- (v) Enclosed drainage around construction material storage areas on construction sites and storage will be on hard standing. Fuel storage, maintenance shop and vehicle cleaning areas must be stationed at least 300m away from the nearest water body and will include enclosed drainage to ensure contaminated water does not cause pollution and storage, maintenance and cleaning activities will be on hard standing.
- (vi) Temporary drainage provision will be provided during construction to ensure that any storm water running off construction areas will be controlled;
- (vii) Effective septic treatment and disposal systems will be installed at construction camps.
- (viii) Temporary drainage provision will be provided during construction to ensure that any storm water running off construction areas will be controlled. This will ensure that potentially contaminated water does not impact on sensitive receptors. Contaminated water will be removed off-site for disposal in the facilities identified in the Construction Camp Management Plan; and
- (ix) The civil works contractor will develop and implement contingency plans for control of spills of oil and other hazardous substances (Spill Management Plan) before commencement of construction.

143. **Impacts related to waste generation.** Disposal of waste could have adverse impacts on the soil, water and health of contractors and the community. Waste streams will include inert construction wastes (e.g. soil, spoil, debris, concrete) and municipal type wastes (construction workers' food and packaging wastes from construction consumables) and hazardous wastes from construction (e.g. fuel containers, oil filters, oily rags).

144. **Mitigation of Impacts for Solid and Liquid Waste**

- (i) **Waste hierarchy.** Construction will be subject to the waste hierarchy to ensure efficient use and management of resources. The preference is for prevention of waste at source. This means the effective management of materials on site through good house-keeping and work planning, in order to generate less waste. Procurement options will play a role in waste prevention as the procurement of



materials which have less packaging for example, would be preferable. Waste minimization is the second preferred option. Reuse or recycling options should be considered prior to disposal. The recyclables market in the Western Region does not appear to be well developed however this can be explored when the Contractor's Site Waste Management Plan is developed as the waste streams generated will be identified at that stage. Disposal of waste which cannot be reused or recycled shall take place at sites authorized by the *aimag* authorities;

- (ii) Provide appropriate waste storage containers for construction, hazardous and liquid wastes; install confined storage points of solid and liquid wastes away from sensitive receptors, regularly haul to an approved disposal facility;
- (iii) Provide designated temporary solid waste collection point at the workers' campsite which will be surrounded with protection fences. Apply disinfection at the waste collection point using proper disinfectant sprays/powder on weekly basis;
- (iv) Sign Solid Waste Disposal Agreement with Khovd soum administration. Locations of approved waste landfill sites and monthly waste disposal fees will be indicated in the agreement;
- (v) Spoil will be disposed only in sites which are approved by the provincial government in accordance with the Aggregate, Borrow Pit and Spoil Management Plan; spoil will not be disposed of on slopes or near pasture land where it may impact on vegetation; rehabilitate and restore spoil disposal sites in accordance with the agreed plan.
- (x) Ensure waste water is properly treated with neutralizer regularly. Once full, waste water collected in the designated container will be transported to the WWTP of Khovd city. The civil works contractor will sign an agreement on waste water disposal and transportation with the Waste Water Treatment Plant of Khovd city who will send its waste water truck to transport the waste water collected in the container to the waste water treatment plant which locates adjacent to the AH-4 road in 20km distance from the start point of the proposed road.
- (vi) Prohibit burning of waste at all times.

145. **Impacts on soil resources.** Following types of potential impacts on soil and land surface are anticipated, including: (i) soil erosion; (ii) soil contamination and (iii) land damage.

- (i) **Land damage and landscape change** due to earthworks, exploitation of borrow pits and other construction activities.
- (ii) **Soil erosion.** May be caused by cut and fill operations, for culverts and borrow pits, stockpiles and spoils from earthworks during rehabilitation of roads, road grading and construction camp construction. The factors that are expected to contribute to accelerated erosion in the project area are winds and peak water flows. The project area is subject to dust storms therefore mitigation to reduce soil erosion will contribute to lessening dust mobilization and dispersal during high winds.
- (iii) **Soil contamination.** Contamination of soil in the construction phase may result from the inappropriate transfer, storage, and disposal of petroleum products, lubricants, chemicals, hazardous materials, liquids and solid waste. These impacts are particularly associated with construction camps where the majority of potentially contaminating chemicals are stored, and during refueling of plant and equipment.

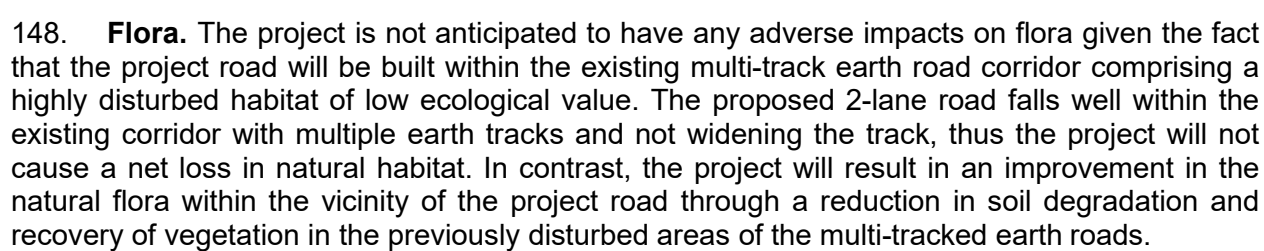
- (iv) **Earth soil balance.** Inert materials generated during the earthworks including cleaning of foundation of the alignment and use of borrow pits and quarry site.

146. **Mitigation of impacts on soil and land surface.**

- (i) **Soil erosion:** (a) Soil erosion management plan to be prepared by the contractor and to be approved by MRTD before construction starts; (b) Minimizing the area of soil clearance; (c) Maintaining slope stability at cut faces by implementing erosion protection measures; (d) Construction in erosion and flood-prone areas should be mainly restricted to the dry season where possible. The peak surface water flow (combined melt water and rain water) lasts for up to 150 days from late June, therefore the EMP recognizes that working when the rivers are in low flow is difficult given the short construction season; (e) Control silt runoff; (f) Cover soil stockpiles; (g) Use a geotextile membrane where needed; (h) Properly stabilize slopes and re-vegetate disturbed surfaces; and (i) Protect slopes on both sides of any culverts to prevent soil loss; (j) use of temporary berms or other appropriate temporary drainage provisions at construction sites to prevent water eroding cut faces, stockpiles and other exposed areas of soil.
- (ii) **Soil contamination:** (a) Store chemicals/hazardous products and waste on impermeable surfaces in secure, covered areas with clear labeling of containers and with a tray or bund to contain leaks with an area of 110% of the materials/waste stored; (b) Regularly remove all construction wastes from the site to approved waste disposal sites; (c) Establish emergency preparedness and response plan (Spill Management Plan); (d) Provide spill cleanup measures and equipment at each construction site; (e) Conduct training in emergency spill response procedures (f) ensure fuel is stored in a bunded tank and vehicle refueling takes place on hard standing away from sensitive receptors, such as surface water; and (f) use neutralizers and disinfection sprays at the workers' toilets to prevent from bacterial pollution to soil cover.
- (iii) **Land surface damage and landscape change:** (a) Place strict control on construction vehicles to ensure the drivers follow the pre-determined haulage route thus do not create multiple earth tracks; (b) Execute technical and biological rehabilitation according to relevant standards at the end of construction period. Borrow sites, quarry sites, workers' camp sites and other affected areas will be rehabilitated and handed over to Khovd soum administration.
- (iv) **Earth soil balance.** Inert materials generated during the earthworks will be used for technical rehabilitation of the borrow areas and other affected land sites such as the workers' camp site and waste landfilling site. Topsoil will be stored in separate stockpiles and will be layered out at the top layer during the technical rehabilitation of the affected sites.

## 6.2.2 Impact on Biological Resources

147. **Context.** The potential impact of construction activities on biological resources is largely mitigated by the fact that the construction works for the proposed road will be undertaken primarily within the existing earth tracks that have been used to travel to the Khovd soum center for decades and thus consist of a highly modified and degraded habitat. There is no any critical habitat in the vicinity of the proposed road corridor. The closest critical habitat to the project road corridor is Huh Serh Mountain Range SPA which is in 25.6 km distance from the project area, as shown in the Figure 13 below.

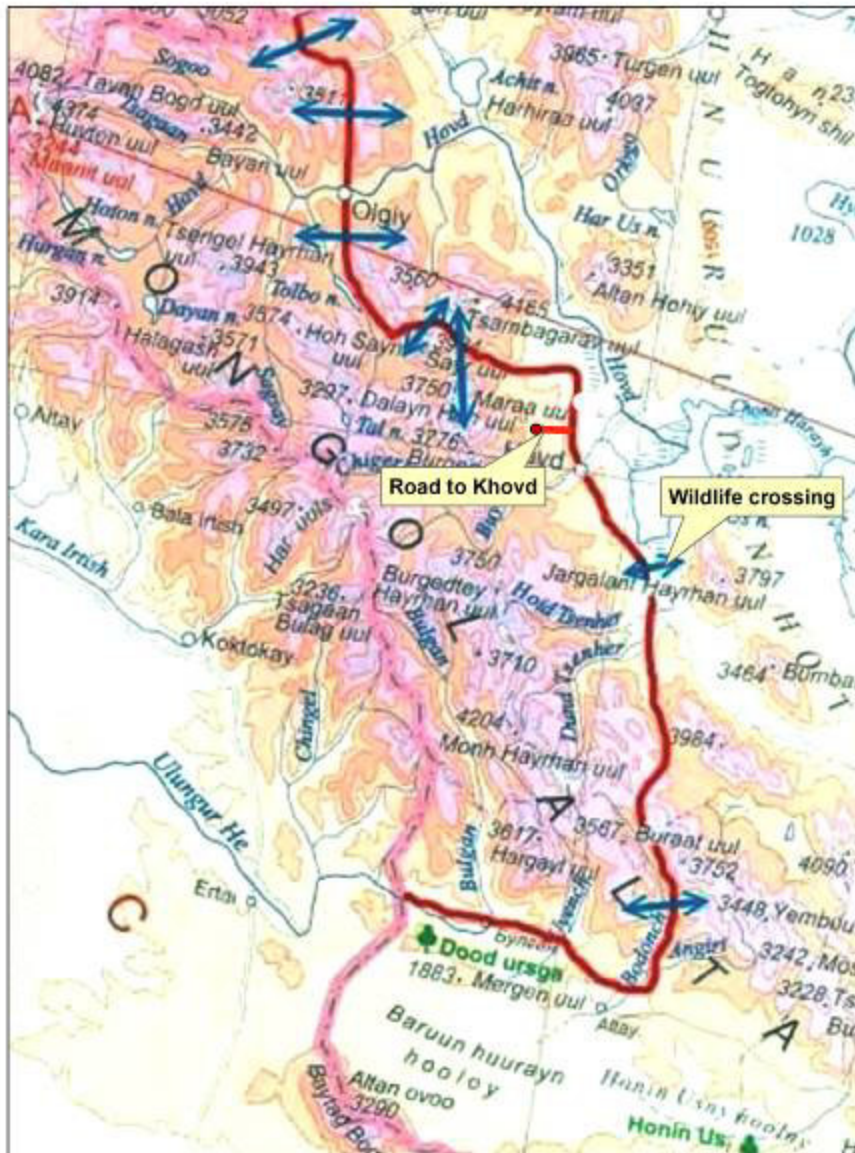




149. **Wildlife.** The proposed road corridor does not overlap with wildlife movement routes identified by the Wildlife Movement Survey conducted by the Wildlife Conservation Society (WCS) specialist Buuveibaatar in 2015. As shown in Figure 17. below, the migration routes for saiga, argali sheep, ibex and snow leopard determined along the AH-4 corridor were marked as blue vectors. The closest wildlife migration routes to the proposed road corridor are Tsambagarav mount-Hongio river valley which is in 35km distance and Great lakes depression-Moun Jargalant Khairkhan which is in 40 km distance. Therefore, the proposed road does not project to bisect wildlife migration routes. Other risks, such as illegal hunting/fishing by construction workers, animal poisoning due to waste food and livestock falling in the borrow pits can be prevented and managed with implementation of the mitigation measures provided below.

**Figure 20. Location of wildlife movement routes along the Asian Highway Route 4 corridor**





### Mitigation measures for biological resources

- (i) Raise awareness of contractors on wildlife, hunting laws and penalties associated with poaching both in terms of domestic law and penalties imposed by the employer (contracting company). Contractors' internal rules shall prohibit illegal hunting
- (ii) EMP trainings will include topics regarding law clauses on illegal hunting and protection of wildlife
- (iii) Discussions with residents along the road corridor regarding hunting and poaching to ensure no additional hunting is occurring.
- (iv) Borrow pits shall be surrounded earth barriers in order to prevent from animal or livestock falling



- (v) Temporary waste collection points shall be surrounded with protection fences to prevent from animals and birds poisoning from waste food items

150. **Special Protected Areas.** The project is not anticipated to have any adverse impacts on protected areas given the fact that the closest SPA Huh Serh Mountain Range is in over 25.6 km distance from the construction site.

### 6.2.3 Impacts on Cultural Resources

151. **Context.** 14 cultural heritage items identified as a result of baseline archaeological survey conducted by the Institute of Archaeology of Mongolia. As specified in Section 6.1 in this report, rescue excavations will be executed the Institute of Archaeology at the 13 locations where ancient tombs are found and the petroglyphs located in 1.5 km distance from the road alignment will be protected with visibility fencing and warning signs. Action on Plan Rescue Excavation is provided in Appendix 2 and approval letter issued by the Governor of Khovd province is provided in Appendix 3.

152. **Chance Finds.** Unearthed archaeological or paleontological items might be discovered or damaged during the earthworks, particularly at borrow sites.

153. **Chance finds procedure.** Contractors, particularly operators of excavators and construction unit supervisors will be given awareness training on the cultural heritage protection so that they are aware of what to do if a site is discovered during construction and what culturally significant sites look like in Mongolia, as the construction workers may be from outside Mongolia. Construction workers will be made aware of the penalties for interfering with artefacts of cultural heritage under Mongolian law and that this may lead to dismissal. Following procedure will be implemented in case of a chance finds:

- (i) Construction works at the site of occurrence shall be stopped immediately
- (ii) The chance finds will be notified to local soum and aimag government and Institute of Archaeology.
- (iii) Experts of Institute Archaeology will carry out site inspection to determine the value of unearthed item.
- (iv) Experts of Institute Archaeology will perform rescue excavation in case the unearthed item is of cultural value.
- (v) Construction works at the site of occurrence may resume only after an approval by the Institute of Archaeology.

154. Construction supervision engineers will be properly trained to monitor implementation of Chance Finds Procedure on daily basis during the earthworks.

### 6.2.4 Impacts on Human Environment

**Pasture Land.** As an economic resource, pasture land is valuable in the project area. The proposed road passes through pasture land used by herders. The following mitigation measures to protect pasture land are proposed:

- (i) **Spoil Disposal.** Spoil is to be disposed of only in areas delineated in the Aggregate, Borrow Pit and Spoil Management plan which should avoid productive pasture land.
- (ii) **Borrow Pit Location.** Borrow pits are to be located only in areas delineated in the Aggregate, Borrow Pit and Spoil Management plan which should avoid productive pasture land.
- (iii) **Pasture Identification.** Consultation with herders will be undertaken in advance of starting a new area of construction to identify any locally valuable grazing areas which

may be affected by construction activities.

**HIV/AIDS and Social Issues.** The construction labour associated with the project in such a sparsely populated area will mean the likely influx of outside labour to the region as has happened with Chinese contractors in the previous tranches. In order to ensure that the social impacts of this temporary influx are managed, the following specialist support roles are proposed:

- (iv) The PIU will engage Social, HIV/AIDS and Human Trafficking Prevention Monitoring Specialist who will be responsible for (i) assessing HIV and human trafficking risks (ii) refining activities such as local employment, public consultation, road safety awareness, social and cultural awareness of local needs and requirements (iii) coordinating the functions of the *soum* level community outreach and monitoring officer; and (iv) Preparation and implementation of Social Development Action Plan.
- (v) *Soum* Level Community Outreach and Monitoring Officer will be hired in Khovd soum who will serve as a direct point of contact for local people potentially affected by the program and for the grievance redress mechanism and Social Development Action Plan implementation.

155. **Community Health and Safety.** Potential impacts may arise from road safety issues and health and safety of the local people nearby the construction sites. These can be mitigated as follows:

- (i) Erect safety and warning signs at junctions and other visibility limited points along the temporary road
- (ii) Enforce a rule of 5 second stop at all junctions and entry points of the temporary and access roads
- (iii) All borrow pits shall be surrounded with earth barriers to prevent from animal or people falling in the pits
- (iv) Execute rehabilitation of the borrow pits by reshaping the surface with 18 degree slope to ensure animal and people not falling in the pit in future
- (v) Earthworks and construction plan shall be presented to local authorities 3 days in advance of specific activity that disturb local herders and passenger traffic

156. **Worker Health and Safety.** The civil works contractors will implement adequate protection measures to ensure health and safety of their construction workers. Occupational health and safety risks will be managed by applying measures in the following order of preference: avoiding, controlling, minimizing hazards, and providing adequate protective equipment. The contractors will undertake the following activities:

- (i) **On-site Environment Health and Safety Officer.** An on-site Environment Health and Safety Officer (EHSO) will be hired by the civil works contractor to develop, implement and supervise a Health and Safety Management Plan (HSMP), as well as ensure that the requirements of the EMP are implemented.
- (ii) **Implementation of HSMP.** The EHSO will ensure that the HSMP, submitted to PIU prior to construction, is approved and implemented. This includes recording and reporting any occupational health and safety incidents, and reviewing the distribution and use of appropriate PPE.
- (iii) **Construction Safety.** Clear signs will be placed at construction sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials and excavation and raising awareness on safety issues. Heavy machinery will not be used after day light and all such equipment will be

returned to its overnight storage area/position before night. All sites will be made secure, discouraging access by members of the public through fencing or security personnel, whenever appropriate.

### 6.3 OPERATION PHASE

157. Once the construction activities are halted, there will be no negative or residual impacts during the operation period. Construction of the proposed road to Khovd soum center will bring positive impacts such as recovery of land surface, reduced emission of dust and noise and improved road safety.

#### 6.3.1 Physical resources

158. **Air quality.** Construction of the proposed paved road to Khovd soum, the existing multiple tracked earth roads, which is a source of dust emission, will no longer be used. Therefore, the project will help to improve air quality in the project area. Dust emission of construction activities are temporary in nature and will have no any residual impacts on air quality.

159. **Noise.** Once constructed, the access road to the Khovd soum is subject to noise emitting from vehicles using the road. However, there is no any permanent dwellings within 200-meters distance of the road. With diminishing level of spread, noise sensed on the potential receptors in more than 200-meters away from the road is considered to be acceptable (less than 55 decibels referring back to the table 31).

160. **Surface water courses.** No any river crossings for project road. Square shaped concrete culverts installed at 25 points where the road is crossed by ephemeral surface streams. The project road is not anticipated to cause changes to surface water courses. However, there is a potential that the road culverts might be blocked with sedimentation and rocks due to surface water flows over time. The local road maintenance agency – Khovd provincial AZZA will perform frequent cleaning of the blocked culverts.

161. **Waste management.** In Mongolia there is not a strong culture of retaining waste for disposal at the end of a journey, instead it is disposed of during the journey at the roadside. In order to mitigate, as far as possible, the impacts of roadside litter, the following measures are specified in the EMP:

- (i) **Litter Bins.** The rest stops along the road (at STA.8+600L & STA.+700R) will have litter bins which will be emptied by the local road maintenance crews during road operation.
- (ii) **Signage.** Signs will be installed near litter bins to encourage road users to use the bins.

#### 6.3.2 Biological resources

162. **Context.** The potential impact of operation of the road on biological resources is mitigated by the fact that the road will operate within the existing multi-tracked earth road corridor. Therefore, impacts on biological resources because of operation of the road are not expected to be significantly different from the existing situation.

163. **Flora.** There are no anticipated adverse impacts on flora associated with the operation of the road to Khovd soum. The new road will be within a 10 m wide corridor, which is narrower than the existing width of the area covered by the multi-track earth roads. It is anticipated that

the earth roads will no longer be used when the road is complete and vegetation will naturally begin to encroach on the tracks, in locations where vegetation is present. Thus the overall impact of the project on flora adjacent to the road will be beneficial.

164. **Fauna.** As assessed in the section Construction impacts, the wildlife migration movement routes identified by the survey by WCS professionals locate 35-40 km distance from the proposed road corridor and the natural habitats for wildlife located in 25.6 km distance from the road as well. Therefore, there are no anticipated adverse impacts on wildlife and their habitat associated with the operation of the road to Khovd soum.

### **6.3.3 Socio-economy**

165. No significant negative impact is anticipated on cultural resources, accessibility, community health and safety and pasture land if the mitigation measures specified in the EMP during the pre-construction and construction phases are implemented. Road crossings for local herder access are installed at STA.7+500 L&R and at STA.14+900 L&R during construction and road safety signage is in place. The mitigation measure that is required, as specified in the EMP is:

- ❖ **Road Maintenance and Traffic Safety.** During road operation, local road maintenance agency (a government owned entity called Khovd province AZZA is responsible for maintaining the road safety signs and installing new ones as necessary, for example if an unforeseen accident hotspot develops.

### **6.3.4 Unanticipated Impacts during Construction and Operation**

166. If any unanticipated impacts become apparent during project implementation, the borrower will (i) inform and seek ADB's advice; (ii) assess the significance of such unanticipated impacts; (iii) evaluate the options available to address them; and (iv) prepare or update the EIA and EMP.

## **7.0 PUBLIC CONSULTATION**

167. Due to the COVID-19 lockdown imposed by the Government of Mongolia, public consultation meeting, group discussions or household visits are banned throughout Mongolia. Thus, any meaningful public consultations can not be organized until the COVID situation gets better in Mongolia.

168. Governors and Heads of the Citizen Councils of Khovd soum have been contacted and they have expressed their full support toward the project. They insisted that the besides causing temporary impacts that can be mitigated, the project offers following benefits to the local communities and the surrounding environment. These include:

- (i) With construction of the paved road to the soum centers, the earth tracks or the dirt roads that have been used for decades will no longer be used. This would allow recovery of the land surface and plant cover along the existing dirt roads.
- (ii) Dust emission caused by use of the current dirt roads to the soum centers will be reduced significantly thanks to construction of the paved roads.
- (iii) Once the soums are connected to the paved road network of Mongolia, economic benefits such as increased trade turnover, tourism and employments opportunities will be followed.
- (iv) Construction of the access roads will bring convenience to passenger and cargo transportation between the soum centers and the provincial center of Khovd.

169. In line with ADB's Public Communications Policy, MRTD is required to ensure that relevant project information about environment safeguard issues is made available during the initial stages to affected people and other stakeholders, where it is publicly accessible in Mongolian language and any other vernacular local language.

170. Concerns and issues identified during the public consultations will be recorded and reflected in relevant project documents. Incorporation of the environmental concerns of affected persons (APs) through the public consultation in the decision-making process will avoid or minimize conflict situations during the implementation process as well as enable them to provide meaningful inputs into the project design and its implementation.

171. Public consultation will be a continuous process through pre-construction, construction and operational phases. Once the COVID-19 ban on public event is lifted by the government, the PIU together with civil works contractors, COMO officer and relevant local officials will conduct public consultation and information disclosure through public meetings and notice on regular basis.

172. Public consultation meetings will strictly follow to the "Safeguards guidance on Covid" 'Guidance note on Safeguards Compliance during the Covid-19 Pandemic' issued by ADB.

173. Local communities and administrations, including environmental department of Khovd provincial government, Khovd soum administration and residents of Khovd soum will be engaged through the methods to be presented with information specified in the Stakeholder Engagement Plan in Section 10.8.

174. Contact details of the soum official are shown in the table below.



**Table 20. Contact details of local officials**

No.	Name	Position	Phone number
1	B. Dugerjav	Governor of Khovd province	99431201
2	Mr. Oidov	Environmental officer at the Khovd Provincial Government	99065457
3	Ya.Umirkhan	Governor of Khovd soum	99437936
4	Kh.Valentina	Head of Citizen Council of Khovd soum	99431162
5	J.Mukhtar	Vice Governor of Khovd soum	99661649

175. **Information disclosure.** Environmental information on the project was and will be disclosed as follows:

- (i) The domestic and previous EIA reports are available for review in the IA's office;
- (ii) This current EIA will be disclosed on ADB's website ([www.adb.org](http://www.adb.org)) for 120 days prior to management consideration of the periodic financing requests for Tranche 2. Updates to the EIA will also be disclosed.
- (iii) Copies of the project EIA reports will be made available upon request; and
- (iv) During implementation, semi-annual monitoring reports on compliance with the Environmental Management Plan will be disclosed on ADB's website ([www.adb.org](http://www.adb.org)).

## 8.0 GRIEVANCE REDRESS MECHANISM

176. The construction contractors are required to implement the existing grievance redress mechanism (GRM) of the Western Regional Road Corridor Investment Program which is consistent with the requirements of the ADB Safeguard Policy Statement (2009). This will ensure: (i) open channels for effective communication, including the identification of new environmental issues of concern arising from the project; (ii) demonstrate concerns about community members and their environmental well-being; and (iii) prevent and mitigate any adverse environmental impacts on communities caused by project implementation and operations. The GRM is accessible to all members of the community.

### 8.1 The existing grievance redress system

177. The GRM follows the existing approach taken for managing complaints about local issues by members of the public in Mongolia. Residents' complaints or concerns are generally taken to *bagh* or *soum* representatives for resolution, therefore this system is proposed for the GRM. The GRM approach also fits with the *aimag's* existing approach to managing complaints for the public, which is focused on taking complaints to soums.

178. The PIU will establish *soum* based Public Complaints Unit (PCU) in conjunction with local government representatives and the PIU Environment Specialist will take a focal point of GRM.

179. The PIU environmental specialist (ES) will closely communicate with *soum*-based PCUs on the work schedule, so that residents will be informed and can get information about the project or can discuss any concern or issue related to the project. The PCUs through PIU will issue public notices to inform the public within the project area of the Grievance Redress Mechanism. The PCU's phone number, fax, address, email address will be disseminated to the people through displays at the respective offices of the *bagh*, *soum* and *aimag* government administrations and public places.

180. The PIU ES will have facilities to maintain a complaints recording system (such as database or complaints log book) and communicate with Loan Implementation Environment Consultant, contractors, design and construction supervision company(s), Governors of *aimags*, *soums*, and *baghs*.

### 8.2 GRM steps and timeframe

181. Procedures and timeframes for the grievance redress process are as follows:

**Stage 1: Access to GRM.** If a concern arises, the aggrieved person may resolve the issue of concern directly with the contractor (during construction) The contractor shall resolve the issue by taking corrective actions within seven working days upon identification of the eligibility of the complaint. The contractor shall report to the *bagh* or *soum* level PCU and PIU. For an oral complaint the PCU must make a written record. For each complaint, the PCU will report to the PIU ES, who will assess its eligibility. If the complaint is not eligible, e.g. related to an issue outside the scope of the project, PCU will provide a clear reply within five working days to the aggrieved person. If the complaint is eligible but resolved by the contractor, the PIU and PCU will investigate and resolve the issue within 14 working days.

**Stage 2: Stakeholder Meeting:** If no solution can be identified by the PIU and PCU or if the aggrieved person is not satisfied with the suggested solution under Stage 3, within 14 days, the PCU together with the PIU will organize a multi-stakeholder

meeting under the auspices of the head or the representative from the *soum Governor office*, where all relevant stakeholders will be invited. The meeting should result in a solution acceptable to all, and identify responsibilities and an action plan. The agreed redress solution needs to be implemented within seven working days.

**Stage 3: Special consultation meeting with the EA, ADB, and relevant authorities, including Aimag Specialized Inspection Agency (ASIA)**<sup>10</sup>. If the Multi-stakeholder meeting cannot resolve the problem, and the aggrieved person is unsatisfied, the PIU will inform the EA and ADB and reorganize a special consultation meeting within 21 days with the aggrieved person, the EA, ADB, and other relevant authorities including ASIA to find appropriate solutions. The agreed solution shall be implemented within 14 days reporting. The PCU must report all kinds of complaints to PIU, who is responsible to record the complaint, investigation, and subsequent actions and results and provide this information to the PIU-Environmental Specialist who will include it in progress reports. In the construction period and the initial operational period covered by loan covenants the EA will periodically report complaints and their resolution to ADB in the semi-annual environmental monitoring reports.

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<sup>10</sup> A specific division within the organization is responsible for Infrastructure, Environment and Mining inspection.

## 9.0 CONCLUSION AND RECOMMENDATIONS.

### 9.1 PROJECT CONTEXT

182. The expected outcome and impact from the project is:

- **Impact:** inclusive economic growth promoted by enhanced local connectivity and competitiveness in the remote western region.
- **Outcome:** improved transport accessibility within the project area leading to increased access to markets, health and education facilities.

183. The project is in a remote area of western Mongolia. Khovd soum will be connected to the national paved road network and the Asian Highway route 4 with construction of the proposed road which will help to increase connectivity and improve access to markets, health and education services for the soum residents.

### 9.2 MAJOR ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

184. **Alternative Analysis.** Alternatives are examined which relate to the project's location, design and components and their potential environmental and social impacts and consider the no project alternative. The "No Action Alternative" is also considered, addressing the likely consequences of not undertaking the proposed intervention. The Alternative Analysis considered that failure to construct the access road to Khovd soum would mean the poor infrastructure and access to services remain the same for the Khovd soum residents and the soum center remain unconnected to the regional road network.

185. Without a paved road, the existing earth road corridor will remain a highly disturbed area affected by vehicle movement and transport. In terms of social and economic development, the Khovd soum remain an underdeveloped, remote area which has a poorly developed infrastructure. Therefore, it was concluded that the "No Action Alternative" is not a reasonable option if the overall poverty, socio-economic and environmental situations in the Khovd soum is not improved.

186. **Impacts during Construction.** Most of the project impacts are expected to be limited to the construction phase, and will therefore be temporary in nature.

187. Dust generated and mobilized by construction activities is likely to impact on residents close to the project construction sites. This may be exacerbated by the dry desert- steppe conditions and the scale of earthworks proposed. However dust suppression measures are clearly specified and will seek to manage dust to acceptable levels.

188. Noise generated by construction activities are not likely to cause disturbance on the local community to unacceptable degree given the distance of the potential receptors (no permanent dwelling within 200m distance). Construction workers will use PPE such as earmuffs when working in noisy environment.

189. Accidental oil spill and un-authorized access by the construction vehicles to nearby Dund Us river might cause pollution to the surface water which is the main drinking water source for both humans and livestock in the project area. Therefore, drivers and operators of vehicles will be properly trained on cautionary measures and prohibited access to the rivers. Water quality of the rivers will be measured regularly throughout the construction phase and

emphasis will be placed on local consultations with residents to ensure their water quality is not impacted.

190. It is unlikely that construction of the new road within the existing road corridor will exert any significant additional impact on the existing flora and fauna in the project area over and above the current situation given the distance between the project road and the major natural habitats and wildlife movement routes, including Huh Serh Mountain Range (25.6 km).

191. The issue of accessibility is important as the road may bisect grazing areas and may make crossing the road difficult and hazardous for livestock and people. Therefore suitable crossing points will be created at 2 locations along the road corridor with consultation to the local administration.

192. The Project area is not located nearby any protected areas as well no endangered or protected species of flora or fauna are reported at the project site.

193. 14 cultural heritage sites, including 13 ancient tombs and 1 petroglyph were identified by baseline survey conducted by Institute of Archaeology in October 2021. As specified in the EMP, the ancient tombs at 13 locations shall have rescue excavation by professional entity and the petroglyph shall be protected with visibility fencing and warning signs before commencement of construction.

194. All environmental and social impacts are manageable and can be managed cost effectively. Careful mitigation and monitoring, specific selection criteria and review/assessment procedures have been specified to ensure that minimal impacts take place. Regular monitoring of the recommended mitigation measures shall also be carried out during the construction phase. EMP includes appropriate measures for mitigating all environmental impacts associated with operations of the facilities. Worker campsites will generate waste during its operation that can be managed properly following to EMP.

195. **Impact during Operation.** This study indicates that the main potential impact during operation will be the increased traffic volume and higher speed that could result in increased risk to local herders and their livestock crossing the road. The risk will be reduced to acceptable levels through installation of road crossing points with signage and speed bumps.

196. The project will also have an impact on greenhouse gas emissions. The WRRICIP will help to increase the economic development of the western region and result in increased traffic. This will lead to higher levels of greenhouse gas emissions. This is deemed to be an acceptable impact for the project as the economic and social benefits are considerable.

### 9.3 OVERALL CONCLUSION

197. The findings of this Environmental Due Diligence show that construction of the access road to Khovd soum will not have any significant, long term or irreversible impacts on the physical, biological or socio-economic environment. The project will have short term impacts during construction which can be mitigated to an acceptable level through mitigation measures which seek to reduce the potential for harm to the environment and human health. These measures relate primarily to implementing good construction practice as well as meeting the particular needs of the project area. Good practice and responsible design will also contribute significantly to reducing the operational impacts of the project.

198. Rescue excavation will be conducted by Archaeological Institute of Mongolia to save and relocate the cultural heritages in the form of ancient tombs identified at 13 sites along the proposed road according to the Action Plan on Rescue Excavation attached in Appendix 2

before commencement of construction in 2022. Once the rescue excavation works are completed, this Due Diligence Report and the Project EIA will be updated to reflect the findings.

199. The project will implement a robust Grievance Redress Mechanism and will engage independent community based outreach officers in order to ensure that any negative or positive impacts from the project are captured and dealt with appropriately. The community outreach officer will become known to the residents in the project area and will bridge the gap between the project team and local communities.

200. The consultation with local authorities and officers during the development of the DDR demonstrated that the project has local support as it will result in significant benefits in terms of accessibility to services, improved connectivity between communities particularly in winter and importantly the economic development prospects of the area will be greatly increased. Main findings of this DDR will be presented to the local communities through public consultation events before commencement of construction in 2022 once the curfew on public meeting is lifted by the government. An on-going consultation is proposed during implementation.

201. EMP and Environment Monitoring Plan has been prepared within this report provides impact mitigation plans, environmental monitoring plans, and specifies the institutional responsibilities and capacity needs for the environmental management of the Project. Based on the environmental assessment and surveys conducted for the project, the potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of the mitigation measures identified in the EMP.

202. The project is not considered highly sensitive or complex.



## **10.0 ENVIRONMENTAL MANAGEMENT PLAN**

203. This EMP was prepared by the Project Implementation Unit following to the requirements set out by ADB's Safeguard Policy Statement (SPS 2009). The civil works contractors are responsible for implementation of this EMP during the construction period.

204. This EMP is prepared in compliance with the Mongolian Law on Environmental Impact Assessment and the Methodology on Developing Environmental Management Plan which was adopted by the MET in January, 2014.

205. Within this EMP, the impact mitigation measures were described by providing coverage, corresponding national environmental standards, responsible parties, timeframe and necessary budgets. As specified in the Law on Environmental Protection, the project proponent and its contractors are obliged to implement all mitigation actions described in this EMP properly.

### **10.1 KEY OBJECTIVES**

206. The key objectives of this EMP are to ensure protection of surrounding environment from potential impacts from the project activities, proper use of natural resources, ensure affected sites are rehabilitated properly, the relevant legal requirements are fulfilled, impacts identified within the DEIA were avoided and minimized accordingly, control over impacts with frequent monitoring actions and periodic evaluation of implementation status of the EMP.

### **10.2 LEGAL REQUIREMENTS**

207. This EMP has incorporated requirements in the relevant laws such as Law on Environmental Protection, Law on Water, Law on Soil Protection and Prevention from Desertification, Law Flora Protection, Law on Fauna, Law on Air Quality, Law on Protection of Cultural Heritage, Law on Waste and Law on Natural Resource Use as well as corresponding regulations set out by the MET.

208. Within this EMP, protection of following environmental and social aspects were taken into consideration:

- Avoid, minimize and ensure control over the negative impacts of the project activities on land, soil cover, water resources, plant, fauna, roadside communities and cultural heritages.
- Pay special attention to protection of the environmentally sensitive areas by carrying out the site-specific mitigation measures
- Execution of technical and biological rehabilitation at the affected sites during the project closure
- Prevention of potential risks regarding human health and safety
- Implementing an effective waste management system at the project sites
- Establishing a robust environmental management system during construction period.

### **10.3 IMPLEMENTATION PERIOD**

209. This EMP covers pre-construction period (2021-2022), road construction period (2022) and operation period (starting from 2023).

#### 10.4 EMP IMPLEMENTATION COST SUMMARY

210. Implementation costs of management plans are summarized in below table.

**Table 21. EMP Implementation costs**

<b>№</b>	<b>Management plans</b>	<b>Total Budget, MNT</b>
1	Mitigation Measures Plan	11,650,000
2	Cultural Heritage Protection Plan	109,379,000
3	Environmental Monitoring Program	10,480,000
<b>Total EMP budget, MNT</b>		<b>131,509,000</b>
<b>Total EMP budget, USD</b>		<b>46,143</b>

## 10.5 MITIGATION MEASURES PLAN

Table 22. Mitigation measures plan

Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
<b>General management actions</b>						
Ensuring implementation of EMP	Organize trainings for construction workforce on EMP implementation and requirements of relevant environmental laws and regulations	All construction workforce	At the start of construction period	250,000	ES, GE, US	MNS 4969:2000 MNS 4585:2007 MNS 5850:2008 MNS4969-2000
	Contractors is required to employ a full time on-site environmental staff during the construction period.	Civil works contractors	During construction	Included in construction costs	TL	Law on Environmental Protection, Clause 20.3, 31.7
	Ensure the contractor's internal regulations, work procedures and job descriptions of the team leader & unit supervisors include duties regarding implementation of the EMP.	Team leader, unit supervisors	At the start of construction period	Included in construction costs	GE, ES	Law on Environmental Protection, Clause 31,2
	Ensure environmental monitoring shall be conducted on monthly basis	Pre-determined monitoring spots	Monthly	Included in Monitoring program	TL, ES, EHSO	Law on Environmental Protection, Clause 20.1, 31.3, relevant standards
<b>1. Pre-construction/design phase</b>						

<b>Key issues</b>	<b>Mitigation measures</b>	<b>Applies to</b>	<b>Time frame and frequency</b>	<b>Cost estimation, MNT</b>	<b>Responsible party</b>	<b>Relevant standards, laws and regulations</b>
Accessibility for local residents and livestock	1.1. Based on consultations with local authorities and residents, the design consultant has determined key livestock movement routes and planned livestock crossings	Locations at: STA.7+500 & STA.14+900	Pre-construction	Included in design costs	Design company	MNS6515:2015 Wildlife crossing standard of Mongolia for auto and rail roads
Potential disruption to surface water flows	1.2. Conduct hydrological surveys along the project roads to determine intersection points with ephemeral streams and planning of culvert locations 1.3. Planning of side ditches based on the hydrological survey results	27 points along the access road to Khovd soum	Design phase	Included in design costs	Design company	Road design norms
Extreme weather events, including flooding, need to be factored in the road design	1.4. Maximum flood flows to be calculated 1.5. Dimensions of the culverts to be determined based on calculations of maximum flood flows	Road design development	Design phase	Included in design costs	Design company	National standard "Norms and guidelines for hydrological calculations"
Disruption to existing utility lines	1.6. Determine overlapping points with existing utility lines in the soum centers. Relocation of existing utility lines by professional entities and related costs are included in the operation budget.	STA.18+661 STA.1+228 STA.18+429 STA.18+487 STA.18+643 & STA.18+695	Pre-construction	Included in design & construction costs	Contractor	Road design norms
Potential damage to cultural heritage sites	1.7. Execute rescue excavations at 13 locations where ancient tombs were found. 1.8. Protect the petroglyphs in 1.5km distance from road alignment with visibility fencing and warning signs.	Sites specified in Table., Section ...	Before commencement of construction and valid through construction period	Included in the Cultural Heritage Protection Plan	MRTD, PIU & contractors	Mongolian Law on Protection of Cultural Heritages

## WRRICIP: Construction of access road to Khovd soum

Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
Necessary environmental permits	1.9. The contractor applies to relevant authorities (as specified in Table) to obtain necessary environmental permits.	land use, use of borrow pits/quarry, waste disposal and water use	Pre-construction	Included in construction costs	Contractor	Law on Environmental Protection Law on Water Law on Common Minerals
<b>2. Construction phase</b>						
<b>2.1. Impact mitigation measures for soil cover</b>						
Land damage and landscape change	2.1.1 Ensure earthworks at borrow pits and quarry sites do not exceed permitted spaces or boundaries. Stripped topsoil at borrow pits, temporary roads and other sites shall be stored as stockpiles which will be used for later rehabilitation.	At all earthwork sites	During the construction	Included in construction costs	GE, ES, EHSO	Law on Land 34.6.10, 35.3.1, 35.3.2 MNS 5546 -2005. MNS 5916 : 2008
	2.1.2. Ensure borrow pits, quarry sites, campsites, crusher sites and waste disposal points shall be located at least 1km away from water protection zones, forest areas and special protected areas.	At all earthwork sites	During the construction	Included in construction costs	GE, ES, EHSO	MNS 5917 - 2008 MNS 4586-1998
	2.1.3. Place strict control to ensure the construction vehicles follow the pre-determined routes and avoid creation of multiple earth tracks	Haulage road, access roads, all other transportation routes	During the construction	Included in construction costs	GE, ES, EHSO	Law on Land 34.6.10, 35.3.1, 35.3.2

Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
	2.1.4. Technical and biological rehabilitation shall be conducted at borrow sites, crusher site, quarry site, waste disposal points at the end of the construction.	Borrow pits, quarry and crusher site, campsite	At the end of construction period	Included in construction costs	GE, ES, US, EHSO	MNS 17.5.1.19-1992. MNS 5914-2008.
Soil erosion and soil degradation	2.1.5. Temporary road routes shall be pre-determined in order to avoid creating multiple earth tracks.	Temporary road routes	At the start of construction period	Included in construction costs	GE, ES, US, EHSO	MNS 5546 -2005.
	2.1.6. Pay special attention to protection of meadowland dark brown soil of Shurag river	Shurag river	During construction	Included in construction costs	GE, ES, US, EHSO	MNS 17.5.1.19-1992. MNS 5914-2008.
Potential pollution of soil cover due to oil spills and waste	2.1.7. Conduct regular technical inspection for construction vehicles to prevent from oil spills	All construction vehicles	Daily	Included in construction costs	TE, US	MNS 5850-2008.
	2.1.8. Fuel recharge shall only be made at designated points that are at least 3km away from the rivers and other sensitive receptors.	Fuel recharge station and trucks	During the construction	Included in construction costs	TL, GE, US	
	2.1.9. Contractor shall have spill management procedures and necessary tools for absorbing and neutralizing the contaminated soil shall be available	All construction units	During the construction	2,000,000	TL, EHSO	Law on Environmental Protection, Clause 21.3 MNS 5850-2008.
	2.1.10. In case of oil spill, the contaminated soil shall be stripped off and neutralized before disposing to the approved landfill site.	All construction units	Every occasion	Included in construction costs	GE, EHSO	



## WRRICIP: Construction of access road to Khovd soum

Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
	2.1.11 Regular disinfection at the temporary solid waste collection points of the campsite	All construction units	Monthly	1,000,000	TL, GE, ES, EHSO	Law on Environmental Protection, Clause 21.3 Law on Waste Disposal 9.0 MNS 4585-2016 MNS 5850-2008.
<b>2.2. Impact mitigation measures for air quality</b>						
Dust emission	2.2.1. Watering along the temporary road and active earthwork sites	temporary road and active earthwork sites	4-5 times a day, during dry days	Included in construction costs	GE, EHSO	MNS 4585-2016. MNS 5885-2008. MNS ISO 4226-2000 MNS 4227-2002.
	2.2.2. Limit vehicle speed to 20km/h nearby settlement area and erect signs	Temporary and access roads	During the construction	Included in construction costs	GE, US	
	2.2.3. Stockpiles must be managed to reduce dust emissions. The location of the stockpile must be downwind of sensitive receptors.	Soil stockpile areas	During the construction	Included in construction costs	GE, US, EHSO	
	2.2.4. Transport of materials. Trucks carrying earth, sand or stone will be covered with tarpaulins or other suitable cover. Construction vehicles and machinery will be maintained to a high standard to minimize emissions	All transportation trucks and vehicles	During the construction	Included in construction costs	GE, EHSO	

Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
	2.2.5. Asphalt and cement mixing plants, crusher sites shall be located at least 1km downwind from settlement areas	Asphalt and cement mixing plants, crusher sites	At the start of construction period	Included in construction costs	TL, GE, EHSO	
	2.2.6. Regular cleaning at the crushers site to ensure the fine dust particles do not spread with wind to pollute surrounding environment	crushers site	Weekly	Included in construction costs	GE, US, EHSO	
Noise emission from vehicles and machineries	2.2.7. Source control: Maintain all exhaust systems in good working order; undertake regular equipment maintenance	All construction vehicles	Regularly	Included in construction costs	TE, US	MNS 4598-2011. MNS 5013-2009 MNS 5014-2009
	2.2.8. Locate sites for concrete-mixing and similar activities at least 1 km away from sensitive areas;	All construction units	During the construction period	Included in construction costs	TE, US	MNS 4585:2016
	2.2.9. Notify local community of noisy works in advance	All construction units	Every occasion	Included in construction costs	GE, TE, EHSO	
	2.2.10. Ensure noisy works are conducted only during daytime	All construction units	During the construction period	Included in construction costs	GE, TE, US	
	2.2.11. Ensure the construction workers, who are the main receptors of noise impact, use appropriate PPE such as ear muffs and ear plugs all the time at construction sites.	All construction units	During the construction period	Included in construction costs	GE, TE, US	MNS 4585:2016
<b>2.3. Impact mitigation measures for water resources</b>						

Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
Potential pollution to surface water (Khovd river)	2.3.1 Establish water protection zones for Dund Us river and 2 small ponds by placing warning signs and access barriers (if necessary). Compliance to Law on Water.	Shurag and Hongio river basin	During the construction	1,500,000	GE, US, EHSO	Law on Water 22.3 MNS 0900:2018
	2.3.2 To limit the spill of materials into water bodies during construction by conducting technical inspection and timely maintenance			Included in construction costs		
	2.3.3 No materials will be stored within 300 m of surface water bodies, including soil, spoil, aggregates, chemicals or other materials used during construction. Enclosed drainage around chemical storage areas on construction sites and storage will be on hard standing.			Included in construction costs		
	2.3.4 Temporary drainage provision will be provided during construction to ensure that any storm water running off construction areas will be controlled			Included in construction costs	GE, TE, EHSO	Law on Environmental Protection
	2.3.5 Effective septic treatment and disposal systems will be installed at construction camps or arrangements for adequate off-site disposal made			Included in construction costs	TE, US	MNS 4943: 2011 National standard on treated waste water

## WRRICIP: Construction of access road to Khovd soum

Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
	2.3.6 Obtain water use permission from the "Khar Lake and Khovd river Basin Administration Office" at the start of construction		At the start of construction period	500,000	ES	Law on Water Law on Water Basin
<b>2.4. Impact mitigation measures for plant cover</b>						
Potential disturbance caused by earthworks, movement of vehicles during construction	2.4.1. Execute biological rehabilitation once the construction is completed	Affected sites including borrow pits, quarry sites, workers' campsites & crusher sites, mixing plants	During the construction	Included in construction costs	GE, US, ES	MNS 5914:2008 MNS 5915:2008 National standard for Rehabilitation
	2.4.2 Frequent sprinkling of water along the temporary roads in order to minimize dust damage on plant cover	All construction units	4-5 times a day, during dry days	Included in construction costs	GE, ES	MNS 4585:2016 National standard on air quality
	2.4.3. Prohibit collecting plants and cutting trees and organize awareness raising training among construction workforce	All construction workforce	During the construction period	Included in construction costs	GE, ES	Law on Natural Plants, clause 3.2.2
<b>2.5. Impact mitigation measures for wildlife</b>						
Illegal hunting & fishing; Animal poisoning from waste food and animal falling in the borrow pit	2.5.1. Campsite internal rules shall prohibit illegal hunting	All construction workforce	During the construction period	Included in construction costs	TL, ES	Law on Fauna
	2.5.2. Borrow pits shall be surrounded earth barriers in order to prevent from animal or livestock falling	All borrow areas	During the construction period	Included in construction costs	GE, US	

## WRRICIP: Construction of access road to Khovd soum

Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
	2.5.3. EMP trainings will include topics regarding law clauses on illegal hunting and protection of wildlife	All construction workforce	At the start of construction period	Included in construction costs	ES	
	2.5.4. Temporary waste collection points at workers' camp shall be surrounded with protection fences to prevent from animals and birds poisoning from waste food items	Temporary waste collection points	At the start of construction period	See 7.2 below	ES	
2.6.Waste management measures						
Domestic waste from campsites	2.6.1. Place waste bins at campsite and active construction spots	Workers' campsites and active construction sites	At the start of construction period	500,000	Contractor	Law on Environmental Protection, Clause 21.3
	2.6.2. Establish temporary solid waste collection point at the workers' campsite. Collected solid waste shall be disposed to the approved landfill sites appointed by local soum government.	Workers' campsite	At the start of construction period	2,000,000	Contractor	Law on Waste disposal 9.0, Law on Occupational Hygiene 7.4, 7.5
	2.6.3. Make waste disposal agreement with Khvod soum administration and pay monthly waste fees	Civil works contractors	At the start of construction period	400,000MNT x 7 months = 2,800,000MNT	Contractor	Law on Waste disposal 11.2, 12.4 MNS 5344 -2011 MNS 5344: 2003
Liquid waste and waste water from campsites	2.6.4. Use neutralizers (such as domestically produced neutralizer Tamir Em) in the waste water septic tank.		During the construction period	100,000 x 7 months = 700,000	Contractor	MNS 4943: 2011 National standard on treated waste water

Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
	2.6.5. Place waste water septic tank made of steel at the workers' campsite. Once the holding tank is full, dispose the waste water to the central WWTP of Khovd city.	Waste water collection facility	At the start of construction period	Included in construction costs	Contractor	MNS EH 12566-1-2011 MNS 5344: 2003
Inert materials from earthworks	2.6.6. Stored as stockpiles temporarily and will be used for technical rehabilitation of borrow pits	All construction units	During construction period	Included in construction costs	Contractor	Law on Waste disposal 9.0, 11.2, 12.4 MNS 5344 -2011 MNS 5341 - 2011
Waste construction items	2.6.7. Stored at the temporary waste collection point before disposing to approved landfill site	All construction units	During construction period			Law on Waste disposal
Waste spare parts	2.6.8. Ship to local special agents	All construction units	Every occasion			
Waste water from vehicle washing unit	2.6.9. Collected in the waste water septic tank of the workers' campsite	Waste water collection facility	Every occasion		Contractor	MNS 4943: 2011 National standard on treated waste water
Waste water from cement plant	2.6.10. Collected in the waste water septic tank of the workers' campsite		Every occasion		Contractor	
Waste oil products from maintenance unit	2.6.11. Shall be collected in a designated container before being shipped to local special agents	Waste oil products	Every occasion	400,000	Contractor	Law on Waste disposal
<b>2.7. Impact mitigation measures for community health and safety</b>						



Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
Community health and safety	2.7.1. Erect warning signs at junctions and/or other visibility limited points along the temporary road	Temporary roads	During the construction period	Included in construction costs	Contractor	Traffic Rules of Mongolia
	2.7.2. Enforce a rule of 5 second stop at all junctions and entry points of the temporary and access roads					
	2.7.3. All borrow pits shall be surrounded with earth barriers to prevent from animal or people falling in the pits	Borrow pits	At the end of construction	Included in construction costs		MNS 5914-2008 MNS 5915:2008 National standard for Rehabilitation
	2.7.4. Execute borrow pits by evening the surface with 18 degree slope to ensure animal and people not falling in the pit in future			Included in construction costs		
	2.7.5. Earthwork and construction plan shall be presented to local authorities in advance of 3 days to the planned activity	Earthwork sites	Regularly	Included in construction costs	Contractor	MNS4585:2016
Workers' H&S	2.7.6 On-site Environment Health and Safety Officer (EHSO) will be nominated to develop, implement and supervise a Health and Safety Management Plan (HSMP)	EHSO	At the start of construction	Included in construction costs	Contractor	Law on Environmental Protection
	2.7.7. The EHSO will ensure that the HSMP, submitted to DOR prior to construction, is approved and implemented	EHSO		Included in construction costs	Contractors	

**WRRICIP: Construction of access road to Khovd soum**

Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
	2.7.8. Clear signs will be placed at construction sites in view of the public, warning people of potential dangers	Construction sites	During the construction	Included in construction costs		
	2.7.9. HIV/AIDS Prevention. Awareness Raising training shall be organized by the PIU Social Monitoring Specialist.	All construction staffs	At the start of construction	Included in PIU budget	PIU Social Monitoring Specialist.	Law on Hygiene
Protection of pasture land	2.7.10. Spoil is to be disposed of only in areas delineated in the Aggregate, Borrow Pit and Spoil Management plan which should avoid productive pasture land. 2.7.11. Borrow pits are to be located only in areas delineated in the Aggregate, Borrow Pit and Spoil Management plan which should avoid productive pasture land. 2.7.12. Consultation with herders will be undertaken in advance of starting a new area of construction to identify any locally valuable grazing areas which may be affected by construction activities.	Grazing areas in the vicinity of road	During the construction	Included in construction costs	Contractor	Law on Environmental Protection Law on Land
HIV/AIDS and Social Issues related to temporary influx	2.7.13. The PIU will engage Social, HIV/AIDS and Human Trafficking Prevention Monitoring Specialist who will be responsible for Preparation and implementation of Social Development Action Plan. 2.7.14. Soum Level Community Outreach and Monitoring Officer will be hired in Khovd soum who	COMO & local	During the construction	Included in PIU budget	PIU Social Monitoring Specialist.	Law on Hygiene

Key issues	Mitigation measures	Applies to	Time frame and frequency	Cost estimation, MNT	Responsible party	Relevant standards, laws and regulations
of outside labor	will serve as a direct point of contact for local people	community				
3. Operation Phase						
Road culverts might be blocked with sedimentation and rocks	3.1. Frequent cleaning is needed to ensure the blocked culverts will not change the natural flow regime.	All culvert points	Once a year, during the operation period	Included in AZZA budget	AZZA (Local Road Maintenance Entity)	Road maintenance norms
Road Safety Signage Maintenance and Upgrade	3.2. Local Road Maintenance Entity (AZZA) is responsible for maintaining the road safety signs and installing new ones as necessary, for example if an unforeseen accident hotspot develops.	The structures	Once a year, during the operation	Included in AZZA budget	AZZA (Local Road Maintenance Entity)	Road maintenance norms
Waste management	3.3. <b>Litter Bins.</b> The rest stops along the road will have litter bins which will be emptied by the local road maintenance crews during road operation. 3.4. <b>Signage.</b> Signs will be installed near litter bins to encourage road users to use the bins.	STA.11+320 L and STA.11+490 R	Permanently, during the operation	Included in AZZA budget	AZZA (Local Road Maintenance Entity)	Law on Waste
Total budget				11,650,000 MNT		
Abbreviations:						
GE – General Engineer; TL – Construction Team Leader; US – Unit Supervisor; ES – On-site environmental staff; TE – Technical engineer; PIU ES – PIU Environmental specialist. EHSO – On-site Environmental, Health and Safety Officer; COMO – Community outreach monitoring officer.						

## 10.6 CULTURAL HERITAGE PROTECTION PLAN

**Table 23. Cultural heritage protection plan**

Key concerns	Proposed measures	Time frame	Budget, million MNT	Responsible party	Supervised by	Relevant laws	
Potential damage to the cultural heritage items such as ancient tombs and ovoos	Implementation of the Action Plan on Rescue Excavation (Appendix 2) for the 13 tombs and ovoos that locate within 100 distance of the road alignment	Before commencement of construction	108,379,000	Institute of Archaeology	PIU & MRTD	Law on Cultural Heritage Protection	
	The petroglyphs located at N 48.07.20.14, E 91.35.13.74 shall be protected with visibility fencing and warning signs		1,000,000	Contractor	PIU		
Chance finds	Organize awareness raising training among construction workforce on actions to be taken in case of chance finds	Every occasion	Included in construction budget	Contractor	Supervision Consultant		
	In case of chance finds, the construction works at the spot shall be stopped temporarily. The contractor shall notify local administration and Institute of Archaeology of the findings						
	If necessary, hire a professional team to conduct rescue works						

## 10.7 ENVIRONMENTAL MONITORING PROGRAM

### 10.7.1 Key objectives

211. Key objectives of this program are to indicate the necessary sampling and measurement actions to be carried out in order to determine changes caused by anticipated negative impacts of the Project, ensure the negative impacts are avoided or minimized successfully with implementation of the mitigation measures proposed in the EMP and provide necessary budget, timeframe, monitoring parameters, monitoring spots and corresponding standards for monitoring activities.

### 10.7.2 Monitoring spots

212. Four environmental monitoring spots were identified for each construction package considering baseline environmental condition, locations of potential impacts sources, impact extent, duration and degrees.

213. Based on the relatively short construction season in Mongolia (between April and October), monitoring shall be undertaken on monthly basis.

214. Location of environmental monitoring spots are provided in Table 21 below.

**Table 24. Location of environmental monitoring spots**

Monitoring parameters	Access road to Khovd soum
Air quality, noise and soil quality monitoring spots	91°36'32.94"E 48° 8'28.30"N
	91°29'5.46"E 48° 8'7.32"N
	91°23'8.87"E 48° 7'25.32"N
Water quality monitoring spots	91°23'29.95"E 48° 7'25.19"N

Table 25. Environmental Monitoring Plan

Monitoring parameters	Measuring unit	Location	Frequency	Quantity	Estimated budget, MNT	Relevant standards	Maximum allowed level
1. Air quality monitoring							
Dust-TSP, PM10, NO <sub>2</sub> , SO <sub>2</sub>	(mg/m <sup>3</sup> )	At 3 monitoring spots for each construction package	Monthly	6 times	6 spots x 6 times x 120,000₮=4,320,000MNT	MNS4585-2016	Dust<150 mg/m <sup>3</sup>
Noise	Decibel		Monthly	6 times		MNS4585-2016	<55 decibel
2. Soil contamination monitoring							
Soil contamination analysis (Cr-, Cd, Pb, Ni, Zn)	mg/kg	At 3 monitoring spots for each construction package	Monthly	6 times	5 spots x 6 times x 70,000₮=2,100,000MNT	MNS 5850:2008	Cr<50 mg/kg Cd<3 mg/kg Pb<100 mg/kg Ni<150mg/kg Zn<300 mg/kg
3. Water quality monitoring							
Water chemical analysis, Water contamination analysis (Cr-, Cd, Pb, Ni, Zn)	mg/l	Shurag, Dund Us and Hongio rivers	Once during the pre-construction. Monthly during the construction period.	7 times	4 spots x 7 times x 120,000₮=3,360,000MNT	MNS 0900: 2018	pH 6.5-8.5 Mg<30 Hardness<7.0



**WRRICIP: Construction of access road to Khovd soum**

Monitoring parameters	Measuring unit	Location	Frequency	Quantity	Estimated budget, MNT	Relevant standards	Maximum allowed level
<b>4. Occupational hygiene monitoring</b>							
Occupational hygiene		Workers' campsites, waste collection points & workplaces	Monthly	6 times	No additional costs	MNS4991-2000 MNS4968-2000 MNS5150-2002 MNS5390-2004	
<b>5. Monitoring of Cultural heritage protection</b>							
Good condition of the existing cultural heritage site	# of sites	A petroglyph located in 1.5 km distance from the alignment	Monthly during the construction period	7 times	1 spots x 7 times x 100,000₮=700,000MNT	Law on Protection of Cultural Heritage	
Implementation status of the Action Plan on Rescue Excavation	progress, %	13 sites as mentioned in Table 13	Monthly during the pre-construction period	4 times	No additional costs. A progress update report on implementation of the Action Plan on Rescue Excavation will be prepared by the Institute of Archaeology as a contract duty.		
<b>Total budget</b>					<b>10,480,000₮</b>		

## 10.8 STAKEHOLDER ENGAGEMENT PLAN

Key stakeholders	Methods of engagement	Information to be provided	Timeframe/frequency	Information to be collected	Responsible party
Environmental Department of Khovd Provincial Administration	Submit EMP Implementation Report	Actions and measures taken to protect environment and results of monitoring activities	Once a year in December	Approval on on EMP implementation report	Contractor
Governors and environmental officers of Khovd soum	Organize joint inspection visits at construction sites, organize meetings to discuss EMP implementation progress	Environmental protection measures and their implementation status, key environmental issues, status of rehabilitation of borrow pits	On quarterly basis	Feedback on implementation of EMP Key environmental issues and concerns, opinions and aggrievances of local communities	Contractor, Supervision consultant, PIU
Residents of Khovd soum	Household visits, interviews, questionnaire based survey, target group meetings, information disclosure through social media including local residents' groups on Facebook.	Present results of environmental protection works.	On quarterly basis	Collect opinions on negative impacts, environmental and social concerns, issues and complaints	Contractor, Supervision consultant, PIU

## APPENDIX 1. NATIONAL ENVIRONMENTAL STANDARDS

### National Air Quality Standard MNS 4585:2016 & WHO Air Quality Guidelines

Parameter	MNS 4585:2016 (mg/m3)		EHS Guidelines. World Health Organization (WHO). Air Quality Guidelines Global Update 2005)-µg/m3)	
SO <sub>2</sub>	24-hour	50	24-hour	125 (Interim target-1)
				50 (Interim target-2)
				20 (guideline)
	20 minute	450	10 minute	500 (guideline)
	1-year	20		
NO <sub>2</sub>	1-year	40	1-year	40 (guideline)
	24-hour	50	24-hour	-
	20-min	200	1-hour	200 (guideline)
PM <sub>10</sub>	1-year	50	1-year	70 (Interim target-1)
				50 (Interim target-2)
				30 (Interim target-3)
	24-hour	100	24-hour	150 (Interim target-1)
				100 (Interim target-2)
				75 (Interim target-3)
				50 (guideline)
PM <sub>2.5</sub>	1-year	25	1-year	35 (Interim target-1)
				25 (Interim target-2)
				15 (Interim target-3)
				10 (guideline)
	24-hour	50	24-hour	75 (Interim target-1)
				50 (Interim target-2)
				37.5 (Interim target-3)
				25 (guideline)
CO	Average in 1 hour	30g/m3		No standard

**National Noise Standards MNS 4585:2016 & WHO Noise Guidelines**

Receptor	MNS 4585:2007		EHS Guidelines (Guidelines for Community Noise. World Health Organization (WHO), 1999)	
Residential, Institutional, Educational	07 00 - 23 00	60 dB(A)	07 00 - 22 00	55 dB(A)
	23 00 - 07 00	45 dB(A)	22 00 - 07 00	45 dB(A)

**National surface water quality standard MNS 4586:1998**

Parameter	Measuring unit	MNS 4586:1998
pH		6.5-8.5
DO	mg/l	not less than 6&4
BOD	mg/l	3
NH <sub>4</sub> *N	mgN/l	0.5
NO <sub>2</sub> *N	mgN/l	0.002
NO <sub>3</sub> *N	mgN/l	9
PO <sub>4</sub> -P	mgP/l	0.1
A	mg/l	300
F	mg/l	1.5
SO <sub>4</sub>	mg/l	100
Mn	mg/l	0.1
Ni	mg/l	0.01
Cu	mg/l	0.01
Mo	mg/l	0.25
Cd	mg/l	0.005
Co	mg/l	0.01
Pb	mg/l	0.01
As	mg/l	0.01
Cr	mg/l	0.05
Cr <sub>6+</sub>	mg/l	0.01
Zn	mg/l	0.01
Hg	mg/l	0.1
Oil	mg/l	0.05
Phenol	mg/l	0.001
Active and washing substances	mg/l	0.1
Benzopyren	Mkg/1	0.005

**National standard on drinking water quality MNS 0900-2005 & WHO Guidelines**

Parameter	MNS 0900:2005		WHO Guidelines for Drinking Water Quality, Fourth Edition. 2011	
Na-	mg/l	200		None established
K-	mg/l	200		None established
Ca <sup>2+</sup>	mg/l	100		-
Mg <sup>2+</sup>	mg/l	30		-
SO <sub>4</sub> <sup>2-</sup>	mg/l	500		None established
HCO <sub>3</sub> <sup>-</sup>	mg/l	-		-
CO <sub>3</sub> <sup>2-</sup>	mg/l	-		-
Cl	mg/l	350	mg/l	5
P	mg/l	0.7-1.5		-
Br		-		None established
Test, by mark	mg/l	2		-
Color	degree	20°		None proposed
Odor	mark	2		-
pH		6.5-8.5		None established
Electric Conductivity		-		-
Y S/st				
General Minerals		1000		-
Hardness	mg-eqv/l	7		None established
Acidity potential	mB			-
Solid remains	g/l	1		-
NH <sub>4</sub>	mg/l	1.5		None established
NO <sub>3</sub>	mg/l	50	mg/l	50
NO <sub>2</sub>	mg/l	1	mg/l	3
PO <sub>4</sub>	mg/l	35		-
As	mg/l	0.01	mg/l	0.01
Fe	mg/l	0.3		None established
Pb	mg/l	0.03	mg/l	0.01
Ni	mg/l	0.02	mg/l	0.07
Cr	mg/l	0.05	mg/l	0.05
Cu	mg/l	0.1	mg/l	2
Zn	mg/l	5		None established
Mn	mg/l	0.1		None established

Parameter	MNS 0900:2005		WHO Guidelines for Drinking Water Quality, Fourth Edition. 2011	
Cd	mg/l	0003	mg/l	0003
Hg	mg/l	00005	mg/l	0006
B	mg/l	0.5	mg/l	24
Ba	mg/l	0.7	mg/l	07
Mo	mg/l	007		None established
Se	mg/l	001	mg/l	004

MNS 0900:2005. Drinking Water Hygienic Requirement and Quality Control is the standard used for groundwater supply, which is the source for drinking water supply in Mongolia

**National Soil Quality Standard MNS 5850-2008**

Parameter	MNS 5850:2008			
	Soil Mechanical Composition			Maximum Allowed Level *
	Clay	Loamy	Sandy	
Pb	100	70	50	100
Cd	3	1.5	1	3
Hg	2	1	05	2
As	6	4	2	6
Cr	150	100	60	150
Cr6+	4	3	2	4
Sn	50	40	30	50
Sr	800	700	600	800
V	150	130	100	150
Cu	100	80	60	100
Ni	150	100	60	150
Co	50	40	30	50
Zn	300	150	100	300
Mo	5	3	2	5
Se	10	8	6	10
B	25	20	15	25
F	200	150	100	200
CN	25	15	10	25

\* There are no soil quality International standards for EHS guidelines.



## APPENDIX 2. ACTION PLAN ON RESCUE EXCAVATION

### ACTION PLAN ON RESCUE SAVING OF THE ARCHAEOLOGICAL HERITAGES THAT FALL WITHIN THE RIGHT OF WAY FOR THE PROPOSED AH4-KHOVD SOUM ACCESS ROAD

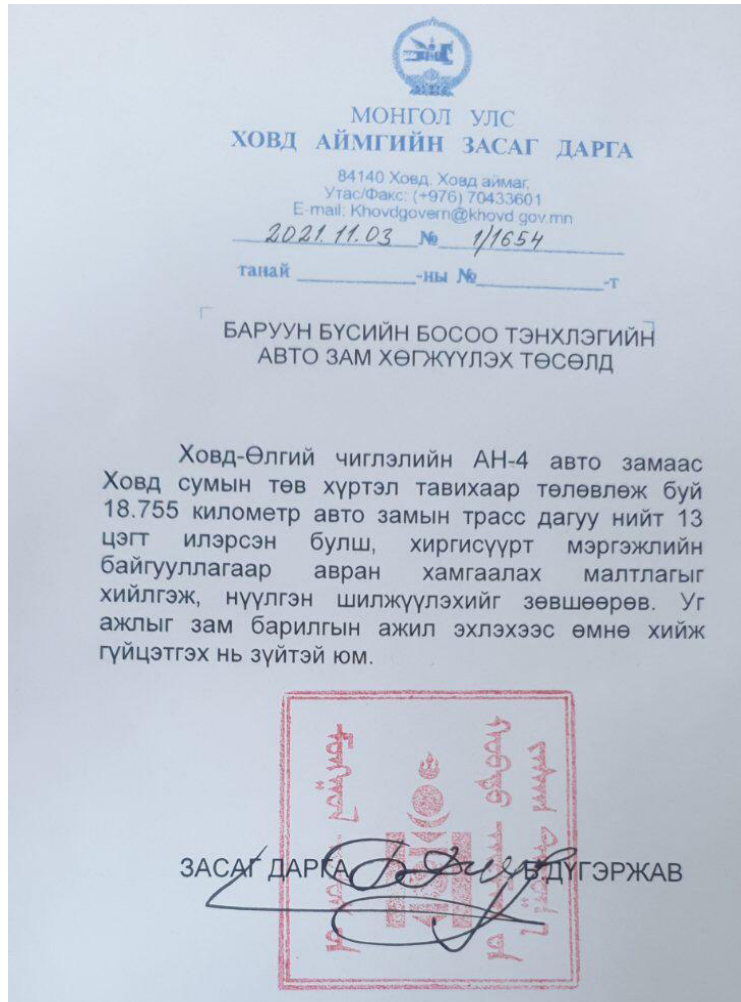
01 NOVEMBER, 2021

No	Planned actions	Time frame	Budget	Remarks
1	Organize field investigation to verify exact locations and pertaining conditions of the cultural heritage sites	7 days	4,000,000₮	Includes preliminary desktop and field surveys
2	Submit Work Proposal and sign Agreement	3 days		Submit Proposal to MRTD with cost estimations to conduct removal of the cultural heritage items (ancient tombs) and sign agreement
3	Preparation of the rescue excavation works	7 days	7,560,000₮	Preparation of necessary tools, devices, vehicles and food items for the field team
4	Transportation of the archeologists to the project area and establish a field camp for archaeologists	23 days	15,795,000₮	This includes vehicle rentals and fuel costs
5	Conduct rescue excavation of the ancient tombs	25 days	62,065,000₮	Costs incurred during the field work including salaries and per diem for archaeologists
6	Relocate and transport the cultural heritage items to the local Archaeological Institute			Transportation and logistics related costs
7	Conduct scientific investigation of the relocated cultural heritage items at the laboratory of the institute of archaeology	5 days	7,125,000₮	Sampling and laboratory test analysis costs
8	Prepare and submit Work Report	3 days	2,345,000₮	Work rates for archaeological team experts who will contribute to report preparation
9	Administration costs		9,489,000₮	
<b>Total cost:</b>			108,379,000 MNT (38,028 USD)	

PREPARED BY:

A. ENKHTUR, HEAD OF DIVISION, INSTITUTE OF ARCHAEOLOGY

**APPENDIX 3. LETTER OF APPROVAL BY GOVERNOR OF KHOVD  
AIMAG**



**Unofficial translation.**

**GOVERNOR OF KHOVD AIMAG**

Date: 2021.11.03

Ref No.1/1654

**TO: THE PROJECT IMPLEMENTATION UNIT OF THE WESTERN REGIONAL ROAD  
CORRIDOR INVESTMENT PROGRAM**

The planned works to conduct rescue excavation and relocation of ancient tombs detected at 13 sites along the proposed 18.755 km alignment of AH-4 to Khovd soum access road is hereby approved. It is recommended that the planned works ought to be executed before commencement of the road construction works.

**GOVERNOR**

**B.DUGERJAV**

## APPENDIX 4. HEALTH AND SAFETY MANAGEMENT PLAN IN RESPONSE TO THE COVID-19 PANDEMIC

### ***Risk-Based Assessment***

#### ***Risk Assessment Framework and Process***

215. The PIU of the Western Regional Road Corridor Investment Program will provide recommendation to the civil works contractors to conduct a workplace-specific risk assessment related to the COVID-19 situation. Here are the steps to follow:

- (i) Identify a workplace-specific pandemic coordinator or team.
- (ii) Define the teams' roles and responsibilities for preparedness and response and prevention planning.
- (iii) Implementation of the Prevention and Response Plan.

#### ***Risk Factors Identification and Findings***

216. Three primary routes of transmission are anticipated for COVID-19, all of which need to be controlled. These include contact, droplet, and airborne transmission.

##### **Breathing in droplets in the air**

217. The Ministry of Health of Mongolia advises that coronavirus is not transmitted through airborne transmission, however, if somebody coughs or sneezes they do generate droplets which are airborne for at least a short period of time but do not float in the air and generally fall to the ground within 1 to 2 meters. Anybody who is near the individual may risk breathing in these droplets. Social distancing (maintaining 2 meters of distance from other people at all time) will reduce the risk of this occurring.

##### **Close contact**

218. Close contact refers to physical contact with another person, for example shaking hands or hugging. When people cough or sneeze droplets may deposit on their skin or clothing, especially if they cough or sneeze into their hands. People who are carriers of COVID-19 may transfer the virus from their hands or clothing to others during close contact.

##### **Surface contact**

219. Surfaces can become contaminated when droplets carrying COVID-19 deposit on them, or when they are touched by a person who is infected. Surface contact involves a worker touching a contaminated object such as a table, doorknob, telephone, or computer keyboard or tool, and then touching the eyes, nose, or mouth. Surface contact is important to consider because COVID-19 can persist for several days on surfaces.

220. The following risk assessment table is adapted from regulation guidelines from the WHO. Using this guideline as a reference, it was determined that the risk level of the workers is low when they maintain social distancing. The workers work on a construction work site and have little contact with the general public.

**Table 26. Risk Screening and Risk Categorization**

<b>Protection methods</b>	<b>Low risk</b> Workers who typically have no contact with people infected with COVID-19	<b>Moderate risk</b> Workers who may be exposed to infected people from time to time in relatively large, well ventilated workspaces	<b>High risk</b> Workers who may have contact with infected patients, or with infected people in small, poorly ventilated workspaces
Hand hygiene	Yes (washing with soap and water, using an alcohol-based hand rub, or using hand wipes that contain effective disinfectant)	Yes (washing with soap and water, using an alcohol-based hand rub, or using hand wipes that contain effective disinfectant)	Yes (washing with soap and water, using an alcohol-based hand rub, or using hand wipes that contain effective disinfectant)
Disposable gloves	Not required	Not required (unless handling contaminated objects on a regular basis)	Yes, in some cases (for example, when working directly with COVID-19 patients)
Aprons, gowns, or similar body protection	Not required	Not required	Yes, in some cases (for example, when working directly COVID-19 patients)
Eye protection - goggles or Face shield	Not required	Not required	Yes, in some cases (for example, when working directly with COVID-19 patients)
Airway Protection - respirators	Not required	Not required (unless likely to be exposed to coughing and sneezing)	Yes (minimum N95 respirator or equivalent)

**Policy, Regulation, and Guidance**  
**International Practice Guidance**

- Considerations for public health and social measures in the workplace in the context of COVID-19 - World Health Organization

**Domestic Regulations and Policy Principles**

221. The Government of Mongolia has successfully implemented prevention measures for the COVID-19 pandemic. The Government has activated the State Emergency Committee in January, 2020, on the basis of the Disaster Protection Law. The Disaster Protection Law (in place since 2017) authorizes the National Emergency Management Agency and SEC to direct emergency policies and measures via the Government of Mongolia and regional emergency committees. The legal enforcement of SEC-led precautionary measures enabled a unified and focused administration of COVID-19 disaster management.

222. On 10 November 2020, the Cabinet Secretariat of Government of Mongolia assembled an emergency session and made a decision to close down public places and social activities

starting from 11 November 2020. In addition to travel, all major public engagements and gatherings, including the annual celebration of Tsagaan Sar (Mongolian Lunar New Year) in mid-February, were prohibited.

223. It has been kept up to date through public information provision and action, coordinated by the SEC and organized by government agencies such as the Ministry of Health. Predominantly spreading health promotion messages via public media, the SEC initiated a one-window policy to provide accessible and reliable information from only one source.

224. The one-window policy included official information and announcements communicated daily at a set time (11:00am) through all communication channels and media. The information provided included periodic and daily latest updates on self-isolation and quarantine, test results from suspected cases, general health recommendations, and the global status of the pandemic. The Ministry of Health has been issuing frequent text message alerts nationwide using all four mobile telephone carriers. The alert messages include recommendations on avoiding unnecessary domestic and international travel, self-isolation for incoming travelers, nutritional advice, and personal hygiene and protective measures.

### ***Applicable Local Requirements and Procedures***

225. In collaboration with UNICEF, the Ministry of Health of Mongolia has issued Guidelines on prevention from COVID-19. This serves as the main guidelines for the public on prevention of the pandemic.

226. Here are the best practices that construction professionals have implemented into their everyday work routines.



All construction site professionals maintain physical distancing rules of 6 feet (2 meters) or more.



Rigorous Pre-screening. Anyone exhibiting signs of sickness is not allowed on site. No one is allowed on site unless they've completed a pre-access screening.



In the rare occasion they have to work closely, proper PPE such as masks, gloves and eyewear is worn.



Extensive hand washing, sanitization, and personal hygiene is expected and commonplace.



Tools are not shared and are sanitized between each use.



All tools, surfaces and vehicles are disinfected continually and between shifts.



Shifts are staggered to reduce the number of people on site when possible. Meetings are kept short and small, with physical distancing in place.



No vehicle sharing. Construction professionals take their own transportation to and from the site.



Just like grocery stores the number of people is restricted on site. The number of people in confined spaces is strictly controlled and limited. Traffic flows throughout the site are managed to ensure appropriate physical distancing.



Sites are separated into zones to separate crews and trades, whenever possible.

### ***Institutional Arrangement and Strengthening***

#### ***Institutional Setup and Responsibilities for Health & Safety Plan Implementation***

227. Employers, workers, and their organizations should collaborate with health authorities in the prevention and control of COVID-19. The employers, in consultation with workers and their representatives, should take preventive and protective measures, such as engineering and administrative controls and provision of personal protective equipment and clothing for occupational safety and health and infection prevention and control. Such measures at the workplace must not involve any expenditure on the part of workers.

228. Workers shall follow established occupational safety and health and infection prevention and control procedures, avoid exposing others to health and safety risks, participate in related training provided by the employer and report immediately to their supervisor any situation which they have reasonable justification to believe presents an imminent and serious danger to their life or health.

229. Cooperation between management and workers and their representatives must be an essential element of workplace - related prevention measures (such as through workers' safety delegates, safety and health committees, and collaboration with providing information and training) and respecting the right and duties of workers and employers in occupational safety and health.

230. COVID-19 and other diseases, if contracted through occupational exposure, could be considered as occupational diseases.

#### ***Health and Safety Technical Support and Training***

231. Workers in this project will receive training in the following:

- The risk of exposure to COVID-19, and the signs and symptoms of the disease
- Safe work procedures to be followed, including hand washing, social distancing
- Cough/sneeze etiquette
- Location of washing facilities, including dispensing stations for alcohol-based hand rubs
- How to seek first aid
- How to report an exposure to or symptoms of COVID-19

232. Provide posters, videos, and electronic message boards to increase awareness of COVID-19 among workers and promote safe individual practices at the workplace, engage workers in providing feedback on the preventive measures and their effectiveness.

233. Here are the best practices that construction professionals have implemented into their everyday work routines on top of the already advanced safety levels in place.



***The necessary budgetary resources for mitigation actions***

234. The COVID-19 outbreak is a major public health emergency, and it is an unforeseen, inevitable and insurmountable force majeure event. The loss and increase in project construction costs caused thereby shall be carried out in accordance with the provisions on force majeure stipulated in the construction contract.

***Prevention and Control, and Mitigation Measures***

***Prevention practices and mitigation measures for workers***

***Hygiene Practices***

- Clean your hands with soap and water for 20 seconds – before you eat and at the end of the workday, during the work shift whenever possible, and when you get home from work.
- Do not shake hands; avoid physical contact.
- Do not share food, drinks, cigarettes, personal hand tools.
- Do not touch your face, eyes, nose, mouth with unwashed hands (i.e., smoking, drinking water, eating, etc.)
- Follow good respiratory etiquette by covering your mouth and nose with a disposable tissue or the crease of your elbow when you sneeze or cough.
- Regularly clean and disinfect commonly touched surfaces and tools

235. Project Orientations

- Limit the number of persons in the orientation – a chair spacing between workers. This may require hosting the video orientation sessions more often. Where practical, move orientation outdoors and conduct a verbal orientation – reinforce social distancing.
- Use the Government of Saskatchewan COVID-19 Self-Assessment tool questions to verify that workers are not feeling sick and so they are aware of what the symptoms are so they can self-monitor.
- Disinfect used pens, tables, chairs, etc., after each orientation.
- As part of the verbal orientation, discuss:
  - social distancing of 2 meters
  - hygiene and location of hand washing and hand sanitization stations.
  - what the company is doing at the site to promote a safe workplace and remind them that their health is important to us.
  - where the safety posters are located.
  - the importance of reporting to their supervisor if they are feeling unwell and leaving the project.

236. Health Verification of Workers

- At start of shift, Supervisor to confirm the health status of contractor workers through
- discussion with Contractor supervisor and notify HSE Manager of any issues. Document issues.

- Supervisor, each day, to ask for updates of workers that have left the site for self-isolation. Document changes.
- At end of shift, Supervisor to confirm the health status of contractor workers through discussion with Contractor supervisor and notify HSE Manager of any issues.
- Use the COVID-19 Self-Assessment tool. Document any issues.

**237. Hoist Operations**

- Outside the hoist: Post signage and remind the workers to maintain social distancing 1.8 m (6 feet) while they are waiting to enter the hoist.
- Inside the hoist: Maintain social distancing (as best as possible) and reduce the number of passengers at any one time.
- Passengers to face the outside of the hoist to avoid being inside each other's breathing zone.
- The Operator has the option to wear an N95 mask.
- Provide the operator with disinfectant to routinely disinfect commonly touched items – call buttons, door handles, etc.

**238. When wearing gloves**

- Do not touch your face, eyes, or mouth
- Make sure that hands are washed thoroughly or disinfected with hand sanitizer as soon as possible after gloves are removed

**239. Meetings at Site**

- Hold outside in open areas.

**240. Risk communication, training and education**

- Provide posters, videos and electronic message boards to raise awareness of novel Coronavirus and promote safe personal behavior in the workplace and to elicit feedback from workers on preventive measures and their effectiveness.
- • Use official sources such as government agencies and WHO to provide regular information on novel Coronavirus risks and highlight the effectiveness of safeguards against rumors and misinformation.
- Special attention should be given to contact and interaction with vulnerable and marginalized groups of workers, such as informal and migrant workers, domestic workers, subcontractors and self-employed workers, and workers working under digital service platforms.

**241. Project Offices/Trailers**

- Restrict Access. Place contact information (phone #) outside on door.
- Limit the number of workers or restrict who is allowed to enter these offices.
- Maintain the social distance requirements.
- Do not touch items – “keep your hands to yourself”.
- Do not share keyboard or mouse, pens, clipboards or documents.

- Disinfect commonly touched items like door handles, chairs, tables, etc.
- Handrails leading up to the trailer or office: Do not slide your hand down them. Routinely disinfect.

242. Lunchroom

- Post signage to remind workers to wash or disinfect their hands before and after eating.
- Stagger coffee/lunch breaks to reduce the number of workers in the lunchroom at the same time.
- Maintain social distancing by staggering seating arrangement, or don't eat in the lunchroom
- Remove garbage often.
- Routinely disinfect the tables and other commonly handled items.
- Ensure sufficient fresh air supply to reduce "recirculating" the air inside the lunchroom.
- Separate PPE and clothing that is hung up in the lunchroom to avoid touching.
- If you have to take your spare work clothing home, place it in a plastic bag and do not take it out of the plastic bag until it goes into the laundry to be washed – ideally separately.

243. Work locations

- Maintain social distancing between workers.
- Stagger work crews to reduce the number of people on site, if possible
- Where possible, reduce the number of partner workers.
- Don't mix workers on crews.

244. Tools

- Avoid sharing tools or equipment.
- If you have to share equipment, clean and disinfect points of contact on the equipment. Example: on a shared extended work platform, before use wipe down controls, gate, guardrails and any other parts touched by hands. Disinfect it when you are done.

245. First Aid Treatment

- First Aid Attendants to wear mask, face shield and medical gloves when treating workers.
- If conscious and capable of answering, ask the worker's local health code to verify current status of their health.

***The prevention of transmission from and to the affected communities***

246. Workers from other provinces enter the construction field should be with a health pass. Workers from other provinces and across the city should be provided a "point-to-point" shuttle bus for commuting. Private recruitment of casual workers without health information is strictly prohibited to prevent the entry of epidemic situations.

247. Check worker's 14-day contact history who are entering the site. Strictly implement the prevention and control measures according to the epidemic situation classification

248. Strictly implement the real-name system management, establish personnel health record, conduct body temperature measurement twice a day in the morning and evening, check workers' health status, and make records one by one.

249. Enclosed management must be implemented on the construction site to strictly control personnel access, and strictly check and register the personnel and vehicles enter the site."

### ***Information Disclosure and Consultation***

250. Each contractor shall formulate an emergency response plan for the prevention and control of epidemic conditions at the construction site, and practice the plan accordingly. Once individuals who have been potentially exposed to the virus, or who are exhibiting flu-like symptoms such as fever, tiredness, coughing, or congestion are spotted, the site manager should call 103 promptly and report to local health and construction authorities for further arrangement.

### ***Emergency Preparedness and Response***

#### ***Possible cases of COVID-19***

251. Individuals who have been potentially exposed to the virus, or who are exhibiting flu-like symptoms such as fever, tiredness, coughing, or congestion are instructed to:

- Not come to work;
- Contact their supervisor and/or human resources department;
- Stay at home and self-isolate; and
- Contact local health authorities for further direction.

252. Such individuals are required to follow the directions of the local health authority and may not return to work until given approval by the proper health authorities.

- Individuals who begin to display flu-like symptoms on site are instructed to avoid touching anything, take extra care to contain coughs and sneezes, and return home immediately to undergo self-isolation as directed by the local health authority.
- All areas on site potentially infected by a confirmed or probable case are barricaded to keep individuals two meters away until the area is properly cleaned and disinfected.

### ***Response plans***

253. All contractors are to complete an integrated continuity plan to respond to partial or complete shutdown of construction sites or in the case of a severe limitation of site operations.

### ***Monitoring, Inspection and Reporting***

#### ***Monitoring and Inspection Programs***

254. Screening at entry of construction site

- Before entering the site, individuals must confirm that:
  - They are not currently exhibiting flu-like symptoms such as fever, tiredness, coughing, or congestion;
  - They have not returned from outside of Mongolia within the past 14 days;
  - To the best of their knowledge, they have not been in contact with someone with a confirmed or probable case of COVID-19; and

- They have not been working on a site that was shut down due to the virus.

Responses are to be kept private and treated as sensitive medical information.

- Individuals who are at increased risk of serious illness (due to age, pregnancy, or other medical condition) are not to be permitted on site.
- Workers who are not authorized to access the site are to be safely transported directly back home, or to a preferred location of self-isolation. When unable to do so themselves, a vehicle and driver will be arranged for them.
- When transporting a potentially ill individual, both driver and passenger are to be given masks and nitrile gloves. The passenger is to sit in the backseat, and the driver is to open and close the doors for them.

### ***Documenting and Reporting***

255. All contractors should keep records of Monitoring and Inspection, instruction and training provided to workers regarding COVID-19, as well as exposure reports and first aid records.