International ESIA for an Integrated Renewable Energy Project

180MW Wind Power and Battery Energy Storage System, Tsogttsetsii soum, Mongolia

Chapter 7 Environmental Impact Assessment

PREPARED FOR

Net Zero Energy LLC
MCS and URECA

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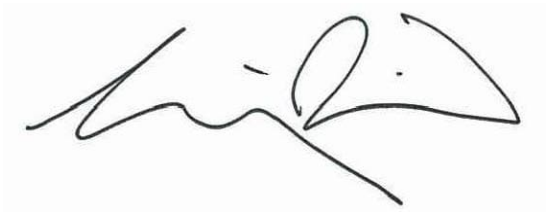
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Craig A. Reid
Partner

ERM-Hong Kong, Limited
2507 One Harbourfront
18 Tak Fung Street
Hong Kong
Tel: +852 2271 3000
Fax: +852 3015 8052

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CONTENTS

7.	ENVIRONMENTAL IMPACT ASSESSMENT	7-1
7.1	INTRODUCTION	7-1
7.2	AIR QUALITY IMPACT ASSESSMENT	7-1
7.2.1	Scope of Assessment	7-1
7.2.2	Summary of Baseline Conditions	7-2
7.2.3	Assessment Approach and Criteria	7-2
7.2.4	Impact Assessment	7-5
7.3	CLIMATE CHANGE IMPACT ASSESSMENT	7-10
7.3.1	Scope of Assessment	7-10
7.3.2	Assessment Approach and Criteria	7-11
7.3.3	Impact Assessment	7-16
7.3.4	Additional Mitigation, Management and Monitoring Procedures	7-63
7.4	NOISE IMPACT ASSESSMENT	7-68
7.4.1	Scope of Assessment	7-68
7.4.2	Summary of Baseline Conditions	7-69
7.4.3	Assessment Approach and Criteria	7-69
7.4.4	Impact Assessment	7-74
7.5	SOIL IMPACT ASSESSMENT	7-87
7.5.1	Scope of Assessment	7-87
7.5.2	Summary of Baseline Conditions	7-87
7.5.3	Assessment Approach and Criteria	7-88
7.5.4	Impact Assessment	7-90
7.6	WATER RESOURCES IMPACT ASSESSMENT	7-93
7.6.1	Scope of Assessment	7-93
7.6.2	Summary of Baseline Conditions	7-95
7.6.3	Assessment Approach and Criteria	7-97
7.6.4	Impact Assessment	7-100
7.7	BIODIVERSITY IMPACT ASSESSMENT	7-108
7.7.1	Scope of Assessment	7-109
7.7.2	Summary of Baseline Conditions	7-110
7.7.3	Assessment Approach and Criteria	7-116
7.7.4	Existing/Embedded Measures	7-120
7.7.5	Impact Assessment	7-126
7.8	SUMMARY OF ENVIRONMENTAL IMPACTS	7-165

LIST OF TABLES

TABLE 7-1:	SCOPES OF AIR QUALITY IMPACT ASSESSMENT	7-1
TABLE 7-2:	IMPACT ON AIR QUALITY DURING CONSTRUCTION PHASE (FUGITIVE DUST EMISSION)	7-7
TABLE 7-3:	QUANTITY OF MOBILE MACHINERIES	7-8
TABLE 7-4:	IMPACT ON AIR QUALITY DURING CONSTRUCTION PHASE (VEHICULAR EXHAUST EMISSIONS)	7-8
TABLE 7-5:	CLIMATE SCENARIOS USED IN THE CCRA	7-12
TABLE 7-6:	LIST OF CLIMATE HAZARDS AND INDICATORS	7-13
TABLE 7-7:	RISK MATERIALITY CATEGORY	7-15
TABLE 7-8:	CLIMATE DATA OF EXTREME HEAT	7-16

TABLE 7-9: RISK ANALYSIS OF EXTREME HEAT 7-17
TABLE 7-10: CLIMATE DATA FOR EXTREME COLD 7-21
TABLE 7-11: RISK ANALYSIS OF EXTREME COLD 7-22
TABLE 7-12: CLIMATE DATA FOR EXTREME RAINFALL AND FLOODING 7-28
TABLE 7-13: RISK ANALYSIS OF EXTREME RAINALL AND FLOODING 7-31
TABLE 7-14: CLIMATE DATA FOR MEAN WIND SPEED 7-36
TABLE 7-15: RISK ANALYSIS OF EXTREME WINDS AND STORMS 7-39
TABLE 7-16: CLIMATE DATA FOR WILDFIRES 7-46
TABLE 7-17: RISK ANALYSIS OF WILDFIRES 7-47
TABLE 7-18: CLIMATE DATA FOR RAINFALL-INDUCED LANDSLIDES 7-52
TABLE 7-19: RISK ANALYSIS OF RAINFALL-INDUCED LANDSLIDES 7-53
TABLE 7-20: CLIMATE DATA FOR WATER STRESS AND DROUGHT 7-54
TABLE 7-21: RISK ANALYSIS OF WATER STRESS AND DROUGHT 7-55
TABLE 7-22: EARTHQUAKE DATA 7-58
TABLE 7-23: RISK ANALYSIS OF EARTHQUAKE 7-61
TABLE 7-24: SCOPE OF NOISE IMPACT ASSESSMENT 7-68
TABLE 7-25: AVERAGE AMBIENT NOISE LEVELS 7-69
TABLE 7-26: NOISE ASSESSMENT CRITERIA (WORLD BANK GROUP, 2007) 7-70
TABLE 7-27: PROPOSED WIND TURBINE DETAILS 7-72
TABLE 7-28: PROPOSED WIND TURBINE SOUND POWER LEVELS 7-72
TABLE 7-29: WIND TURBINE NOISE MODELLING PARAMETERS 7-73
TABLE 7-30: BESS AND SUBSTATION NOISE SOURCES 7-74
TABLE 7-31: IMPACT FROM NOISE DURING CONSTRUCTION PHASE (CONSTRUCTION NOISE AND CONSTRUCTION TRAFFIC NOISE) 7-76
TABLE 7-32: PREDICTED NOISE LEVELS AT SENSITIVE RECEPTORS – DAY PERIOD 7-78
TABLE 7-33: PREDICTED NOISE LEVELS AT SENSITIVE RECEPTORS – NIGHT PERIOD 7-80
TABLE 7-34: IMPACT FROM NOISE DURING OPERATIONAL PHASE (WIND TURBINE, BESS, SUBSTATION AND OPERATIONAL TRAFFIC NOISE) 7-83
TABLE 7-35: SCOPES OF SOIL ENVIRONMENTAL ASSESSMENT 7-87
TABLE 7-36: SENSITIVITY ASSESSMENT CRITERIA FOR SOIL QUALITY (COMPACTION, EROSION AND CONTAMINATION) 7-88
TABLE 7-37: CRITERIA FOR IMPACT MAGNITUDE FOR ASSESSMENT OF IMPACT TO SOIL 7-89
TABLE 7-38: IMPACT TO SOIL DURING CONSTRUCTION PHASE 7-91
TABLE 7-39: SCOPES OF WATER RESOURCES ASSESSMENT 7-94
TABLE 7-40: WELLS IN THE VICINTY OF THE PROJECT SITE 7-96
TABLE 7-41: SENSITIVITY ASSESSMENT CRITERIA FOR WATER RESOURCES 7-98
TABLE 7-42: CRITERIA FOR IMPACT MAGNITUDE FOR WATER RESOURCE IMPACT ASSESSMENT 7-98
TABLE 7-43: IMPACT ON WATER RESOURCE COMPETITION FROM CONSTRUCTION ACTIVITIES 7-101
TABLE 7-44: IMPACT ON WATER QUALITY FROM CONSTRUCTION ACTIVITIES AND WORKER'S ACTIVITIES 7-103
TABLE 7-45: IMPACT ON WATER RESOURCE COMPETITION FROM OPERATION ACTIVITIES 7-104
TABLE 7-46: IMPACT ON WATER QUALITY FROM OPERATION ACTIVITIES 7-105
TABLE 7-47: POTENTIAL IMPACT TO BIODIVERSITY VALUES 7-109
TABLE 7-48: ANNUAL FATALITY THRESHOLDS AND PREDICTED WTG COLLISIONS 7-112
TABLE 7-49: SPECIES QUALIFYING AS PRIORITY BIODIVERSITY FEATURES (EBRD ESR6) 7-113
TABLE 7-50: HABITAT IMPACT ASSESSMENT – SIGNIFICANCE CRITERIA 7-117
TABLE 7-51: SPECIES IMPACT ASSESSMENT – SIGNIFICANCE CRITERIA 7-118
TABLE 7-52: EXISTING/EMBEDDED MEASURES IN THE PROJECT'S DEIA 7-120

TABLE 7-53: TOTAL AREA OF DISTURBANCE FROM TEMPORARY AND PERMANENT FACILITIES 7-127
TABLE 7-54: TOTAL AREA OF NATURAL HABITATS AFFECTED BY PERMANENT FACILITIES 7-128
TABLE 7-55: IMPACT SIGNIFICANCE FROM LOSS OF TERRESTRIAL HABITAT 7-131
TABLE 7-56: IMPACT SIGNIFICANCE FROM DISTURBANCE TO OR DISPLACEMENT OF FAUNA 7-134
TABLE 7-57: IMPACT SIGNIFICANCE FROM BARRIER CREATION 7-135
TABLE 7-58: IMPACT FROM INDIRECT DEGRADATION OF HABITATS 7-138
TABLE 7-59: IMPACT FROM VEHICLE COLLISION, HUNTING AND POACHING ON FAUNA 7-141
TABLE 7-60: COLLISION RISK MODELLING RESULTS FOR BIRD SPECIES 7-143
TABLE 7-61: IMPACT ON VOLANT FAUNA MORTALITY FROM OPERATION OF WIND TURBINES 7-145
TABLE 7-62: IMPACT ON VOLANT FAUNA MORTALITY FROM OPERATION OF OHL 7-147
TABLE 7-63: IMPACT ON FAUNA DISPLACEMENT FROM PRESENCE OF OPERATIONAL PROJECT FACILITIES 7-148
TABLE 7-64: SIGNIFICANCE OF RESIDUAL IMPACTS ON BIODIVERSITY 7-160
TABLE 7-65: NO NET LOSS ASSESSMENT FOR PRIORITY BIODIVERSITY FEATURES 7-163
TABLE 7-66: SUMMARY OF ENVIRONMENTAL IMPACTS 7-165
TABLE 7-67: SUMMARY OF BIODIVERSITY IMPACTS 7-166

LIST OF FIGURES

FIGURE 7-1: AQIA METHODOLOGY FOR FUGITIVE DUST EMISSIONS 7-3
FIGURE 7-2: AQIA METHODOLOGY FOR VEHICULR EXHAUST EMISSIONS 7-4
FIGURE 7-3: GLOBAL WARMING ABOVE 1850-1900 LEVEL UNDER THE TWO SELECTED CLIMATE SCENARIOS. 7-12
FIGURE 7-4: MAXIMUM 1-IN-500-YEAR (0.2% ANNUAL EXCEEDANCE PROBABILITY) FLOOD INUNDATION DEPTH. 7-30
FIGURE 7-5: NUMBER OF ANNUAL DUST STORMS ACROSS DIFFERENT REGIONS IN MONGOLIA. SOURCE: COOPER, C. & SOVACOOL, B (2013). 7-37
FIGURE 7-6: FUTURE PROJECTIONS OF SAND AND DUST STORM BY 2050 UNDER SSP5-8.5 SCENARIO. SOURCE: IPCC WGI INTERACTIVE ATLAS: REGIONAL SYNTHESIS (HTTPS://INTERACTIVE-ATLAS.IPCC.CH/REGIONAL-SYNTHESIS). 7-38
FIGURE 7-7: THE PROJECT SITE AND THE CLOSEST EARTHQUAKE OCCURRENCE 7-59
FIGURE 7-8: SHOWS THE PEAK GROUND ACCELERATION VALUES ACROSS THE PROJECT SITE 7-60
FIGURE 7-9: WIND TURBINE NOISE CONTOUR MAP 7-82
FIGURE 7-10: NATURAL AND MODIFIED HABITATS IN THE BIODIVERSITY AOI 7-111

ACRONYMS AND ABBREVIATIONS

Acronyms	Description
AADT	Annual Average Daily Traffic
[redacted]	[redacted]
AIS	Air Insulated Switchgear
ALARP	As Low As Reasonably Practicable
AoI	Area of Influence
APLIC	Avian Powerline Interaction Committee
BESS	Battery Energy Storage System

Acronyms	Description
BMP	Biodiversity Management Plan
BOD	biochemical oxygen demand
CAF	Central Asian Flyway
CAQMP	Construction Air Quality Management Plan
CCRA	Climate Change Risk Assessment
CD	Community Development
CH	Critical Habitat
CHA	Critical Habitat Assessment
CIA	Cumulative Impact Assessment
CIP	Climate Impact Platform
CITES	Convention on International Trade in Endangered Species
CLO	Community Liaison Officer
CMIP6	Coupled Model Intercomparison Project Phase 6
CMS	Conservation of Migratory Species of Wild Animals
CO	Carbon monoxide
COD	chemical oxygen demand
CR	critically endangered
CRM	Citizen's Representative Meeting
CRM	Collision Risk Model
CSMP	Cold Stress Management Plan
DEIA	Detailed Environmental Impact Assessment
DFID	International Development
DSF	Development Support Fund
E&S	Environmental and Social
EAAA	Ecologically Appropriate Area of Analysis
EAAF	East Asian-Australasian Flyway
EBRD	European Bank for Reconstruction and Development
EC	Electrical Conductivity
EEO	Extent of Occurrence
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EN	Endangered
EPC	Engineering Procurement and Construction

Acronyms	Description
EPRP	Emergency Preparedness and Response Plan
ERM	ERM-Hong Kong, Limited
ESA	European Space Agency
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMS	Environment and Social Management System
ETI	Ethical Trading Initiative
FERP	Flood Emergency Response Plan
FFDI	Arthur Forest Fire Danger Index
FGD	focus group discussion
FPIC	Free, Prior and Informed Consent
GBV	Gender-based violence
GCD	Global Climate Database
GHG	Green House Gas
GIIP	good international industry practice
GIS	Geographic Information System
GM	grievance mechanism
GPN	This Good Practice Note
GRM	Grievance Redress Mechanism
HCO	Bicarbonate
HSEQ	Health, Safety, Environment, and Quality
HSMP	Heat Stress Management Plan
HSS	Health, Safety and Security
HSSE	Health, Safety, Security and Environment
HVAC	Heating, Ventilation, and Air Conditioning
IA	Impact Assessment
IAQM	Institute of Air Quality Management
IBA	Important Bird and Biodiversity Areas
IBAT	Integrated Biodiversity Assessment Tool
IFC	International Finance Corporation
ILO	International Labour Organisation
IMAR	Inner Mongolia Autonomous Region
IPA	Important Plant Areas

Acronyms	Description
ISMP	Invasive Species Management Plan
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Areas
KII	Key Informant Interview
LC	Least Concern
LiDAR	Light Detection and Ranging
LLC	Limited Liability Company
LO	Land Officer
LRP	Livelihood Restoration Plan
LRP	Livelihood Restoration Plan
LVIA	Landscape & Visual Impact Assessment
MCS	Mongolian Consulting Service
MECC	Ministry of Environment and Climate Change
MNS	Mongolian National Standard
MRIA	Mongolian Renewables Industries Association
MRL	Mongolian Red List
MSDS	Material Safety Data Sheet
MW	Mega Watt
MWEA	Mongolian Wind Energy Association
NASA	National Aeronautic Space Administration
NDC	Nationally Determined Contributions
NDC	National Dispatching Centre
NE	not evaluated
NGO	Non-governmental Organization
NH4+	Ammonium
NO2	Nitrogen dioxide
NO2-	Nitrite
NO3-	Nitrate
NOAA	Atmospheric Association
NPTG	National Power Transmission Grid Company
NPTG	National Power Transmission Grid Company
NREC	The National Renewable Energy Centre
NSR	Noise sensitive receiver

Acronyms	Description
NT	Near threatened
NZE	Net Zero Energy LLC
O&M	Operation and Maintenance
OHL	Overhead Transmission Line
OHS	Occupational Health and Safety
OT	Oyu Tolgoi
PA	protected area
PAD	project affected districts
PAPs	Project Affected Persons
PI, mg/L	Phosphate
PM	Particulate matter
POP	persistent organic pollutants
PPA	Power Purchase Agreement
PPE	Personal protective equipment
PS	Performance Standards
RAP	Resettlement Action Plan
RCIA	Rapid Cumulative Impact Assessment
RCS	Real Case Scenario
RILI	rainfall-induced landslide index
RoW	Right of Way
SCADA	Supervisory Control and Data Acquisition
SNH	Scottish Natural Heritage
SO	Social Officer
SO2	Sulphur dioxide
SO4	Sulphate
SPA	Strictly Protected Area
SRTM	Shuttle Radar Topography Mission
STE	Serrated Trailed Edge
TDS	Total Dissolved Solids
TIP	Trafficking in Persons
TL	Transmission Line
TNC	The Nature Conservancy
TOR	Terms of Reference

Acronyms	Description
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States dollars
UV	Ultra-violet
VEC	Valued Environmental and Social Components
VP	Vantage Point
VU	Vulnerable
WBG	World Bank Group
WBGT	Wet Bulb Globe Temperature
WCS	Worst Case Scenario
WCS	Wildlife Conservation Society
WHO	World Health Organisation
WPF	Wind Power Farm
WPFW	West Pacific Flyway
WRI	World Resource Institute
WSDI	Warm spell duration index
WTG	Wind Turbine Generator
WWF	World Wide Fund for Nature

7. ENVIRONMENTAL IMPACT ASSESSMENT

7.1 INTRODUCTION

The following chapter presents the Environmental Impact Assessment to assess impacts arising from the planned activities of the Project and includes a Climate Change Risk Assessment so as to also assess climate and natural hazards to the Project. The scope of the assessment is based on the results of the Scoping Study as presented in *Chapter 5*. A further review of the proposed project activities as presented in the Project Description (*Chapter 3*), the Applicable Standards (*Chapter 2*), and the existing Environmental Baseline (*Chapter 6*) has also been conducted to support the assessment.

Where potential impacts have been identified as potentially significant, mitigation measures and / or management procedures are recommended to address such impacts. Such measures and / or procedures are further presented in the Environmental and Social Management Plan (ESMP), as presented in *Chapter 11*.

7.2 AIR QUALITY IMPACT ASSESSMENT

7.2.1 SCOPE OF ASSESSMENT

Activities in the construction phase that have potential to impact air quality and affected communities, who have been identified as receptors, to the considered impacts are listed in *Table 7-1*. Activities during the operation phase are likely to have an insignificant impact on air quality and were scoped out in the Scoping Study (refer *Section 5.3.3*). Therefore, the scope for impact assessment on air quality is limited to only activities during the construction phase for this ESIA.

TABLE 7-1: SCOPES OF AIR QUALITY IMPACT ASSESSMENT

Phase	Activities	Potential Impacts	Receptors
Construction	• Land preparation (site clearance, excavation and levelling), fencing, and civil works; • Construction of Access Road, internal roads, WTGs foundations, Substation and Control Building, and OHL; • Equipment and material transportation and supply; • Operation of ancillary facilities such as the concrete batching plant, workers' accommodation facility; and • Installation of the WTGs, OHL, internal cabling, Substation, BESS and Control Building.	1. Impact due to dust-generating activities: • Exhaust emissions from vehicles involved in site preparation as well as dust generation may temporarily impact air quality in the immediate area; • Construction and installation activities would generate dust and air emissions resulting in impact to ambient air quality; and • Operation activities of concrete batching plant can results particular matter and dust. 2. Impact due to vehicular exhaust • Use of trucks for the transportation of	• Local herders (classified as 'Residential')

Phase	Activities	Potential Impacts	Receptors
		equipment and construction materials will impact air quality.	

7.2.2 SUMMARY OF BASELINE CONDITIONS

Ambient air quality was monitored on 10th April 2025 to 21st April 2025. The data collected from the monitoring process on the concentrations of PM_{10}, $PM_{2.5}$, NO_2, SO_2 and CO was compared to the corresponding tolerance levels of pollutants specified in the Mongolian Air Quality Standard MNS 4585:2016 and IFC/WBG General EHS Guidelines WHO Ambient Air Quality Limits and reflects the General Procedure for Assessing and Reporting the Air Quality Index, as approved by the Minister of Environment and Green Development, No. A-327, 17th September 2014.

The results of the baseline air quality assessment surveyed in six (6) points showed concentration of PM_{10} and $PM_{2.5}$ were well below the local and international standards. Concentration of NO_2 and SO_2 were not detected and thus at below permissible limits under the good air quality index, in all six (6) survey points. As a result, the ambient air quality is considered as an undegraded airshed.

7.2.3 ASSESSMENT APPROACH AND CRITERIA

7.2.3.1 FUGITIVE DUST EMISSIONS

Impact magnitudes of the identified potential impacts on ambient air quality during construction phase (fugitive dust emissions) are assessed by methodology which aligns with that prescribed by the Institute of Air Quality Management (IAQM) on the Assessment of Dust from Demolition and Construction.

The primary purpose of the dust risk assessment is to identify whether standard, best practice mitigation is sufficient in managing the risk, or if additional site-specific measures are required to effectively reduce the dust risk to an acceptable level.

Impact significances of the identified potential impacts are subsequently determined in *Section 7.2.4.2*.

7.2.3.2 VEHICULAR EXHAUST EMISSIONS

Impact magnitudes of the identified potential impacts on ambient air quality during construction phase (vehicular exhaust emissions) are assessed by methodology in which fundamental aspects are based on the UK Highways Agency Design Manual for Roads and Bridges. A screening approach is undertaken in the absence of detailed traffic information for the Project.

Impact significances of the identified potential impacts are subsequently determined in *Section 7.2.4.2*.

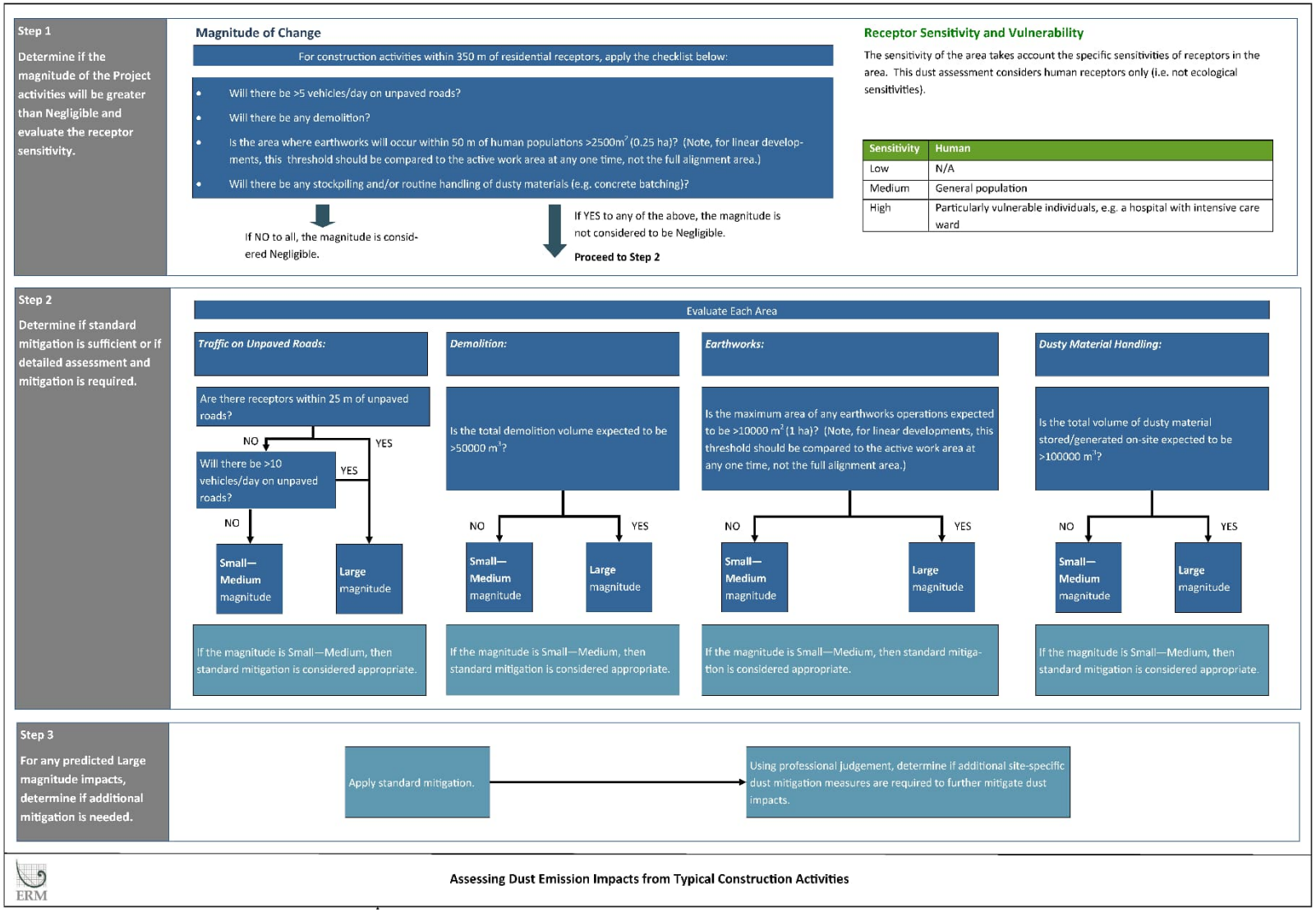
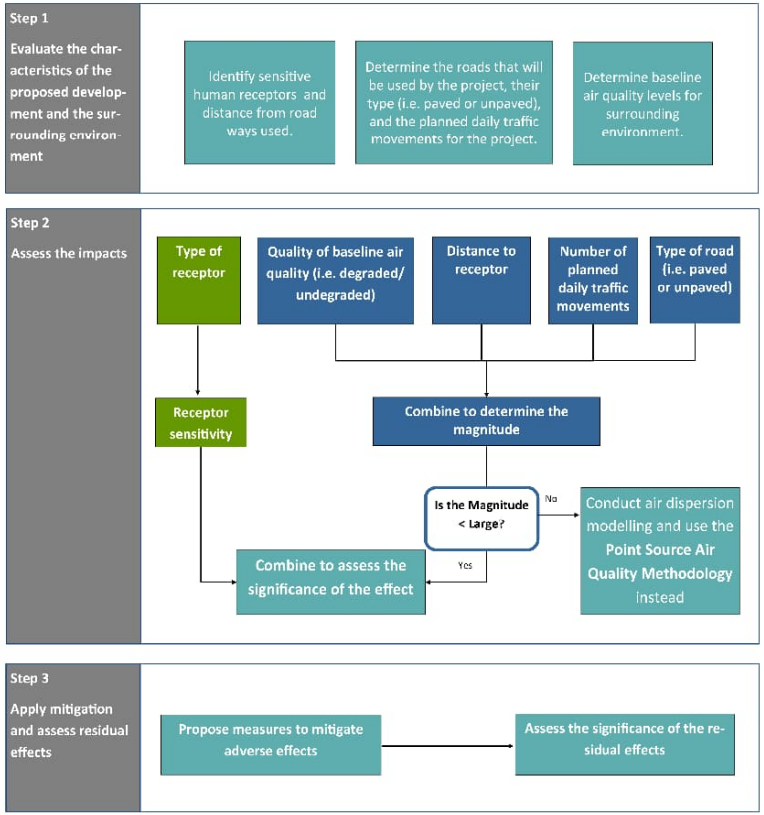


FIGURE 7-1: AQIA METHODOLOGY FOR FUGITIVE DUST EMISSIONS

Overview

The IFC are not prescriptive in determining the threshold of road traffic which may result in significant impacts. The only guidance provided is that operators of fleets with greater than 120 Heavy Goods Vehicles should consider using lower emission vehicles. This methodology is therefore based upon the UK Highways Agency Design Manual for Roads and Bridges assuming Euro 3 or equivalent fleet .

The methodology is based upon the calculated increases in vehicles needed to trigger the significance thresholds, based upon the interpretation of the IFCs significance criteria.



Receptor Sensitivity

Note that this methodology applies only to human receptors (i.e. not ecological receptors). The table below provides receptor sensitivity with respects to human health.

Sensitivity	Description
Negligible	N/A
Low	N/A
Medium	General population
High	Particularly vulnerable individuals, e.g. a hospital with intensive care ward

Magnitude of Change

The magnitude of the impacts to air quality from project traffic are determined using the combination of factors illustrated to the left. The first step in this process is identifying the relative level of traffic.

Road Type	Type of Traffic	Annual Average Daily Traffic (AADT), e.g. number of traffic movements	Level of Project Traffic (Relative to the Baseline Air Quality)	
			Undegraded Airshed	Degraded Airshed
Paved Roads	Heavy Duty Vehicles (HDV)	<440	Negligible	Negligible
		<1000	Negligible	Small
		<3200	Small	Medium
		<15000	Medium	Large
		>15000	Large	Large
	Light Duty Vehicles (LDV)	<7600	Negligible	Negligible
		<17000	Negligible	Small
		<55000	Small	Medium
		<250000	Medium	Large
		>250000	Large	Large

This methodology applies to road traffic exhaust emissions. Emissions of dust arising from the use of unpaved roads by vehicles is assessed separately .

The magnitude can then be determined using the matrix below.

Level of Project Traffic	Distance of Receptor to Road				
	>100m	<100m	<50m	<20m	<5m
Large	Negligible	Small	Medium	Large	Large
Medium	Negligible	Small	Small	Medium	Large
Small	Negligible	Negligible	Negligible	Small	Small
Negligible	Negligible	Negligible	Negligible	Negligible	Negligible

Environmental Resources Management Ltd
2nd Floor, Exchequer Court
33 St Mary Axe
London, EC3A 8AA

Assessing Air Quality Impacts from Road Traffic

FIGURE 7-2: AQIA METHODOLOGY FOR VEHICULR EXHAUST EMISSIONS

7.2.4 IMPACT ASSESSMENT

7.2.4.1 EXISTING/EMBEDDED MEASURES

Construction Phase

The existing controls for the construction phase air quality impacts (fugitive dust emissions and vehicular exhaust emissions) include:

Fugitive Dust Emissions

- Sprinkle water on roadways that are sources of dust during construction and earthworks to reduce dust in the surrounding air;
- Store construction materials, sand, clay, and cement in areas that are minimally exposed to wind and dust to reduce airborne particles;
- Store petroleum products and other hazardous materials in sealed containers at designated points to reduce the emission of volatile dust particles;
- Ensure that construction vehicles follow designated routes to prevent dust, and rehabilitate, plant vegetation, and close any damaged or unused roads;
- Cover fine-grained construction materials such as cement and sand to prevent spillage and transport them using closed vehicles;
- After construction, clean up all construction waste, landscaping, and cover exposed areas with gravel, plant vegetation, or apply hard surfacing; and
- After the completion of construction, ensure that parking areas, vehicle paths, and pedestrian walkways around the station are paved and properly developed.

Vehicular Exhaust Emissions

- Ensure that vehicles, machinery, and equipment undergo annual inspections and regular maintenance to prevent harmful emissions; and
- Monitor and control exhaust emissions from vehicle engines to meet the required standards.

7.2.4.2 SIGNIFICANCE OF IMPACTS

Construction Phase

Fugitive Dust Emissions

This impact assessment for fugitive dust emissions based on the IAQM methodology considers human receptors, which refer to a series of herder settlements identified in the proximity of the Project.

The impact magnitudes from the four types of dust generating activities that fall within 350 m of nearby human receptors are assessed below.

Traffic on Unpaved Roads

- During the early stage of construction phase, a 25 km Access Road will be constructed to connect the existing Heavy Duty Coal Transport Road to the WTG Area; and internal roads

will be established to connect the WTGs and the substation and BESS. Another access road may be built for the OHL that are not close to the existing roads.

- Both the Access Road and internal roads can be unpaved. These roads do not fall within 25 m from the human receptors, however, the vehicular flow on these roads may exceed ten (10) vehicles per day. Details of the access road design for OHL (routing and whether the road will be paved) are not available at this stage.
- However, since the road traffic within the 350 m screening distance depends on the construction activities at the active work areas, which are not expected to be fully active throughout the construction phase, the dust impact from the road traffic is expected to be short-term. In addition, some measures that may mitigate the dust impact from on-site unpaved roads are already in place as stated in *Section 7.2.4.1*, including:
    - Sprinkle water on roadways that are sources of dust during construction and earthworks to reduce dust in the surrounding air; and
    - Ensure that construction vehicles follow designated routes to prevent dust, and rehabilitate, plant vegetation, and close any damaged or unused roads.
- As a result, the magnitude of dust impact from the on-site unpaved roads is likely to be medium at worst.

Demolition

- Negligible dust emission impact from demolition as substantial demolition of existing structures is not expected.

Earthwork

- During the construction phase of the Project, major earthworks (e.g. site clearance, excavation and ground levelling) are associated with the construction of WTG foundations, substation, storage area, Access Road and internal roads.
- Detailed design for the construction of OHL poles and towers is not available at this stage. However, minor earthworks including soil excavation and grounding installation are expected.
- However, no earthworks will occur within 50 m of the human receptors. The nearest earthworks to the human receptors would be for the internal roads which are still located approximately 100 m way from the local herder (i.e. [redacted] Moreover, the construction phase of the Project will last for a short period (about 17 months), and the construction will occur in phases which the actual disturbed area at any time during construction is likely to be lower. Hence, the dust impact magnitude from earthwork is expected to be negligible.

Dusty Material Handling

- The Project will set up stockpile areas and a temporary concrete batching plant on-site to supply concrete for the construction of WTG foundations. Handling of dusty materials will occur for mainly the stockpiling and construction of WTG foundations.
- The capacities of the stockpile areas are unavailable at this stage. However, the location of stockpile areas is outside of 350m of the human receptors, and part of the excavated materials will be used as backfilling in Project construction sites. Moreover, mitigation measure as stated in *Section 7.2.4.1* are currently in place to reduce the dust impact from dusty material handling:

- Store construction materials, sand, clay, and cement in areas that are minimally exposed to wind and dust to reduce airborne particles; and
- Cover fine-grained construction materials such as cement and sand to prevent spillage and transport them using closed vehicles.

Therefore, the dust impact magnitude from handling of dusty material in stockpile areas is expected to be negligible.

- For the concrete batching plant, it is assumed that approximately 700 m^3 of concrete will be required per WTG foundation, therefore, a total of approximately 20,300 m^3 of concrete (i.e. from multiplying 700m^3 of concrete by 29 WTGs) will be stored/generated on-site, which is expected to be far less than the screening criteria of 100,000 m^3.
- As a result, the dust impact magnitude from dusty material handling is considered as small at worst.

The overall impact significance of fugitive dust emissions is summarised in *Table 7-2* below.

TABLE 7-2: IMPACT ON AIR QUALITY DURING CONSTRUCTION PHASE (FUGITIVE DUST EMISSION)

Impact		Impact on Air Quality during Construction Phase (Fugitive Dust Emission)			
Nature		Negative	Positive	Neutral	
		Depletion of ambient air quality, in terms of PM during construction phase			
Type		Direct	Indirect	Induced	
		Impact from fugitive dust emission in the construction phase is direct			
Duration		Temporary	Short-term	Long-term	Permanent
		Impact will only occur during the short period of time (17 months), and therefore be described as short-term			
Extent		Local	Regional	International	
		Impact is expected to be limited to the vicinity of the Project Site and therefore is considered local			
Scale		Impact scale is considered small given the localised and short-term impact duration			
Frequency		During daytime and nighttime throughout the construction phase			
Magnitude	Positive	Negligible	Small	Medium	Large
		Magnitude of impact ranges from negligible to medium, depending on the type of construction activities			
Resource/Receptor Sensitivity		Low	Medium	High	
		General population is classified as receptor with medium sensitivity.			
Significance		Negligible	Minor	Moderate	Major

Impact	Impact on Air Quality during Construction Phase (Fugitive Dust Emission)
	Without additional mitigation measures, the significance of impact ranges from negligible to moderate, depending on the type of construction activities.

Vehicular Exhaust Emissions

The road traffic risk assessment considers the project-induced Annual Average Daily Traffic (AADT) (i.e. the number of additional vehicle movements due to the Project) on roads to establish the magnitude of the air quality impact, in terms of NO_2 and PM, from the vehicular emission on human receptors based on their relative distance to the road.

The Project will utilise a total of 31 machineries which are mobile on road for the construction works (*Table 7-3*). It is therefore unlikely the average Project-induced traffic movements (as AADT) will be more than 440 (for Heavy Duty Vehicles) and 7600 (for Light Duty Vehicles). In this regard, the magnitude of the air quality impact from construction traffic is considered negligible.

TABLE 7-3: QUANTITY OF MOBILE MACHINERIES

Mobile Machinery	Unit	Quantity
300 tonnes hydraulic truck mounted crane	Set	3
Concrete transport mixer	Vehicle	10
Concrete pump	Set	5
Dump truck	Vehicle	6
Motor truck	Vehicle	2
Water transporting vehicle	Vehicle	1
Sprinkling truck	Vehicle	1
Flat-bed transport vehicle	Set	3
Total Quantity		31

The overall impact significance of vehicular exhaust emissions is summarised in *Table 7-4* below.

TABLE 7-4: IMPACT ON AIR QUALITY DURING CONSTRUCTION PHASE (VEHICULAR EXHAUST EMISSIONS)

Impact	Impact on Air Quality during Construction Phase (Vehicular Exhaust Emission)		
Nature	Negative	Positive	Neutral
	Depletion of ambient air quality, in terms of NO_2 and PM, during site preparation and construction phase.		
Type	Direct	Indirect	Induced

Impact	Impact on Air Quality during Construction Phase (Vehicular Exhaust Emission)				
	Impact from vehicular exhaust emission in the construction phase is direct.				
Duration	Temporary	**Short-term**	Long-term	Permanent	
	Impact will only occur during the short period of time (17 months), and therefore be described as short-term.				
Extent	**Local**	Regional	International		
	Impact is expected to be limited to the vicinity of the Project Site and therefore is considered local.				
Scale	Impact scale is considered small given the localised and short-term impact duration.				
Frequency	During daytime throughout the construction phase.				
Magnitude	Positive	**Negligible**	Small	Medium	Large
	The Project utilises only limited number of mobile machineries, and therefore impact magnitude is considered negligible.				
Resource/Receptor Sensitivity	Low	**Medium**	High		
	General population is classified as receptor with medium sensitivity.				
Significance	**Negligible**	Minor	Moderate	Major	
	The significance of impact is considered negligible during construction phase.				

7.2.4.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

Construction Phase

Fugitive Dust Emissions

The following good practice measures are required to further mitigate the impacts from fugitive dust emissions:

- A Construction Air Quality Management Plan (CAQMP)) will be developed and implemented. The CAQMP will contain the measures outlined in this document and a plan for implementation;
- Regular site inspections will be performed to monitor compliance with the CAQMP. All inspection results will be recorded, and corrective actions taken where mitigation and management measures are not being implemented effectively (i.e., to reduce dust emissions);
- Daily onsite and offsite inspections will be undertaken to visually assess the dust emissions from earthwork and construction activities, and from vehicles exiting the construction sites. Results from the inspection will be recorded and appropriate measures such as those presented in this table will be taken to reduce emissions where necessary;
- All dust and air quality complaints will be recorded, the cause identified and appropriate measures such as those presented in this table will be implemented to reduce dust emissions in a timely manner;

- The frequency of site inspections will be increased when activities with a high potential to produce dust are being carried out and during prolonged dry and windy conditions;
- The Project will keep records of all inspections, dust complaints, and corrective actions. The records will be kept on site and made available for inspection when necessary;
- The site layout will be planned so that dust causing activities are located as far as possible from social receptors;
- Screens or barriers will be erected around dusty activities or the site boundary that are at least the height of any stockpile on site;
- All chutes and skips will be covered at all time;
- Drop heights from loading shovels and hoppers will be minimised;
- Open burning of waste is not allowed; and
- Watering or use of proprietary suppressants will be used to suppress wind and physical disturbance dust generation. The use of water or proprietary suppressants should be carefully managed throughout the Project. During the rain season (typically July-September), rainfall will provide natural suppression for periods of time, however high temperatures will result in rapid evaporation and drying of surfaces. The Project should ensure an adequate water supply and actively manage the use of water for dust suppression. The Project should consider the use of proprietary suppressants in drier months when rainfall is infrequent.

Vehicular Exhaust Emissions

As the impact significance of vehicular exhaust emissions is considered negligible, no addition mitigation, management and monitoring procedures will be required.

7.2.4.4 MONITORING AND AUDITING

Monitoring of air will be conducted in compliance with the monitoring program outlined in the Local Environmental Management Plan approved by the Mongolian authorities.

Monitoring may be required under the Construction Air Quality Management Plan.

7.2.4.5 RESIDUAL IMPACTS

With the implementation of the recommended mitigation measures proposed in *Section 7.2.4.3*, the residual impacts in regard to fugitive dust emissions are expected to be minor.

The residual impacts in regard to vehicular exhaust emissions from induced traffic are expected to be negligible given its negligible impact significance.

7.3 CLIMATE CHANGE IMPACT ASSESSMENT

7.3.1 SCOPE OF ASSESSMENT

This Chapter includes a physical Climate Change Risk Assessment (CCRA) undertaken by ERM on behalf of the client as per the Scoping Study (*Chapter 5*). The CCRA was conducted in alignment with IFC Performance Standards as well as with the Equator Principles 4 (EP4) due to its more comprehensive guidance for the assessment[1]. The CCRA consists of a qualitative risk analysis of the climate and natural hazards that could occur and impact the critical

[1] It may be noted EP4 is not an applicable standard for this Project.

infrastructure of the Project, and throughout the Project lifecycle. The full list of climate hazards considered can be found in *Section 7.3.3*.

The critical infrastructure in scope of the CCRA is listed below:

- The wind power farm
- The battery energy storage system
- The transmission line from the Project site to the Oyu Tolgoi mine
- Key access routes to the Project site.

The environmental and social (E&S) impacts/effects associated with the major hazards are assessed in reference to the IFC Performance standards. High-level recommendation on mitigation measures is also provided.

7.3.2 ASSESSMENT APPROACH AND CRITERIA

The assessment follows ERM's standard methodology which has been developed to align with the EP4 guidelines. A number of climate hazards have been considered for this study. For each of these hazards, ERM has selected a number of climate indicators. A climate indicator represents a measurable variable that indicates and reflects the state or trends of the climate system over time. For example, a common hazard is extreme heat, to assess such hazards one can measure the human heat stress indicator or the number of extreme hot days in a year.

Time horizons

To understand how future climate may change compared to historic conditions, climate hazards were generated to represent a "climate normal" by averaging the climate hazard over a 30-year time period. Therefore, the time horizons selected were baseline (1985-2014), 2030 (2015-2044), 2050 (2035-2064). The time horizons were selected based on the Project's expected life span as well as in alignment with the EP4 guidance note on climate change risk assessment. It is important to note that the consideration of a 30-year data in defining a climate normal follows the definition set by the World Meteorological Organization[2].

Climate scenarios

The CCRA used the latest scenarios from the latest IPCC Sixth Assessment Report (AR6), specifically the Shared Socioeconomic Pathways (SSPs). The SSPs illustrate how the natural and physical environment may respond to qualitative narratives regarding the pace of emissions reduction or acceleration due to societal changes. The CCRA uses the SSP1-2.6 and SSP5-8.5 scenarios. These represent a range of potential outcomes and can aid in preparedness against future risks.

The SSP scenarios were selected for the following reasons:

- Facilitates the alignment with the EP4 guidance
- Robust information supporting the scenarios which describes trends to which the Project may be sensitive, facilitating the required risks analysis.

[2] Guidance CCRA_May 2023

TABLE 7-5: CLIMATE SCENARIOS USED IN THE CCRA

Scenarios	Description
SSP1-2.6 (very low emissions)	A low emissions scenario that represents a sustainable future with 'taking the green road' and low challenges to mitigation and adaptation. Under this scenario, the world shifts towards a more sustainable path driven by more commitments to achieving the goal of below 2°C in Paris Agreement. By the end of 21st century, the projected global warming is between 1.3°C and 2.3°C above pre-industrial levels, with the best estimate being 1.8°C
SSP5-8.5 (very high emissions)	A high emissions scenario which follows a business-as-usual trajectory, assuming no additional climate policy and seeing CO2 emissions in 2100 triple compared to 2015 levels. By the end of the 21st century, the projected global warming is between 3.3°C and 5.7°C above pre-industrial levels, with the best estimate being 4.4°C

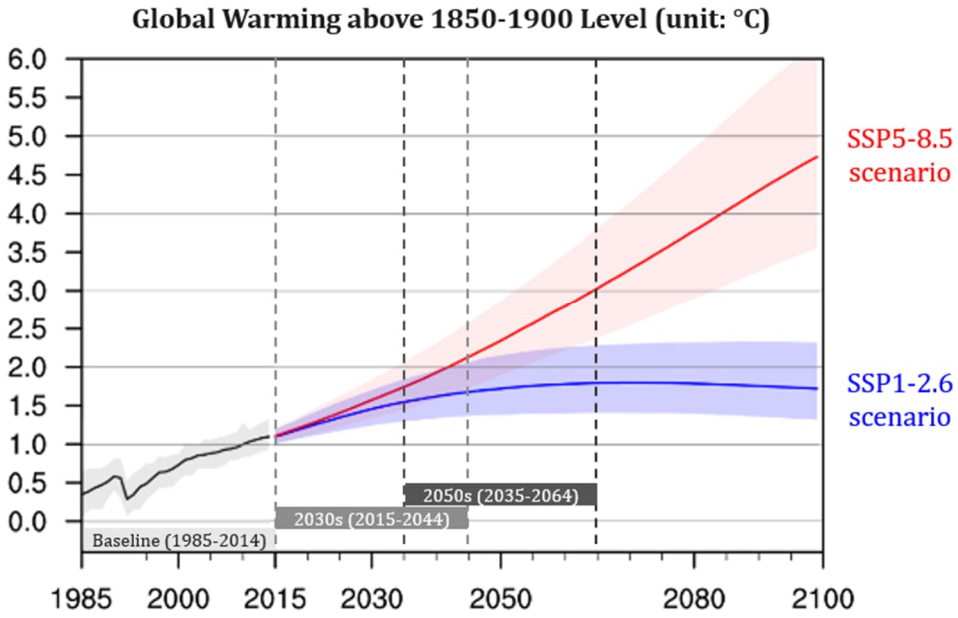


FIGURE 7-3: GLOBAL WARMING ABOVE 1850-1900 LEVEL UNDER THE TWO SELECTED CLIMATE SCENARIOS[3].

Climate data

ERM collected a set of climate data to further understand the extent to which climate hazards could pose a risk to the site. The data were collected from ERM's Global Climate Database (GCD), which extracts and contains data from internationally recognised databases such as the European Space Agency (ESA), the National Aeronautic Space Administration (NASA), the National Oceanic and Atmospheric Association (NOAA), and the World Resource Institute (WRI). The data utilises statistically downscaled high-resolution data (0.5°x0.5°) generated from the state-of-the art global climate model simulations participating in IPCC AR6. It draws upon five primary models that were selected by the third phase of the Inter-sectoral Impact assessments as they represent the full range of uncertainty in the CMIP6 climate models. It

[3] Redrawn from https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf

includes models with low climate sensitivity (GFDL-ESM4, MPI-ESM1-2-HR, MRI-ESM2-0) and models with high climate sensitivity (IPSL-CM6A-LR, UKESM1-0-LL).

Twenty-fiver climate indicators were generated for each of the climate models, and the multi-model mean of the models was calculated for each indicator. The data was then resampled at a monthly, seasonal, or annual timesteps, where the 95th percentile across 30 years is taken for each time horizon to determine the upper bounds of an indicator. For example, when sampling the warm spell duration index for a model, the index was calculated first for each year, and then the 95th percentile across the 30 years was selected.

The use of mean outcomes does not account for the uncertainty of variability for a given indicator or the increasing likelihood of extremes within a data set, however, for the purposes of developing plausible future scenarios, this approach is considered best practice.

Climate output variables from the models were downscaled by ISMIP and then bias corrected to ensure that the historical (baseline) model data is representative of the true climate experienced between 1980-2022, 1985-2014 or 1961-2014 depending on the chosen indicator. The observational dataset used for bias adjustment and statistical downscaling in ISMIP3b models is version 2.0 of WGDE5 over land, merged with ERA5 over the ocean.

The list of climate hazards evaluated in the assessment are listed below. For each climate hazard, a set of climate indicators was also chosen.

TABLE 7-6: LIST OF CLIMATE HAZARDS AND INDICATORS

Climate hazard	Climate indicator (unit)	Baseline time horizon	Data source
Extreme heat	Warm spell duration index (days)	1985-2014	ISIMIP3b CMIP6 models
	Human heat stress (days)		
	Highest daily maximum temperature (deg C)		
	Annual-mean maximum temperature (deg C)		
	Annual-mean temperature (deg C)		
Extreme cold	Lowest daily minimum temperature (deg C)		
	Annual-mean minimum temperature (deg C)		
	Number of ice days (days)		
	Cold spell duration index (days)		
	Number of frost days (days)		

Climate hazard	Climate indicator (unit)	Baseline time horizon	Data source
Flooding	1-in-500 year fluvial inundation depth (m)	2020	Fathom 3.0
	1-in-500-year pluvial inundation depth (m)	2020	Fathom 3.0
Extreme rainfall	Maximum 1-day precipitation (mm)	1985-2014	ISIMIP3b CMIP6 models
	Maximum 5-day precipitation (mm)		
	Maximum 1-in-500 year 1-day precipitation (mm)	2020	ISIMIP3b CMIP6 models
	Maximum 1-in-500 year 5-day precipitation (mm)		
	Number of days above 20 mm (days)	1985-2014	ISIMIP3b CMIP6 models
	Number of days above 10 mm (days)		
	Annual total precipitation (mm)		
Extreme winds and storms	Mean wind speed (m/s)	1980-2022	IBTrACS V4
Rainfall-induced landslides	Rainfall-induced landslide index (days)	1985-2014	ISIMIP3b CMIP6 models, NASA's Landslide Susceptibility Map
Water stress and drought	Number of consecutive dry days (days)	1985-2014	ISIMIP3b CMIP6 models
	Water stress (categorical)	1960-2014	WRI Aqueduct Water Risk Atlas
Wildfire	Forest fire danger index (days)	1985-2014	ISMIP3b CMIP6 models
	Maximum burned area (m^2)	1989-2018	European Space Agency

Risk categories

The CCRA is a qualitative assessment. To determine the extent to which a climate hazard could impact the construction and operation of the Project, ERM has developed a risk category rating scale. This approach is often used in risk assessments, where either using or developing a company's enterprise risk management, the potential impact of a climate hazard is linked to its severity and damage to the Project, such as the normal operation of the Project, health and safety impacts, and other financial impacts associated with damages or disruptions.

TABLE 7-7: RISK MATERIALITY CATEGORY

Risk materiality category		Definition
Unlikely material		Impacts with this category (such as those related to operational, financial or other types of impacts are unlikely to be material. This means that, for example, (a) operational impacts could be expected to be short term, impacting a limited proportion of the overall asset and its operations, or (b) financial impacts would be expected to be minimal relative to the project's overall revenue and/or costs.
Likely material	Low to moderate	Impacts with this category (such as those related to operational, financial or other types of impacts) are likely to be of low-moderate materiality. This means that, for example, (a) operational impacts could be expected to be short to medium term, impacting a low to moderate proportion of the overall asset and its operations, or (b) financial impacts would be expected to be small to moderate relative to the project's overall revenue and/or costs.
	High	Impacts associated with this category (such as those related to operational, financial, or other types of impacts) are likely to be high materiality. This means that, for example, (a) operational impacts could be expected to be medium to long term, impacting a large to significant proportion of the overall asset and its operations, or (b) financial impacts would be expected to be moderate to high relative to the project's overall revenue and /or costs.

7.3.3 IMPACT ASSESSMENT

7.3.3.1 EXTREME HEAT

TABLE 7-8: CLIMATE DATA OF EXTREME HEAT

Climate indicator	Baseline	SSP1-2.6		SSP5-8.5	
		2030	2050	2030	2050
Warm spell duration index (WSDI) (days)	12	29.2	39.3	36.7	77.4
Human heat stress index	1.5	4	7.5	6.5	13.5
Highest daily maximum temperature (deg C)	36.23	38.9	38.93	38.39	40.09
Annual mean maximum temperature (deg C)	11.03	12.19	12.92	12.39	13.92
Annual mean temperature (deg C)	4.84	6.07	6.76	6.29	7.79

Outputs from the climate indicators indicate an increasing trend in extreme heat related events at the Project site. The annual number of warm days in the area is projected to increase over time (i.e., 12 days under baseline conditions and 77.4 days in 2050 under a high emissions scenario). Furthermore, the highest daily maximum temperature is also projected to increase from 36.23°C under baseline conditions to 40.09°C by 2050 time horizon under SSP5-8.5 scenario. In addition to this, the annual mean maximum temperature, which under baseline conditions is 11.03°C, is projected to only slightly increase to 13.92°C in 2050 under a high emissions scenario. The annual mean temperature being low at 4.84°C at present day and projected to increase to 7.79°C in 2050 under the SSP5-8.5 scenario. Additionally, the human heat stress index being 1.5 days under baseline conditions and projected to increase to up to 13.5 days in 2050, which only represent ~3% of a calendar year.

TABLE 7-9: RISK ANALYSIS OF EXTREME HEAT

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
Site personnel	Extreme heat could pose a health and safety risk to workers during the construction phase. Whilst the site is located in a cooler region. Highest daily maximum temperature can reach ~36°C. Furthermore, the site is situated in a grassland semi-arid area with low vegetation and no tree cover. Hence, high temperatures can cause heat stress and dehydration, and therefore increase the risk of accidents, heat related illnesses, and reduced productivity.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.
The wind power farm	At the construction phase, extreme heat related hazards would pose minimal risk to the wind turbines. Whilst during operation, extreme heat events could affect the gearboxes, generators, and other power electronics components in the nacelle, as these may be subject to thermal stress and may lead to decrease output or even wind turbine shutdown.	The risk is unlikely material under baseline conditions.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
The battery energy storage system (BESS)	BESS are temperature sensitive systems that require active cooling to maintain optimal operations. Extreme heat events could pose several risks to day-to-day operations of the BESS. These can include: (i) Overheating of batteries due to extreme heat conditions can lead to thermal runaway which subsequently can vaporise electrolytes present in the batteries and can be ventilated and thus release toxic chemical compounds. (ii) Damage to electrical components and other heat sensitive equipment in the BESS, which can also lead to malfunctioning of equipment. (iii) Increased energy demand to cool the BESS. This could increase operational expenditure associated with the Project. The risks described above are likely to be material during the operational phase of the BESS and not the construction phase. However, as the project is located in a region where maximum temperatures are not expected to	The risk is unlikely material under baseline conditions.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	exceed 40°C under a high emission scenario (2050) the overall risk is considered to be low to moderate, as majority of BESS are designed to withstand temperatures up to 50°C.			
The transmission line from the Project site to the Tolgoi mine	Extreme heat events can have the following effects on transmission lines: (i) Decrease in transmission line optimal carrying capacity due to increase in ambient temperature. (ii) Thermal degradation of the transmission lines (iii) Thermal elongation which increases line sag Extreme heat is expected to have only a minor impact on the construction phase of the transmission lines, furthermore, based on the extreme heat climate indicator, even though there is an increasing trend in extreme heat related events, the maximum daily temperature is not expected to surpass 40 degree Celsius. Hence, the risk is considered to be likely but low to	The risk is unlikely material under baseline conditions.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	moderate during the operation phase.			
Key access routes to the Project site	Increased temperature and extreme heat events could accelerate the drying and cracking of the road surface. This may render the road less stable on possibly more prone to washouts following rainfall events. Therefore faster road degradation could lead to increased operational expenditures to maintain the road in a good state. On its own this hazard is unlikely to present a material risk.	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

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7.3.3.2 EXTREME COLD

TABLE 7-10: CLIMATE DATA FOR EXTREME COLD

Climate indicator	Baseline	SSP1-2.6		SSP5-8.5	
		2030	2050	2030	2050
Lowest daily minimum temperature (deg C)	-33.39	-32.26	-31.47	-30.5	-30.78
Annual mean minimum temperature (deg C)	-1.75	-0.44	0	-0.21	1.09
Number of ice days (day)	111.3	102.1	100.9	105.8	95.2
Cold spell duration index (days)	9.1	4.5	5.1	5.3	3.4

Climate indicator	Baseline	SSP1-2.6		SSP5-8.5	
		2030	2050	2030	2050
Number of frost days (days)	194.1	185.3	182.6	187.1	180.7

The climate indicators used to represent extreme cold indicate that the hazard may pose a risk to the site. Even though there is a slight decreasing trend of extreme cold over future time horizons and emissions scenarios, the intrinsic value of each climate indicators demonstrates that the extreme cold remains a hazard that could pose risks to both the construction and operation of the site. Under baseline conditions, the lowest daily minimum temperature is -33.39°C, the number slightly decreases to -30.78° in 2050 with the SSP5-8.5 scenario. The annual mean minimum temperature follows a similar trends with baseline numbers indicating -1.75°C and rises to 1.09°C in 2050 (SSP5-8.5). The number of ice days which in present day is 111.3, which represents ~30% of the calendar year, decreases to 95.2 (i.e., 26% of the calendar year) in 2050 (SSP5-8.5). The number of frost days follows the same trajectory, indicating that the number of frost days at the Project site decreases from 194.1 to 180.7, a -6.9% decrease from baseline to 2050 (SSP5-8.5). Nevertheless, nearly half of the year the site is experiencing frost conditions.

TABLE 7-11: RISK ANALYSIS OF EXTREME COLD

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
Site personnel	As shown by the climate indicators above, extreme cold is set to pose a moderate to high risk for personnel working on site. As half of the time throughout the calendar year the site is experiencing frost like conditions, and 30% of the year ice days like conditions. Furthermore, the	Likely material, High.	Likely material, high.	Likely material, high.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	lowest maximum daily temperature can reach up to -33°C. Such conditions can lead to cold stress and associated illnesses for personnel working on site. Prolonged exposure to sub-zero temperatures can lead to hypothermia, frostbite. It can also affect worker productivity, affecting their manual dexterity and more easily increase fatigue levels. Furthermore, icy conditions can increase the risk of slips, trips, falls and associated injuries. Such hazards carry through from the construction phase to the operation phase, hence the risk is likely material and high.			
The wind power farm	Whilst the south Gobi region is known for having a very dry climate, extreme cold events can still occur. Therefore under extreme cold conditions wind turbines can experience: (i) Icing and frost of the blades. Ice accretion can deteriorate the turbine performance, increase	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	component wear and can also cause potential health and safety risk to personnel due to ice throw. (ii) Extreme cold stress on nacelle components such as gearboxes, bearings and other power electronics if they are not rated/adapted for sub-zero conditions. (iii) Increased rate of deterioration can reduce the lifetime of the blades and the wind turbine, therefore higher operational and maintenance costs can be expected. Extreme cold conditions can also affect the transportation of the wind turbines to the site, and hence could delay the construction of the project as the site is situated in a remote area with limited road access.			
The battery energy storage system	If temperature conditions are not kept at sufficient levels, extreme cold events could have the following effects on BESS:	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	(i) Decrease in battery performance and power output, due to reduction in energy density and slower charge/discharge rates. (ii) Increase in HVAC activity and hence increase in associated operational costs to maintain optimal operational temperature. Extreme cold conditions can also affect the transportation of the BESS components to the Project site and hence could delay the construction of the Project as the site is situated in a remote area with limited road access.			
The transmission line from the Project site to the Tolgoi mine	Extreme cold events can cause the following risks to the transmission lines: (i) Degradation of transmission lines and damaging of insulation material. (ii) Accumulation of ice and snow can increase the weight, mechanical stress, and	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	structural fatigue on both the conductors and the towers. These combined factors can cause a risk of decrease in operational reliability and physical integrity of transmission lines. Extreme cold conditions can also affect the transportation of transmission lines components to the Project site and hence could delay the construction of the Project as the site is situated in a remote area with limited road access.			
Key access routes to the Project site	Extreme cold conditions, including ice and snow conditions may render the development of roads difficult as vehicles may not easily navigate these conditions, for instance frozen ground can hinder excavation and grading, thus extreme cold conditions can cause delay to the development of the roads. During the operation phase, freeze-thaw cycles cause frost heave where water in the solid freezes and expands,	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	therefore lifting the road surface. As well as thaw weakening when ice melts and the road becomes soft and muddy. These cycles can also lead to the formation of potholes. Roads covered in ice, frost, or snow can cause traction loss for vehicles and increase the risk of accidents. Therefore, there may an associated cost and capital expenditure in road maintenance.			

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7.3.3.3 EXTREME RAINFALL AND FLOODING

TABLE 7-12: CLIMATE DATA FOR EXTREME RAINFALL AND FLOODING

Climate indicator	Baseline	SSP1-2.6		SSP5-8.5	
		2030	2050	2030	2050
1-in-500-year flood inundation depth (m)	0	0	0	0	0
1-in-500-year pluvial flood inundation depth (m)	0.97	0.97	1.19	0.96	0.96
Maximum 1-day precipitation (mm)	18.12	20	21.37	19.97	22.94
Maximum 5-day precipitation (mm)	34.32	34.29	33.59	38.12	37.97
Maximum 1-in-500-year-1-day precipitation (mm)	48.35	43.87	53.89	46.51	46.77
Maximum 1-in-500-year 5-day precipitation (mm)	77.69	74.51	81.65	76.55	62.64
Number of days above 20 mm (days)	0.6	0.6	0.9	0.8	0.8

Climate indicator	Baseline	SSP1-2.6		SSP5-8.5	
		2030	2050	2030	2050
Number of days above 10 mm (days)	2.2	2.7	2.7	2.7	2.8
Annual total precipitation (mm)	117.3	130.28	129.54	127.35	136.35

The Project site is located in a semi-arid region, therefore, annual precipitation is low, with the total annual precipitation estimated at 117.3 mm and the rainiest months being June, July, August (ECMWF ERA5, Past Climate Explorer). This is further illustrated by the different climate indicators used to represent extreme rainfall and flooding. The maximum 1-day precipitation is 18.32 mm which only slightly increases to 20mm in 2030 under a low emissions scenario and to 21.37mm in 2050 (SSP1-2.6). The maximum 5-day precipitation follows a similar trend where the present-day values remain stable over future time horizons and climate scenarios. Similarly, the total number of days above 20mm remains below one (1) from present day to future time horizons. When looking at a probabilistic 1-day rainfall event with a 1-in-500 year occurrence the baseline values indicate a rainfall amount of 48.35mm for baseline conditions and is expected to remain within a similar range over future time horizons and climate scenarios. The main indicator of concern is the 1-in-500-year pluvial inundation depth, which indicates a value near 1m of inundation depth, future projections indicate similar levels expect for 2030 under the SSP1-2.6 scenario where the inundation depth reach 1.19m. The flood map below indicates that some areas of the project site for the wind turbines could be affected by rainfall flooding. These depth levels are dependent on the local topography and catchment area where the site is situated.

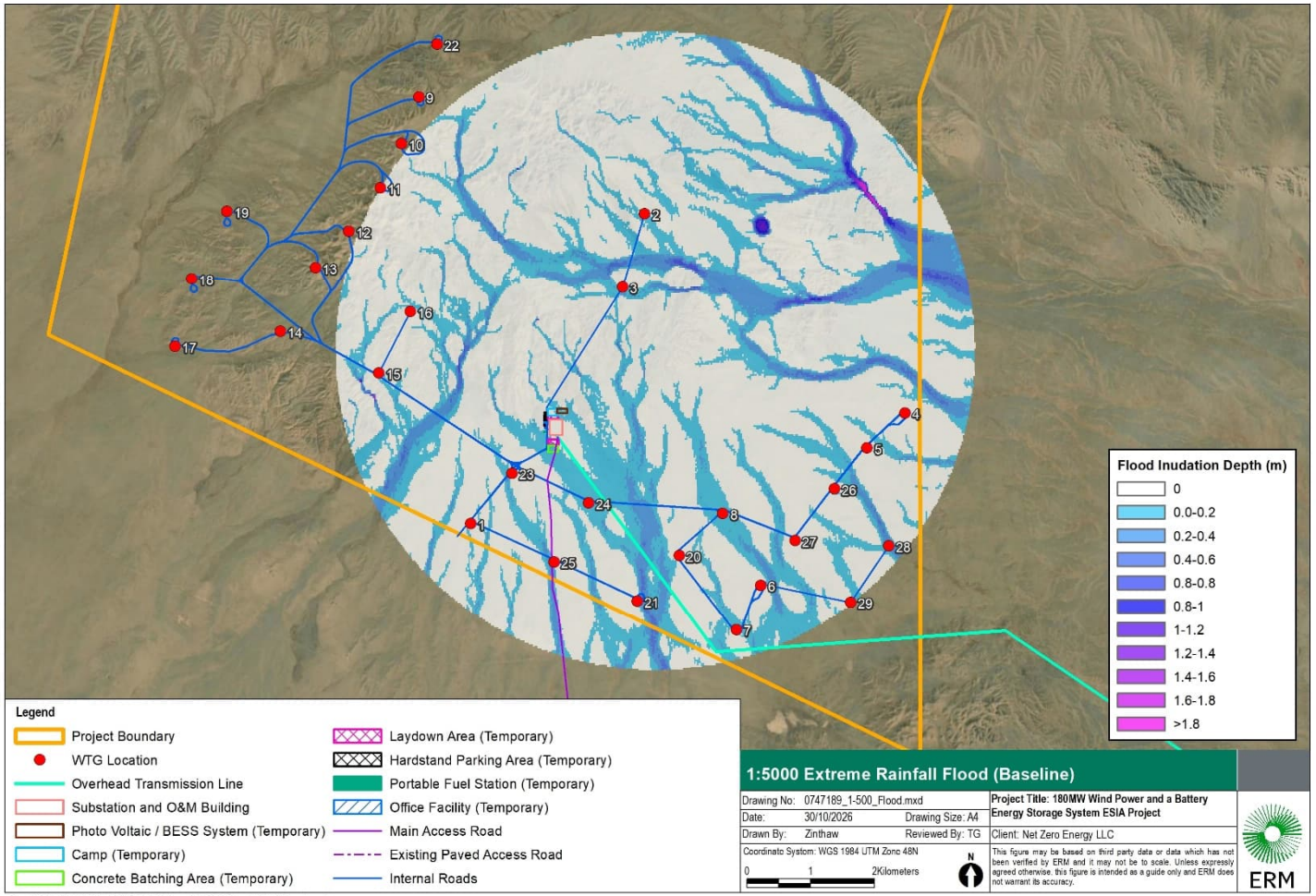


FIGURE 7-4: MAXIMUM 1-IN-500-YEAR (0.2% ANNUAL EXCEEDANCE PROBABILITY) FLOOD INUNDATION DEPTH.

TABLE 7-13: RISK ANALYSIS OF EXTREME RAINALL AND FLOODING

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
Site personnel	Extreme rainfall and associated flooding events can cause health and safety risks to site personnel in several ways. During the construction phase, rainfall and flooding events can render the area of the Project site wet, muddy, and uneven terrain, which them increases the risks of falls, especially near slopes or excavation sites. Site access may be reduced if water has accumulated along key roads, this could cause delay in site construction. Overall, rainfall like conditions can reduce worker productivity. Based on the climate indicator data trend, it is deemed that the risk materiality of this hazard is likely but low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
The wind power farm	Extreme rainfall and associate flooding events can reduce road access and could delay delivery of turbine and other necessary components and equipment. When laying the foundation for the wind turbine, the excavation for the foundations may flood and would require additional expenses and efforts as pumping of water may be required. Concrete pouring may be compromised due to high moisture, which could also affect the structural integrity of the foundation. During the operational phase, rainfall and water can infiltrate into the tower base or nacelle which can lead to corrosion and damage electrical equipment if not appropriately insulated. Additionally, there may be risks of short circuits or power outages if the	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	substation or underground cables are flooded. Based on the climate indicator data trend, it is deemed that the risk materiality of this hazard is likely but low to moderate.			
The battery energy storage system	Extreme rainfall and associate flooding events can reduce road access and could delay delivery of turbine and other necessary components and equipment. When laying the foundation for the BESS the excavation for the foundations may flood and would require additional expenses and efforts as pumping of water may be required. During the operational phase, water ingress may occur, damaging critical electrical equipment and components which can cause technical and safety risks.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	Based on the climate indicator data trend, it is deemed that the risk materiality of this hazard is likely but low to moderate.			
The transmission line from the Project site to the Tolgoi mine	Similarly to the above critical infrastructure to the project, extreme rainfall and flooding event can reduce road access and could delay delivery of towers, conductors, and other equipment. During operation, extreme rainfall and flooding event can affect the surrounding soil and base of the towers, therefore undermining the structural stability. Based on the climate indicator data trend, it is deemed that the risk materiality of this hazard is likely but low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.
Key access routes to the Project site	Key access roads can be affected by extreme rainfall and flooding in several ways:	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	(i) Unpaved roads are susceptible to erosion, and gully formation during intense rainfall events. (ii) Structural weakening of the roads and potential road collapse in embankment sections as well as increase in slope instability. Based on the climate indicator data trend, it is deemed that the risk materiality is likely, ranging from low to moderate.			

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7.3.3.4 EXTREME WINDS AND STORMS

TABLE 7-14: CLIMATE DATA FOR MEAN WIND SPEED

Climate indicator	Baseline	SSP1-2.6		SSP5-8.5	
		2030	2050	2030	2050
Mean wind speed (m/s)	4.61	4.62	4.51	4.56	4.54
Mean wind speed (km/h)	16.6	16.6	16.2	16.4	16.3

Within the vicinity of the Project site, the historical mean monthly wind speed ranges from 16 km/h (August) to 21 km/h (April). Whereas the monthly maximum wind gust speed ranges from 63 km/h (July) to 82 km/h (April) (ECMWF ERA5, Past Climate Explorer). The mean wind speed indicator from the GCD indicates that the mean wind speed around the Project site is projected to remain unchanged over future time horizons and climate scenarios.

Additionally, the site is located in the southern part of Mongolia, where local climate and environmental conditions make it easier for dust storms to form and propagate. According to Cooper et al. (2013), the site is located in a region that experiences 30 or more dust storms per year. Bao et al. (2025) showed that dust intensity increased at approximately two-thirds of monitoring stations in Mongolia during 2001-2022. Han et al. (2021) suggested that a combination of a warmer and drier climate and widespread desertification (affecting 77% of Mongolia's land area) favours dust storm activity. Under climate change, both temperature and precipitation are projected to increase in Mongolia. Increased precipitation may suppress dust storm activity enhanced by higher temperature. The IPCC WGI Interactive Atlas (https://interactive-atlas.ipcc.ch/regional-synthesis) indicates low confidence in direction of change for sand and dust storm activity in Mongolia (*Figure 7-6)*. Therefore, the risk of sand and dust storm activity during the operational phase is projected to remain at the baseline level.



Fig. 3. Areas of Mongolia by number of annual dust storms.

FIGURE 7-5: NUMBER OF ANNUAL DUST STORMS ACROSS DIFFERENT REGIONS IN MONGOLIA. SOURCE: COOPER, C. & SOVACOOL, B (2013).

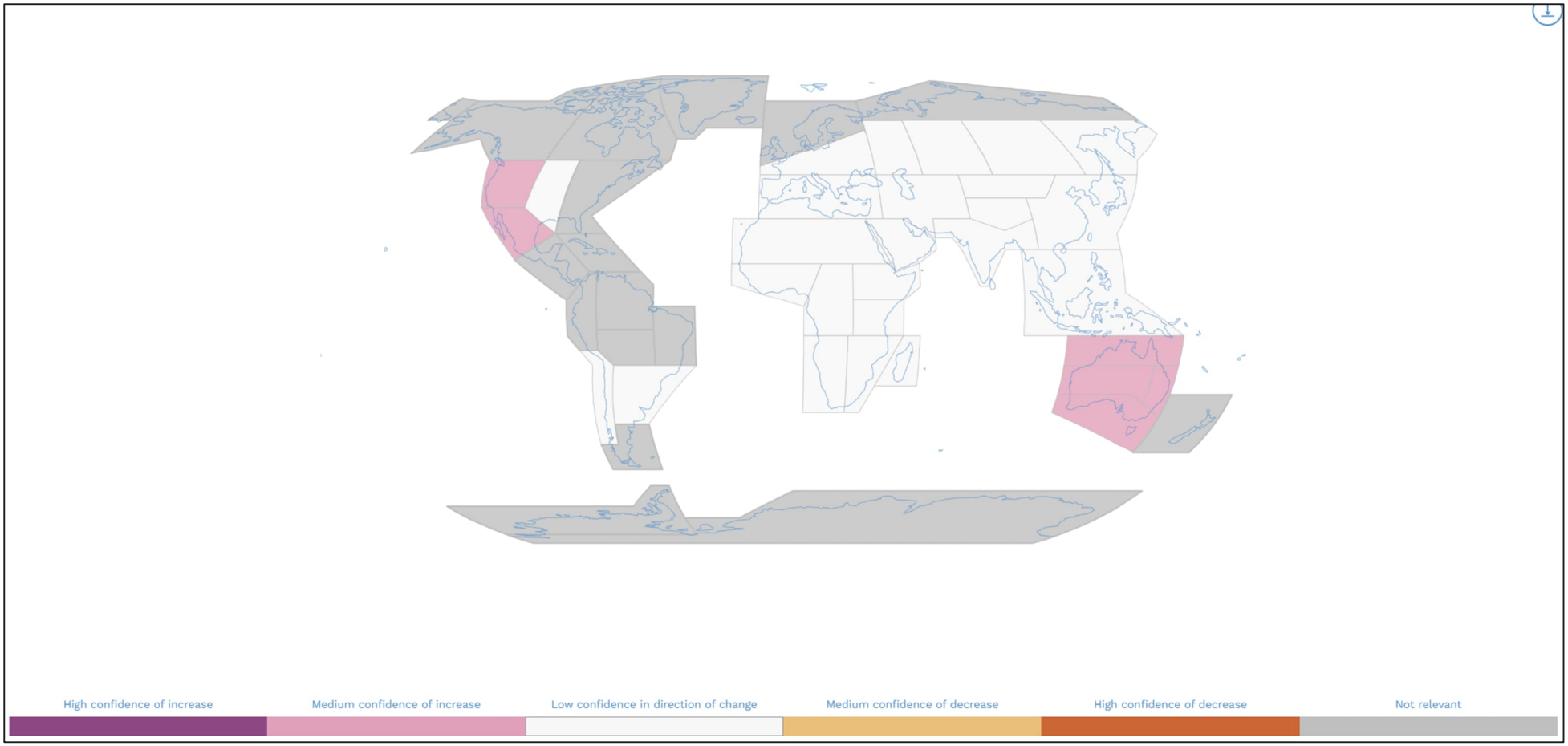


FIGURE 7-6: FUTURE PROJECTIONS OF SAND AND DUST STORM BY 2050 UNDER SSP5-8.5 SCENARIO. SOURCE: IPCC WGI INTERACTIVE ATLAS: REGIONAL SYNTHESIS (HTTPS://INTERACTIVE-ATLAS.IPCC.CH/REGIONAL-SYNTHESIS).

TABLE 7-15: RISK ANALYSIS OF EXTREME WINDS AND STORMS

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
Site personnel	Whilst the average wind speed at the project site remains within a reasonable range, there may still be risks associated with strong wind gusts. (i) During the construction phase, there may be risks of debris and dust particles being airborne due to strong wind gusts, these could cause a health and safety risks to personnel on site. (ii) Elevated work platforms, such as nacelles and transmission line towers can become areas of high risk due to strong wind gusts. (iii) Strong wind gusts can cause work delay as certain machinery such as cranes require suspension above a certain wind speed threshold. (iv) Dust storms expose personnel to respiratory and eye irritation, increase	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	accident risk due to poor visibility, and cause fatigue from harsh conditions Based on data trends from the wind climate indicator, the risk unlikely to be material but appropriate warning systems and site management plans should be in place to avoid risk of dust storms.			
The wind power farm	During the construction phase strong wind gusts can create a challenge to the assembly of the wind turbines. Cranes lifting operations may need to be halted if wind speed exceed certain thresholds. Some equipment can become airborne if not properly secured, which can lead to health and safety risks for personnel on site. During operation, wind turbines may need to be shut down if wind speed and wind gusts exceed certain thresholds. This	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	would result in production loss. Dust storms can damage turbine components through abrasive erosion, clog air filters, and reduce efficiency by coating blades with dust. They also increase maintenance needs, accelerate wear on moving parts, and can disrupt power generation due to sensor malfunction or forced shutdowns. Based on data trends from the wind climate indicator, the risk unlikely to be material but appropriate measures should be taken to ensure correct maintenance of wind turbines to maintain operational efficiency			
The battery energy storage system	During the construction phase strong wind gusts can create a challenge to the assembly of the BESS. Cranes lifting operations may need to be halted if	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	wind speed exceed certain thresholds. During the operation phase, wind gusts can carry debris which may damage cooling units, ventilation fans and other external conduits mounted outside of the BESS containers. Damage to HVAC would require additional expenditure to cover costs. Dust storms can infiltrate battery enclosures, causing contamination and reducing cooling efficiency. Abrasive particles accelerate wear on seals and connectors, while high dust loads increase fire risk by impairing ventilation. Prolonged exposure can degrade system performance and shorten equipment lifespan. Based on data trends from the wind climate indicator, the risk unlikely to be material.			

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
The transmission line from the Project site to the Tolgoi mine	During the construction phase, the erection of tower transmission lines can be at risk of strong wind gusts, furthermore, it could also pose a challenge to conductor stringing operation, where conductors could get entangled or damaged. During operation, strong winds carrying debris can possibly strike insulators and cause potential damage. Structural damage can arise from oscillation induced of transmission lines. Lines can also collide with one another resulting potential short circuits. Dust storms can cause contamination of insulators, leading to flashovers and outages. Abrasive particles accelerate wear on hardware, while strong winds increase mechanical stress on towers and conductors, raising the risk of structural damage and service disruption	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	Based on data trends from the wind climate indicator, the risk unlikely to be material.			
Key access routes to the Project site	During the construction phase, the operation of trucks, cranes and other machinery may become unsafe due to strong wind gusts and may require operational downtime. Unpaved roads are susceptible to wind erosion. Hence, there may be loss of solid before compaction and stabilization leading to uneven road surface and network. Such effect is also applicable to the operation phase. Strong winds can pick up dusts and other particles from the road, hence continuous dust generation can affect visibility and local air quality. Possibly causing health and safety risk for personnel working on site. Dust storms can block access routes with heavy	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	dust deposition, reduce visibility leading to accidents, and cause road surface degradation. They also disrupt transportation schedules and increase maintenance needs for vehicles and roads Based on data trends from the wind climate indicator, the risk unlikely to be material.			

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7.3.3.5 WILDFIRES

TABLE 7-16: CLIMATE DATA FOR WILDFIRES

Climate indicator	Baseline	SSP1-2.6		SSP5-8.5	
		2030	2050	2030	2050
Forest fire danger index (days)	186	180.5	184	149.5	172.5
Maximum burned area (m^2)	0	N/A	N/A	N/A	N/A

The historical maximum burned area climate indicator identified the maximum burned area with a 30 km^2 area of the site based on satellite observational data from the period of 1989 to 2018. The data indicates that the site has not experienced any wildfires during that time period. Furthermore, the site is situated in a region with limited vegetation and bare grounds. Additionally, Bao, Y. et al., 2023. Indicated that the site is not situated in an area prone to wildfire risk, unlike other regions of Mongolia The other climate indicator chosen to represent the wildfire risk is the McArthur Forest Fire Danger Index (FFDI). The FFDI represents the annual number of days with climatic conditions highly suitable for wildfire, the index is built by combining data on rainfall and evapotranspiration rates, wind speed, temperature and humidity. Thus, whilst the FFDI for baseline conditions is 186 days (~51% of the year), it does not mean that a wildfire would necessarily occur as the FFDI does not take into account local vegetation or other parameters. The FFDI remains with similar range over future time horizons and emission scenarios, except for the 2030 timeframe under SSP5-8.5 where the FFDI decreases to 149.5 (~41% of the year).

TABLE 7-17: RISK ANALYSIS OF WILDFIRES

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
Site personnel	In the event of a wildfire occurring either during the operation or construction phase, there could be several risks posed to the Project site personnel: (i) Health and safety threats to workers cause by the exposure to elevate temperatures and smoke. As well as risks of physical injuries from flames. (ii) Accessibility and mobility across the site may be reduced if wildfires affect and blocks the roads. This may delay the safe evacuation of workers. Whilst the inherent risk posed by wildfires can be severe, the Project site itself is situated in a low-risk area, and in a zone with minimal vegetation. This is further corroborated with the climate data. Hence, this hazard is considered to be unlikely material for the Project site and its different components.	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
The wind power farm	During the construction phase wildfires can cause direct physical damage to equipment and components, such as turbine blades, nacelles, and control systems that are stored on site. Similar risks are applicable during the operation phase. With fiberglass blades and other polymer components being at high risk of degradation or ignition due to extreme heat. Additionally, control systems and other electronic sensors in the nacelle may be damaged due to smoke intrusion or elevated temperatures. Whilst the inherent risk posed by wildfires can be severe, the Project site itself is situated in a low-risk area, and in a zone with minimal vegetation. This is further corroborated with the climate data. Hence, this hazard is considered to be unlikely material for the Project site and its different components.	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
The battery energy storage system	Wildfires and associated health and safety risks can cause delays to the construction of the BESS. These may cause damaged to heat sensitive and flammable components such as inverters, control systems before their installation. During the operation, there may be risks of thermal runaway triggered by increase in ambient temperatures caused by wildfires. In worst case scenario a thermal runaway has the potential for leading to fire, explosion and release of toxic materials. Smoke and ash can infiltrate the BESS ventilation and HVAC system, therefore reducing colling efficiency. Whilst the inherent risk posed by wildfires can be severe, the Project site itself is situated in a low-risk area, and in a zone with minimal vegetation. This is further corroborated with the climate data. Hence, this hazard is considered to be unlikely	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	material for the Project site and its different components.			
The transmission line from the Project site to the Oyu Tolgoi mine	Wildfires and associated health and safety risks can cause delays to the construction of transmission lines. During operation, wildfires can cause physical damage to transmission lines infrastructure, such as insulators and conductors. Accumulation of smoke and ash can contaminate conductors and can reduce their performance, and lead to potential electrical flashovers and outages. There can also be associated structural damage to transmission towers, necessitating capital expenditure to cover maintenance and repair costs. Whilst the inherent risk posed by wildfires can be severe, the Project site itself is situated in a low-risk area, and in a zone with minimal vegetation. This is further corroborated with the climate data. Hence, this hazard is considered to be unlikely	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	material for the Project site and its different components.			
Key access routes to the Project site	Wildfires could pose the following risks to road construction and operation: (i) Active wildfires or fire danger warnings may restrict the access to the site and hence delay the construction of the road. (ii) Wildfires can contribute to loss of vegetative covers. These can burn vegetation and damage the soil, which can increase risks of erosion and destabilise roadbeds, as well as affecting compaction when constructing the road. Whilst the inherent risk posed by wildfires can be severe, the Project site itself is situated in a low-risk area, and in a zone with minimal vegetation. This is further corroborated with the climate data. Hence, this hazard is considered to be unlikely material for the Project site and its different components.	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

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7.3.3.6 RAINFALL-INDUCED LANDSLIDES

TABLE 7-18: CLIMATE DATA FOR RAINFALL-INDUCED LANDSLIDES

Climate indicator	Baseline	SSP1-2.6		SSP5-8.5	
		2030	2050	2030	2050
Rainfall-induced landslide index (days)	0	0	0	0	0

To evaluate the potential risk of landslides, the rainfall-induced landslide index (RILI) was selected. It represents the annual number of days with a potential chance of a rainfall-induced landslide event. This index is developed using the antecedent rainfall index (weighted summation

of daily rainfall amounts) and landslide susceptibility (based on slope, faults, geology, forest loss, and road networks). The RILI shows a value of zero for baseline conditions and future time horizons and climate scenarios. Furthermore, aerial photography from the on-site field visit indicated that the topography of the terrain within the area of the site is a mixture of flatlands with some hills and small mounts. Such topography is less susceptible to be at risks of landslides events. Therefore, the risk of landslides is considered to be minimal.

TABLE 7-19: RISK ANALYSIS OF RAINFALL-INDUCED LANDSLIDES

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
Site personnel	Based on present and future projection of the RILI, the risk of landslides on site personnel, wind turbines, BESS, transmission lines and key access routes is considered to be minimal.	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.
The wind power farm				
The battery energy storage system				
The transmission line from the Project site to the Tolgoi mine				
Key access routes to the Project site				

7.3.3.7 WATER STRESS AND DROUGHT

TABLE 7-20: CLIMATE DATA FOR WATER STRESS AND DROUGHT

Climate indicator	Baseline	SSP1-2.6		SSP5-8.5	
		2030	2050	2030	2050
Number of consecutive dry days (days)	142.4	135.9	126.5	129.6	120.3
Water stress (category)	Arid and low water use (i.e., annual baseline available water is <0.03 m/yr and annual baseline gross total withdrawal is <0.012 m/yr) Source: aqueduct-40-technical-note.pdf				

The site is located in a cold and dry desert like climate. Therefore, water resources are scarce throughout the region. Two indicators were chosen to represent the climate hazard of water stress and drought. The first one is the number of consecutive dry days (CDD), which represents the annual number of consecutive days when the precipitation is less than 1.0mm. The second indicator is the Water Stress (WS) which was extracted from the World Resources Institute Aqueduct Water Risk Atlas. The WS measures the ratio of total water withdrawals to available renewable surface and groundwater supplies. Water withdrawals include domestic, industrial, irrigation, and livestock consumptive and non-consumptive uses. Available renewable water supplies include the impact of upstream consumptive water users and large dams on downstream water availability.

Under present day conditions the CDD is of 142.4 days, or ~39% of the year where the daily precipitation is less than 1mm. This number steadily decreases to 126 days (~34%.5) in 2050 under SSP1-2.6 scenario, and 120.3 days (~32.9%) under the SS5-8.5 scenario. Additionally, under baseline conditions the WS is categorise as arid and low water use, which indicates severe water stress conditions in the regions. The WS level remains unchanged over future time horizons and emissions scenarios.

TABLE 7-21: RISK ANALYSIS OF WATER STRESS AND DROUGHT

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
Site personnel	Due to the water scarcity in the region, there may be limited access to potable water, therefore there could be higher risks of dehydration, and potential loss in productivity. There may be associated logistics burden with needing to transport potable water from other sources which could increase operational costs.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.
The wind power farm	During the construction phase, high levels of water stress may make it difficult to source sufficient amount of water for supporting water intensive activities such as concrete mixing, and dust suppression when excavating the foundation of the wind turbines. During the operational phase, wind turbines are not highly reliant on water, hence the impact of water	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	stress is expected to be limited.			
The battery energy storage system	During construction phase, limited water availability may delay site preparation (e.g., dust suppression, concrete mixing), dry and windy conditions can generate dust which may infiltrate the battery enclosures and control systems, which could cause risks of contamination and early degradation. During the operation phase dry and windy conditions can generate dusts and lead which can infiltrated HVAC systems and cause decrease in efficiency.	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.
The transmission line from the Project site to the Tolgoi mine	During the construction phase, high levels of water stress may make it difficult to source sufficient amount of water for supporting water intensive activities such as concrete mixing, and dust suppression when	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	excavating the foundation of the transmission towers. During the operational phase, transmission lines are not highly reliant on water, hence the impact of water stress is expected to be limited.			
Key access routes to the Project site	Prolonged periods of dry conditions may affect the construction of the road as the soil may lack moisture which would prevent the proper compaction of the roads. This can lead to roads becoming loose or unstable. Prolonged periods of dry conditions coupled with can contribute to road surface erosion and degradation. This would require increased maintenance needs and operational expenditures.	The risk is unlikely material under baseline conditions.	The risk is unlikely material under future conditions	The risk is unlikely material under future conditions.

7.3.3.8 EARTHQUAKE

TABLE 7-22: EARTHQUAKE DATA

Climate indicator	Baseline	SSP1-2.6		SSP5-8.5	
		2030	2050	2030	2050
Peak Ground Acceleration with a 10% probability of being exceeded in the next 50 years	0.092 – 0.18 g	N/A: there are no future projections available for earthquake			

Earthquakes and seismic activities mostly accumulate in the western and central regions of Mongolia, where several active fault structures have been detected. In the past ten (10) years the strongest earthquake experienced near the Ömnögovĭ region occurred in March 2025 with a magnitude five (5) and occurred 37 kilometres south-west of Dalandzadgad at a depth of 10km. The site itself is situated 160 km east of Dalandzadgad. The earthquake with the highest magnitude (6.8) occurred in 1960 53km south-west of Dalandzadgad. The most recent and nearest earthquake to the Project site occurred in August 2021, 70km south-west of the site. The earthquake had a 4.4 Magnitude and a shallow depth of 10km (Earthquake list, 2025). In addition to this the peak ground acceleration (PGA) indicator which quantifies the intensity of ground shaking during an earthquake indicates that half of the project site would experience a PGA of 0.092-0.18 g (moderate to strong shaking), and the other half a PGA of 0.039 to 0.092 (light to moderate shaking). Such PGA values would lead to none to very light damage.

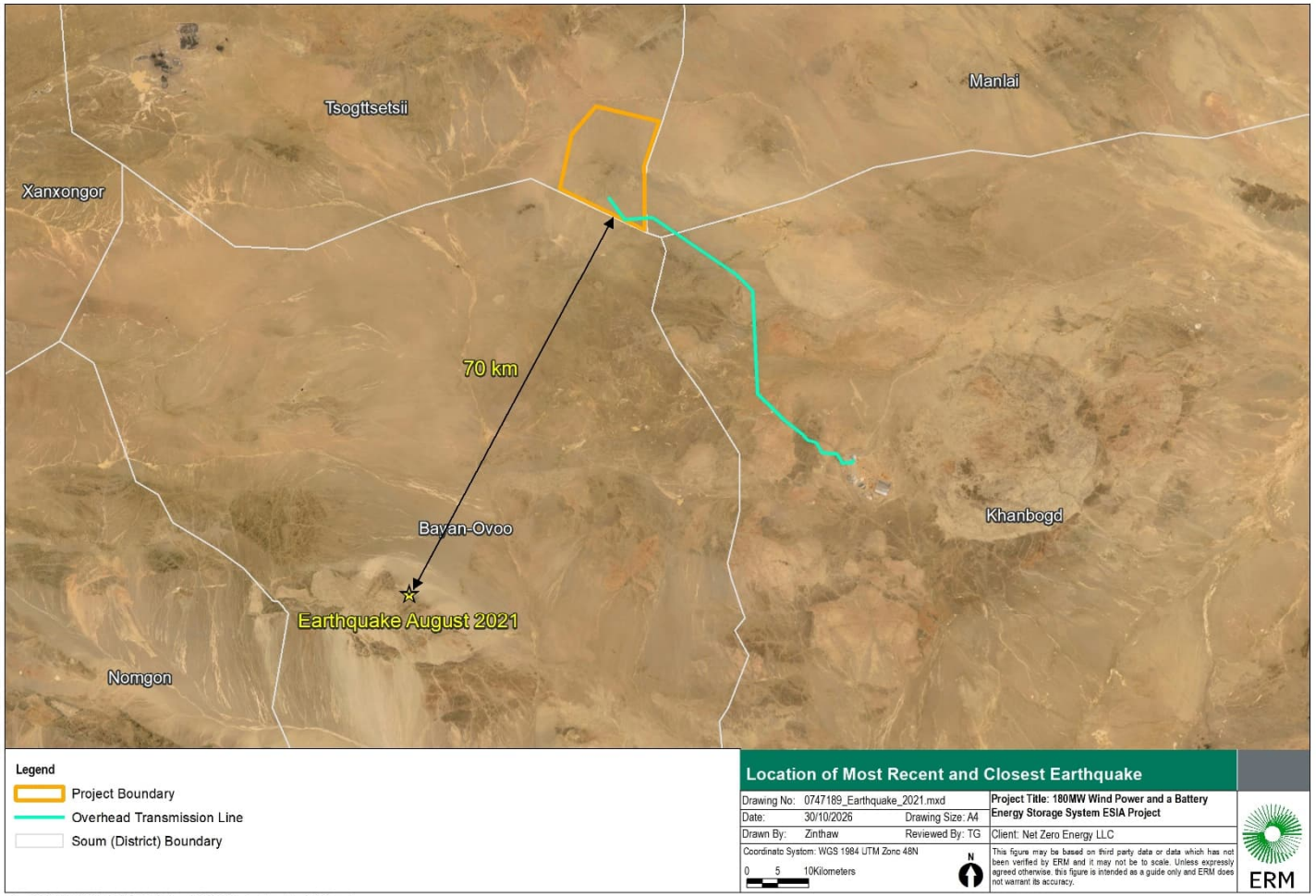
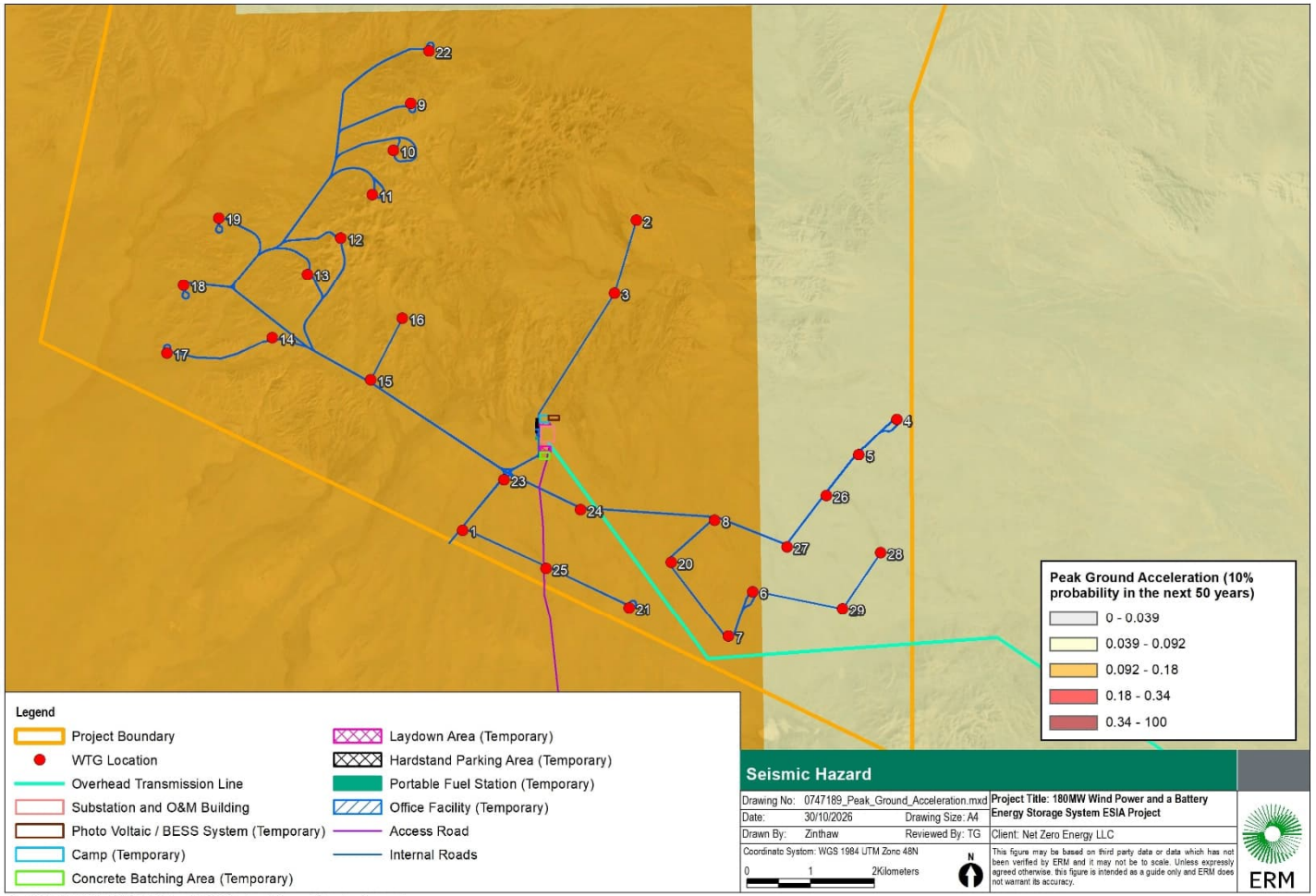


FIGURE 7-7: THE PROJECT SITE AND THE CLOSEST EARTHQUAKE OCCURRENCE



File: T:\GIS\CONTRACT\0747189\mxd\0747189_Peak_Ground_Acceleration.mxd

FIGURE 7-8: SHOWS THE PEAK GROUND ACCELERATION VALUES ACROSS THE PROJECT SITE

TABLE 7-23: RISK ANALYSIS OF EARTHQUAKE

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
Site personnel	During the construction and operation phase light ground shaking during active work, such as excavation, tower erection or crane operation could cause health and safety risks as worked may fall from height, equipment may tip. Temporary structures such as tents / dormitories, or scaffolding may not be designed for seismic loads. Hence, these could collapse and cause a health and safety risk to workers on site.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.	The risk is likely material, low to moderate.
The wind power farm	During the construction phase, ground shaking from an earthquake can cause structural instability during assembly, there is a risk of collapse or misalignment of components, posing health and safety risks to workers. Cranes and equipment hazards are sensitive to ground shaking and may be			

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
The battery energy storage system	During the construction and operation phases, ground shaking from an earthquake can cause instability of temporary structures (e.g., scaffolding), equipment or battery containers. If not properly anchored or designed for seismic loads, there is a risk of equipment damage, battery malfunction, or hazardous material release.			
The transmission line from the Project site to the Tolgoi mine	Ground shaking during the construction or operation can affect the stability of transmission towers and poles. There is a risk of misalignment structural damage, or collapse, especially during assembly or stringing of conductors. Seismic events may also cause damage to insulators or connections, potentially leasing to service interruptions or safety hazards.			
Key access routes to the Project site	Earthquakes can cause cracking, settlement or temporary blockage of access roads due to ground movement. During construction, this may delay material delivery of emergency response. During operation,			

Risk area	Risk description	Risk materiality category and time period		
		Baseline (construction)	2030 (operation)	2050 (operation)
	seismic events could temporarily disrupt site access, but major long-term impacts are unlikely given the PGA values at the site.			

Sources:

Johnson, K. et al. (2023). Global Earthquake Model (GEM) Seismic Hazard Map (version 2023.1 - June 2023). Available at: Global Seismic Hazard Map | Global EarthQuake Model Foundation [Last accessed: 24th of November 2025].

Central Asia Regional Economic Cooperation Program (CAREC). (2022). Country risk profile Mongolia. Available at: CAREC-Risk-Profiles_Mongolia.pdf [Last accessed: 24th of November 2025].

Earthquakelist.Org (2025). Ömnögovĭ Earthquake Report. Available at: The complete Ömnögovĭ, Mongolia earthquake report (up-to-date 2025). [Last accessed: 24th of November 2025].

Zera, T., & Nafiam, M. (2017). Comparing Two Models of Mapping the Peak Ground Acceleration (PGA) in Western Java. *Advacnes in Intelligent Systesm Research*, Volume 149, 140-142. Available at: Mercalli Scale of Peak Ground Acceleration (PGA) | Download Scientific Diagram.

- https://www.carecprogram.org/uploads/CAREC-Risk-Profiles_Mongolia.pdf

7.3.4 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

The *following section describes the proposed mitigation measures that the Project may want to consider adopting to reduce the risks of the climate hazards that have been identified as either 'likely material low to moderate' and 'likely material high'. The recommended mitigation and management measures are based upon the risk review undertaken for each risk area and ERM's technical review and input into this assessment.*

Climate hazard	Site personnel	Wind farm	Battery energy storage system	Overhead transmission line from wind farm to the Tolgoi mine	Access road to the Project site
Extreme heat	Implement a comprehensive Heat Stress Management Plan (HSMP) including acclimatization protocols for new workers. Provide shaded, ventilated rest shelters at all work fronts. Ensure potable water is available at all work locations, with minimum consumption targets and hydration reminders. Enforce mandatory work-rest cycles based on Wet Bulb Globe Temperature (WBGT) thresholds. Issue personal cooling PPE (cooling vests, hats, UV-protective clothing). Conduct toolbox talks on heat illness recognition and first aid. Install real-time weather monitoring stations with automated alerts for heatwaves. Restrict outdoor work during peak heat hours; reschedule	Use heat-resistant materials for turbine components, cabling, and electronics. Store sensitive equipment in climate-controlled containers. Schedule heavy lifts and assembly outside forecasted heatwaves. Install temporary shade structures for assembly areas. Monitor and log ambient and equipment temperatures during construction. Apply reflective coatings to exposed surfaces to reduce heat absorption. Ensure all lubricants and hydraulic fluids are rated for high temperatures. Inspect for thermal expansion or warping of structural elements.	Store batteries and power electronics in temperature-controlled, dust-sealed enclosures. Install redundant HVAC systems with backup power for cooling. Use thermal insulation and reflective barriers on BESS containers. Conduct pre-installation thermal stress testing on all units. Develop emergency shutdown and fire suppression protocols for thermal runaway. Monitor battery temperature and humidity in real time. Train staff in handling and containment of overheated or damaged batteries.	Use conductors and insulators rated for high ambient temperatures. Schedule stringing and tower erection outside peak heat periods. Monitor for thermal sag and adjust tension accordingly. Provide mobile shade and hydration stations for line crews. Inspect for UV degradation of insulators and fittings. Apply anti-corrosion and anti-UV coatings to exposed hardware.	Apply dust suppression (water, polymers) to prevent surface degradation. Inspect for cracking, rutting, and softening of road surfaces. Restrict heavy vehicle movement during extreme heat to prevent road damage. Use heat-resistant surfacing materials where feasible. Maintain emergency access routes and signage for rapid evacuation

Climate hazard	Site personnel	Wind farm	Battery energy storage system	Overhead transmission line from wind farm to the Tolgoi mine	Access road to the Project site
	to early morning/evening where feasible. Maintain on-site medical facilities with supplies for heat stroke and dehydration. Develop and drill emergency evacuation and medical response for heat-related incidents				
Extreme cold	Implement a Cold Stress Management Plan (CSMP) with acclimatization and health monitoring. Provide heated shelters and warming stations at all work fronts. Issue insulated PPE (thermal gloves, boots, layered clothing, face protection). Enforce work-rest cycles based on wind chill and temperature thresholds. Conduct toolbox talks on frostbite, hypothermia, and safe work practices. Maintain on-site medical supplies for cold-related injuries.	Use cold-rated lubricants, greases, and hydraulic fluids. Store components in heated or insulated containers. Pre-heat equipment before operation. Inspect for ice accretion on blades and towers; implement de-icing protocols. Use anti-icing coatings or heating elements on critical components. Schedule major lifts and assembly outside severe cold periods.	Store batteries in heated enclosures; maintain minimum temperature setpoints. Use battery chemistries rated for sub-zero operation. Install redundant heating systems with alarms for HVAC failure. Monitor battery performance and charge/discharge rates for cold-induced degradation. Train staff in safe handling of cold-affected batteries	Use conductors and insulators rated for ice and cold. Inspect for ice loading and sag; implement emergency de-icing if needed. Schedule works to avoid periods of heavy snow/ice. Provide heated shelters and PPE for line crews. Monitor for frost heave or movement at tower foundations.	Apply sand/grit for traction on icy surfaces. Inspect for frost heave, potholes, and ice accumulation. Restrict access during severe ice or blizzard conditions. Maintain snow removal equipment and emergency supplies. Monitor and repair road surfaces after freeze-thaw cycles.

Climate hazard	Site personnel	Wind farm	Battery energy storage system	Overhead transmission line from wind farm to the Tolgoi mine	Access road to the Project site
	Schedule outdoor work for midday when temperatures are highest. Provide heated break rooms and hot beverages. Monitor and record worker exposure times in extreme cold.	Monitor for embrittlement or cracking of materials.			
Extreme rainfall and flooding	Develop a Flood Emergency Response Plan (FERP) with evacuation routes and muster points. Monitor weather forecasts and real-time rainfall data. Halt work and evacuate personnel during heavy rain or flood warnings. Provide waterproof PPE and high-visibility gear. Train staff in flood hazard recognition and response.	Design foundations and critical infrastructure above projected flood levels. Install temporary drainage and dewatering systems at construction sites. Use water-resistant materials and sealants for below-grade works. Schedule excavation and concrete pours outside rainy season. Implement erosion and sediment control (ESC) measures (silt fences, sediment basins). Inspect for water ingress and foundation stability after storms.	Elevate BESS containers above floodplain; use waterproof enclosures. Install perimeter drainage and sump pumps with alarms. Conduct regular inspections for water ingress. Develop emergency shutdown and isolation procedures for flooding.	Site towers outside flood-prone areas where possible. Use deep pile or caisson foundations in floodplains. Inspect for scour and soil instability after heavy rain. Maintain access for emergency repairs during/after floods.	Design roads with adequate cross-drainage and culverts. Inspect for erosion, washouts, and debris after storms. Restrict access during/after flooding; maintain detour plans. Use geotextiles and erosion control mats on vulnerable slopes.

Climate hazard	Site personnel	Wind farm	Battery energy storage system	Overhead transmission line from wind farm to the Tolgoi mine	Access road to the Project site
Water stress and drought	Develop a Water Management Plan with usage targets and restrictions. Install water meters and log daily consumption. Provide water conservation training and signage. Ensure backup potable water supplies (tanks, deliveries). Monitor worker hydration and health	Use water-efficient dust suppression (polymers, recycled water). Schedule water-intensive activities during periods of higher availability. Monitor and report all water withdrawals. Implement rainwater harvesting for non-potable uses.	Use dry cleaning methods for dust removal where possible. Monitor HVAC water use and optimize for efficiency. Maintain emergency water supplies for fire suppression.	Use water-efficient construction methods. Monitor for dust accumulation and clean as needed. Avoid water-intensive activities during drought.	Use alternative dust suppression (e.g., gravel, polymers) during water shortages. Monitor for increased dust and surface degradation. Restrict non-essential vehicle movement during severe drought.
Earthquake	Develop and drill an Earthquake Emergency Response Plan. Secure all temporary structures, scaffolding, and storage containers. Train staff in earthquake safety, evacuation, and first aid. Maintain emergency supplies (first aid, water, food, radios)	Design all foundations and structures to relevant seismic codes. Use flexible connections for cabling and piping. Inspect for structural damage after seismic events. Maintain spare parts for rapid repairs	Anchor all containers and racks to seismic standards. Use flexible connections for electrical and HVAC systems. Inspect for battery displacement or damage after earthquakes.	Design towers and foundations for seismic loads. Use flexible joints and dampers where appropriate. Inspect for misalignment, foundation movement, or conductor damage after earthquakes.	Inspect for cracking, settlement, or landslides after seismic events. Maintain emergency detour plans and rapid repair capability.

7.4 NOISE IMPACT ASSESSMENT

7.4.1 SCOPE OF ASSESSMENT

This section presents the Noise Impact Assessment (NIA) for the Project. The NIA covers the following:

- identifying Noise Sensitive Receptors (NSRs) in the vicinity of the Project;
- evaluating the existing noise environment;
- deriving the assessment noise criteria at the NSRs;
- developing a predictive noise model of wind farm noise impacts;
- quantitatively assessing the predicted noise impacts of wind turbine noise on the identified NSRs;
- qualitatively assessing the extent of noise impacts of Battery Energy Storage System (BESS) and substation;
- qualitatively assessing the extent of noise impacts during construction;
- qualitatively assessing the extent of traffic noise impacts during both construction and operation; and
- recommending mitigation and management measures, as necessary.

The scope of noise impact assessment as identified in the Scoping Study (*Chapter 5*) is described in Table 7-24 below.

TABLE 7-24: SCOPE OF NOISE IMPACT ASSESSMENT

Phases	Potential Activities	Potential Impacts	Receptors
Construction Phase	Land preparation (site clearance, excavation and ground levelling), fencing, and civil works.	Short-term increase in noise levels	▪ Local Herders (classified as 'Residential')
	Construction of access road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL.		
	Transportation of WTGs, construction material and machines		
Operation Phase	Operations of WTGs and OHL	Long-term increase in noise levels	
	Inspection; O&M of WTGs and ancillary facilities such as storage area and associated infrastructure (Substation, BESS and Control Building); Vehicle movement.	Short-term increase in noise levels	
Unplanned Events	Fire and Explosion	Short-term increase in noise levels	

7.4.2 SUMMARY OF BASELINE CONDITIONS

The Project site is situated in the Umnugobi Province in southern Mongolia, relatively close (about 130 km) to the border with China. The Project Area is predominantly characterised as consisting remote semi-desert steppe where there a limited number of NSRs comprising widely dispersed temporary herder settlements. No prominent noise sources associated with roads, rail and industrial plant influencing the noise environment at the receptors have been identified. The noise environment in the vicinity of the Project is rural with an acoustical environment that is dominated by natural sounds such as wind, livestock herds, birdsong and insect noise and is generally characterised by low background noise levels.

A noise level survey was conducted to collect baseline noise data at six locations representative of the Wind Farm Project site, the OHTL, and nearby off-site areas, selected specifically for their proximity to sensitive receptors potentially impacted by the Project.

48-hour noise survey was carried out at six locations within the Project area between 10 to 22 April 2025. Three of these Noise Measurement Locations (NO2, NO3, and NO4) were situated near NSRs which are local herders' winter camps. The noise monitoring methodology and monitored noise levels are presented in *Section 6.1.9.*

Wind speed data from an on-site NZE Light Detection and Ranging (LiDAR) station was obtained for the noise monitoring period between 10 to 22 April 2025. 10-min wind speeds that is concurrent with the collected noise data were downloaded. A vertical wind shear factor was then applied to correct the wind speed data from the lowest LiDAR measurement point of 40m to noise monitor height at ground level. Any noise monitoring data points affected by a wind speed above 5 m/s and rainfall were discarded as standard environmental noise monitoring practice, and average day and night average ambient noise levels were computed. These average ambient noise levels are used to represent the existing noise levels at the NSRs. The day and night average ambient noise levels at the three Noise Measurement Locations that are relevant to the NSRs are presented in *Table 7-25.*

TABLE 7-25: AVERAGE AMBIENT NOISE LEVELS

Noise Measurement Location	Average Ambient Noise Level, dB(A) *	
	Day	Night
N02	36	37
N03	38	34
N04	40	42

Note:

*Data affected by wind speeds >5m/s and rainfall is discarded

7.4.3 ASSESSMENT APPROACH AND CRITERIA

7.4.3.1 CONSTRUCTION PHASE

Typical Construction Noise

The construction phase of the Project will involve a number of activities in support of the construction and installation of wind turbines and the associated ancillary facilities. The main construction activities associated with the Project are summarised in *Section 3.4.2*, and the

key construction plant inventory is provided in *Table 3-5*. Noise emissions from the construction equipment may result in short-term increase of noise levels at the identified NSRs in the vicinity of the Project site. This will be qualitatively discussed in this chapter.

Construction Traffic Noise

During the construction phase, there will be passenger vehicle and heavy vehicle movements to the Project Area via the existing local road network (including the Heavy Duty Coal Transport Road and southern access road) and new access road. WTGs and BESS equipment will be transported to the WTG Area from China, crossing the Mongolia-China border at Gashuun Sukhait. Within the WTG Area, construction traffic will use the internal roads. Along the OHL, it is assumed construction traffic will use the right of way.

The construction traffic noise impacts are short-term and are subject to the volume of additional traffic generated by and duration of the Project. This will be qualitatively discussed in this chapter.

7.4.3.2 OPERATIONAL PHASE

Noise Assessment Criteria

The assessment of wind farm (wind turbines, Battery Energy Storage System (BESS) and substation) noise impacts associated with the Project has been conducted in accordance with the methodology stipulated in the IFC EHS Guidelines for Wind Energy (World Bank Group, 2015). Under *Section 2.1.2* for Performance Indicators Monitoring, the guidelines note that noise impacts should not exceed the levels presented in the IFC General EHS Guidelines (World Bank Group, 2007), as provided in *Table 7-26*.

TABLE 7-26: NOISE ASSESSMENT CRITERIA (WORLD BANK GROUP, 2007)

Receptor	One Hour L_{Aeq} (dBA)	
	Daytime 07:00 – 22:00	Nighttime 22:00 – 07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	70

Notes:

1. The criteria are applicable outdoors at a receptor
2. The criteria apply to total noise. i.e. wind turbine noise + BESS noise + substation noise + existing average ambient noise

The IFC EHS Guidelines for Wind Energy also specifies a general 35 A-weighted decibel limit [35 dB(A) L_{A90}] for wind energy facility sound levels outdoors at NSRs during both day and night-time assessment periods, considering a wind speed of 10 m/s at 10 m height. If preliminary modelling results indicate that noise levels at any sensitive receptors are above 35 dB(A) L_{A90}, further investigation, including more detailed noise modelling and background ambient noise measurements, should be considered. For this assessment, detailed noise

modelling has been conducted and background ambient noise measurements have been utilised.

Section 1.1.2 of the EHS Guidelines also requires noise modelling to take account of the cumulative noise from all wind energy facilities in the vicinity having the potential to increase noise levels. There are no other wind energy facilities in proximity to the NSRs and as such, a cumulative noise assessment is not required.

Wind Turbine Noise

Noise is generated by wind turbines as they rotate to generate power. This only occurs above the 'cut-in' wind speed and below the 'cut-out' wind speed. Below the cut-in wind speed there is insufficient strength in the wind to generate efficiently and above the cut-out wind speed the turbine is automatically shut down to prevent any malfunctions from occurring.

The emanation of noise from the operation of the WTGs is of the following two types: (a) mechanical noise, from interaction of turbine components; and (b) aerodynamic noise, produced by the flow of air over blades. Mechanical sounds originate from the relative motion of mechanical components and the dynamic response among them. Sources of such sounds include gearbox, generator, yaw drives, cooling fans and auxiliary equipment (e.g., hydraulics).

Aerodynamic Noise

Aerodynamic noise is caused by blades passing through the air and it is generally broadband in nature which can have a swishing character. This noise is a function of many factors including blade design, rotational speed, wind speed and inflow turbulence. Aerodynamic noise has been substantially reduced over time due to improvements in turbine design. As a result, aerodynamic noise is wind speed dependant, and the sound power output from a turbine must be measured and quoted relative to wind speed. The reference sound power output from a turbine is typically provided by the manufacturer over a range of wind speeds. Careful design of the rotor blades ensures that aerodynamic noise is minimised. Special consideration is given to the blade tips which, due to their relatively high velocities, generate the most noise. Nevertheless, it should be noted that aerodynamic noise is an unavoidable by-product of wind generated electricity. The use of sufficient separation distances is therefore the fundamental design option available to wind farm developers for the control of noise at residential properties. Aerodynamic sound is typically the largest component of wind turbine acoustic emissions.

Mechanical Noise

Mechanical noise is generated by components inside the turbine nacelle (usually the gearbox and generator) and can be radiated by the shell of the nacelle, blades and the tower structure. Unlike aerodynamic noise, mechanical noise tends to be tonal in nature, i.e. it is concentrated at a few discrete frequencies. Mechanical noise can be successfully controlled at the design stage of the turbine, using advanced gearbox design and anti-vibration techniques. As mentioned above technological developments in engineering practices have in general limited mechanical noise output.

Modelling Methodology

The IFC EHS Guidelines for Wind Energy (World Bank Group, 2015) provides methods for the prediction, measurement, and assessment of sound from wind turbines. Requirements and

methods relevant to assessment of wind farm noise can be found under *Section 1.1.2* of the EHS Guidelines.

Noise modelling has been undertaken using the ISO 9613-2:2024 (Standards Australia, 2024) algorithm as implemented within SoundPLAN 9.1. The noise modelling takes into consideration the sound power level of the proposed candidate WTG, and applies adjustments for attenuation from geometrical dispersion, acoustic shielding from intervening ground topography, ground effects, meteorological effects, and atmospheric absorption.

The proposed wind farm layout consists of 30 WTGs, and the locations of these proposed WTGs are presented in *Table 3-1* and indicated in *Figure 3-2*. Details of the proposed WTG are provided in *Section 3 and Table 7-27*.

It should be noted that only 29 WTGs are relevant to this Project. The inclusion of the additional WTG (i.e. T23) does not influence the noise modelling outcomes and enables the assessment to be more conservative. The layout and noise emissions of the other 29 WTGs are fully applicable to this assessment.

TABLE 7-27: PROPOSED WIND TURBINE DETAILS

Feature	Parameter used
Wind Turbine Generator (WTG) Model	[redacted]
WTG Mode	N/A
Investigated Hub Height, m	[redacted]
Rotor Diameter, m	[redacted]
Modelled Maximum Sound Power Level, dB(A)	[redacted]
Serrated Trailed Edge (STE) technology correction, dB	Not Applied

The 1/3 octave band centre frequency sound power levels at hub-height wind speed for the proposed WTG - [redacted] are provided in *Table 7-28*.

TABLE 7-28: PROPOSED WIND TURBINE SOUND POWER LEVELS

1/3 octave band centre frequency, Hz	Sound power level, dBA
20	[redacted]
25	[redacted]
31.5	[redacted]
40	[redacted]
50	[redacted]
63	[redacted]
80	[redacted]
100	[redacted]
125	[redacted]
160	[redacted]

1/3 octave band centre frequency, Hz	Sound power level, dBA
200	[redacted]
250	[redacted]
315	[redacted]
400	[redacted]
500	[redacted]
630	[redacted]
800	[redacted]
1000	[redacted]
1250	[redacted]
1600	[redacted]
2000	[redacted]
2500	[redacted]
3150	[redacted]
4000	[redacted]
5000	[redacted]
6300	[redacted]
8000	[redacted]
10000	[redacted]

Details of the noise model and the modelling parameters used for the assessment are provided in *Table 7-29*.

TABLE 7-29: WIND TURBINE NOISE MODELLING PARAMETERS

Modelling aspect	Parameter
Noise Modelling Software	SoundPLAN 9.1
Algorithm	International Standard ISO 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation (ISO 9613-2)
Ground Absorption Factor	0.5 (50% acoustically hard ground and 50% acoustically soft ground)
Humidity	70%
Temperature	10°C
Topographical contours	10 m intervals
Receptor height	4 m
Wind direction	Downwind – noise level at each receptor is predicted based on being simultaneously downwind of every WTG at the site. (Note: This is a conservative approach as per ISO9613-2:2024. In reality, downwind conditions are not constant and a receptor will be not be downwind of every WTG)

BESS and Substation Noise

During the operational phase, the dominant noise sources associated with the proposed BESS are the BESS battery containers and inverters. The 2 x 120MVA high voltage transformers are the dominant noise sources associated within the proposed substation. The location of the substation and BESS is presented in *Figure 3-6*.

The main noise sources associated with the BESS and substation are detailed in *Table 7-30*.

TABLE 7-30: BESS AND SUBSTATION NOISE SOURCES

Plant Item	Sound Power Level per Plant Item, L_{eq} dB(A)	Quantity	Notes
Battery Container	[redacted]	10	• [redacted] • Sound power level calculated based on the following: ◦ Sound Pressure Level of [redacted] (worst-case) ◦ Container dimensions: [redacted] ◦ Parallelepiped source propagation loss method
Power Conversion System (PCS)	[redacted]	20	• [redacted] • Sound power level calculated based on the following: ◦ Sound Pressure Level of [redacted] ◦ Point source – hemispherical directivity (Q=2)
High Voltage (HV) Transformer	[redacted]	2	• Estimated based on a 120 MVA Transformer using IEC60076-10 – Outdoor installation – Standard Maximum

Operational Traffic Noise

Traffic during operation will be limited to maintenance vehicles and movement of employees around the Project Site. The operational traffic noise impacts are subject to the volume of additional traffic generated by and duration of the Project. There are no specific noise limits or guidelines relating to traffic related sources that are applicable to the Project. This will be qualitatively discussed in this chapter.

7.4.4 IMPACT ASSESSMENT

7.4.4.1 EXISTING/EMBEDDED MEASURES

The existing controls for the construction phase of the Project as identified in the DEIA include:

- Provide workers operating in areas with dust and noise exposure with protective equipment such as masks, full protective clothing, earplugs, and safety goggles.
-

7.4.4.2 SIGNIFICANCE OF IMPACTS

Construction Phase

Typical Construction Noise

Typical mechanical plants and machinery, such as excavators, cranes and generators, will be used for construction activities for a duration of 17 months. The main construction activities that involve the use of noise-generating equipment include land preparation, construction and installation of wind turbines and the associated ancillary facilities, construction of the OHL, and transportation of materials and equipment.

Construction of these facilities are expected to result in short-term increase of noise levels that would potentially generate impacts. Although construction noise may be audible and there is likely to be some degree of adverse impact during sensitive periods (e.g., relaxing), as is typical with construction projects near NSRs (local herders), by incorporating general standard construction practice, the noise impact to noise sensitive receptors surrounding the site can be minimised as far as practicable and managed.

Nevertheless, the herders will not experience a constant or long-term increased noise levels throughout the Project construction, but rather intermittent impacts due to the intermittent operation of construction equipment and the changing separation distances between mobile construction noise sources and sensitive receptors. Construction noise levels would typically only be experienced for limited periods of time when works are closest to a specific receptor. As the works progress further away from that receptor, noise impacts are expected to decrease. Any impacts associated with these works would be temporary and will not represent a permanent impact on the community and the surrounding environment. Furthermore, given the nearest NSR is situated approximately 400 m from the storage area (i.e. unoccupied [redacted]) and 900 m from the closest WTG location (i.e. unoccupied [redacted]ocated southwest of WTG15), it is unlikely that construction noise will result in significant noise impacts.

Based on the findings discussed above, suitable construction noise mitigation measures are recommended that are designed to ensure that impacts are minimised as far as is practically achievable.

Construction Traffic Noise

Additional road traffic generated by the Project, particularly heavy vehicle movements, during the construction phase may affect the identified NSRs located near the proposed transport routes. The location of the access road and internal road system is presented in *Figure 3-8*. All NSR are well beyond 500m away from the proposed internal road system with the exception of one NSR (i.e. unoccupied [redacted]which is located 100m away from the road).

Noise impacts associated with construction traffic would be temporary and will not represent a permanent impact on the community and the surrounding environment. With good site management practices in place, no significant construction traffic noise impacts associated with the Project are anticipated.

The overall impact significance of construction noise is summarised in Table 7-31 below.

TABLE 7-31: IMPACT FROM NOISE DURING CONSTRUCTION PHASE (CONSTRUCTION NOISE AND CONSTRUCTION TRAFFIC NOISE)

Impact	Noise Impact during Construction Phase (Typical Construction Noise and Construction Traffic Noise)				
Nature	Negative	Positive	Neutral		
	Noise disturbance during site preparation and construction phase.				
Type	Direct	Indirect	Induced		
	Impact from noise emissions in the construction phase is direct.				
Duration	Temporary	Short-term	Long-term	Permanent	
	Impact will only occur during the relatively short period of time at work sites during up to 17 months construction period, and therefore be described as short-term.				
Extent	Local	Regional	International		
	Impact is expected to be limited to the vicinity of the Project Site and therefore is considered local.				
Scale	Impact scale is considered small given the localised and short-term impact duration.				
Frequency	During daytime and nighttime throughout the construction phase.				
Magnitude	Positive	Negligible	Small	Medium	Large
	The Project construction activities are distant from NSRs and the Project utilises only limited number of mobile machineries, and therefore impact magnitude is considered small.				
Resource/Receptor Sensitivity	Low	Medium	High		
	General population is classified as receptor with medium sensitivity.				
Significance	Negligible	Minor	Moderate	Major	
	The significance of impact is considered minor during construction phase.				

Operational Phase

Wind Turbine, BESS and Substation Noise

In this assessment, the modelling inputs of for the prediction of wind turbine noise are summarised in *Table 7-27* to *Table 7-29*. The modelling inputs for the prediction of BESS and substation noise are summarised in *Table 7-30*.

The assessment considers noise level predictions at identified NSRs located within five (5) km from any WTG. Locations of sensitive receptors are provided in *Figure 6-154*. NSRs located more than five (5) km away are expected to experience lower noise impacts that the predicted noise levels presented in this report.

The predicted noise levels at the identified NSRs are presented in *Table 7-32* for the day period and *Table 7-33* for the night period.

These predicted noise levels are the total of wind turbine, BESS, substation and existing ambient noise levels. A noise contour map for wind turbine noise emissions is provided in *Figure 7-9*.

No criteria exceedances occur based on this assessment of operational noise.

TABLE 7-32: PREDICTED NOISE LEVELS AT SENSITIVE RECEPTORS – DAY PERIOD

Sensitive Receptor ID	Status	Distance to nearest WTG, in metres	Nearest WTG ID	*Day Noise Criterion, $L_{Aeq,1h}$*	Average Day Background Noise Level, dB(A)	Nearest Background Noise Monitoring Location	Wind Turbine Noise Level, L_{Aeq} in dB(A)	BESS and Substation Noise, L_{Aeq} in dB(A)	Total Noise Level (Wind Turbine+ BESS+ Substation + Background), L_{Aeq} in dB(A)	Exceedance?
[redacted]	Temporary Herder Settlement (Unoccupied)	930	T10	*55*	38	NO3	42	14	43	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1161	T11	*55*	36	NO2	41	17	42	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1197	T3	*55*	36	NO2	40	18	41	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1657	T16	*55*	40	NO4	39	36	44	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1740	T17	*55*	40	NO4	39	24	43	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1807	T5	*55*	36	NO2	39	13	41	No
[redacted]	Temporary Herder Settlement	1333	T12	*55*	36	NO2	38	<10	40	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1462	5point	*55*	40	NO4	38	18	42	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1612	T9	*55*	38	NO3	38	<10	41	No
[redacted]	Temporary Herder Settlement	1805	26point	*55*	38	NO3	38	12	41	No

Sensitive Receptor ID	Status	Distance to nearest WTG, in metres	Nearest WTG ID	*Day Noise Criterion, $L_{Aeq,1h}$*	Average Day Background Noise Level, dB(A)	Nearest Background Noise Monitoring Location	Wind Turbine Noise Level, L_{Aeq} in dB(A)	BESS and Substation Noise, L_{Aeq} in dB(A)	Total Noise Level (Wind Turbine+ BESS+ Substation + Background), L_{Aeq} in dB(A)	Exceedance?
[redacted]	Temporary Herder Settlement (Unoccupied)	1463	T15	*55*	36	NO2	37	<10	40	No
[redacted]	Temporary Herder Settlement	2255	T4	*55*	36	NO2	36	14	39	No
[redacted]	Temporary Herder Settlement	1582	4point	*55*	36	NO2	35	<10	38	No
[redacted]	Temporary Herder Settlement	2484	T12	*55*	36	NO2	33	14	38	No
[redacted]	Temporary Herder Settlement	2932	T21	*55*	40	NO4	32	<10	41	No
[redacted]	Temporary Herder Settlement	2794	T12	*55*	36	NO2	32	<10	37	No
[redacted]	Temporary Herder Settlement	2897	4point	*55*	36	NO2	31	<10	37	No
[redacted]	Temporary Herder Settlement (Unoccupied)	3732	4point	*55*	36	NO2	25	<10	36	No
[redacted]	Temporary Herder Settlement	4542	T15	*55*	36	NO2	20	14	36	No
[redacted]	Temporary Herder Settlement (Unoccupied)	4817	T15	*55*	36	NO2	19	<10	36	No

TABLE 7-33: PREDICTED NOISE LEVELS AT SENSITIVE RECEPTORS – NIGHT PERIOD

Sensitive Receptor ID	Status	Distance to nearest WTG, in metres	Nearest WTG ID	*Night Noise Criterion, $L_{Aeq,1h}$*	Average Night Background Noise Level, dB(A)	Nearest Background Noise Monitoring Location	Wind Turbine Noise Level, L_{Aeq} in dB(A)	BESS and Substation Noise, L_{Aeq} in dB(A)	Total Noise Level (Wind Turbine+ BESS+ Substation+ Background), L_{Aeq} in dB(A)	Exceedance?
[redacted]	Temporary Herder Settlement (Unoccupied)	930	T10	*45*	34	NO3	42	14	43	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1161	T11	*45*	37	NO2	41	17	42	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1197	T3	*45*	37	NO2	40	18	41	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1657	T16	*45*	42	NO4	39	36	45	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1740	T17	*45*	42	NO4	39	24	44	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1807	T5	*45*	37	NO2	39	13	41	No
[redacted]	Temporary Herder Settlement	1333	T12	*45*	37	NO2	38	<10	41	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1462	5point	*45*	42	NO4	38	18	43	No
[redacted]	Temporary Herder Settlement (Unoccupied)	1612	T9	*45*	34	NO3	38	<10	39	No
[redacted]	Temporary Herder Settlement	1805	26point	*45*	34	NO3	38	12	39	No

[redacted]	Temporary Herder Settlement (Unoccupied)	1463	T15	*45*	37	NO2	37	<10	40	No
[redacted]	Temporary Herder Settlement	2255	T4	*45*	37	NO2	36	14	39	No
[redacted]	Temporary Herder Settlement	1582	4point	*45*	37	NO2	35	<10	39	No
[redacted]	Temporary Herder Settlement	2484	T12	*45*	37	NO2	33	14	38	No
[redacted]	Temporary Herder Settlement	2932	T21	*45*	42	NO4	32	<10	42	No
[redacted]	Temporary Herder Settlement	2794	T12	*45*	37	NO2	32	<10	38	No
[redacted]	Temporary Herder Settlement	2897	4point	*45*	37	NO2	31	<10	38	No
[redacted]	Temporary Herder Settlement (Unoccupied)	3732	4point	*45*	37	NO2	25	<10	37	No
[redacted]	Temporary Herder Settlement	4542	T15	*45*	37	NO2	20	14	37	No
[redacted]	Temporary Herder Settlement (Unoccupied)	4817	T15	*45*	37	NO2	19	<10	37	No

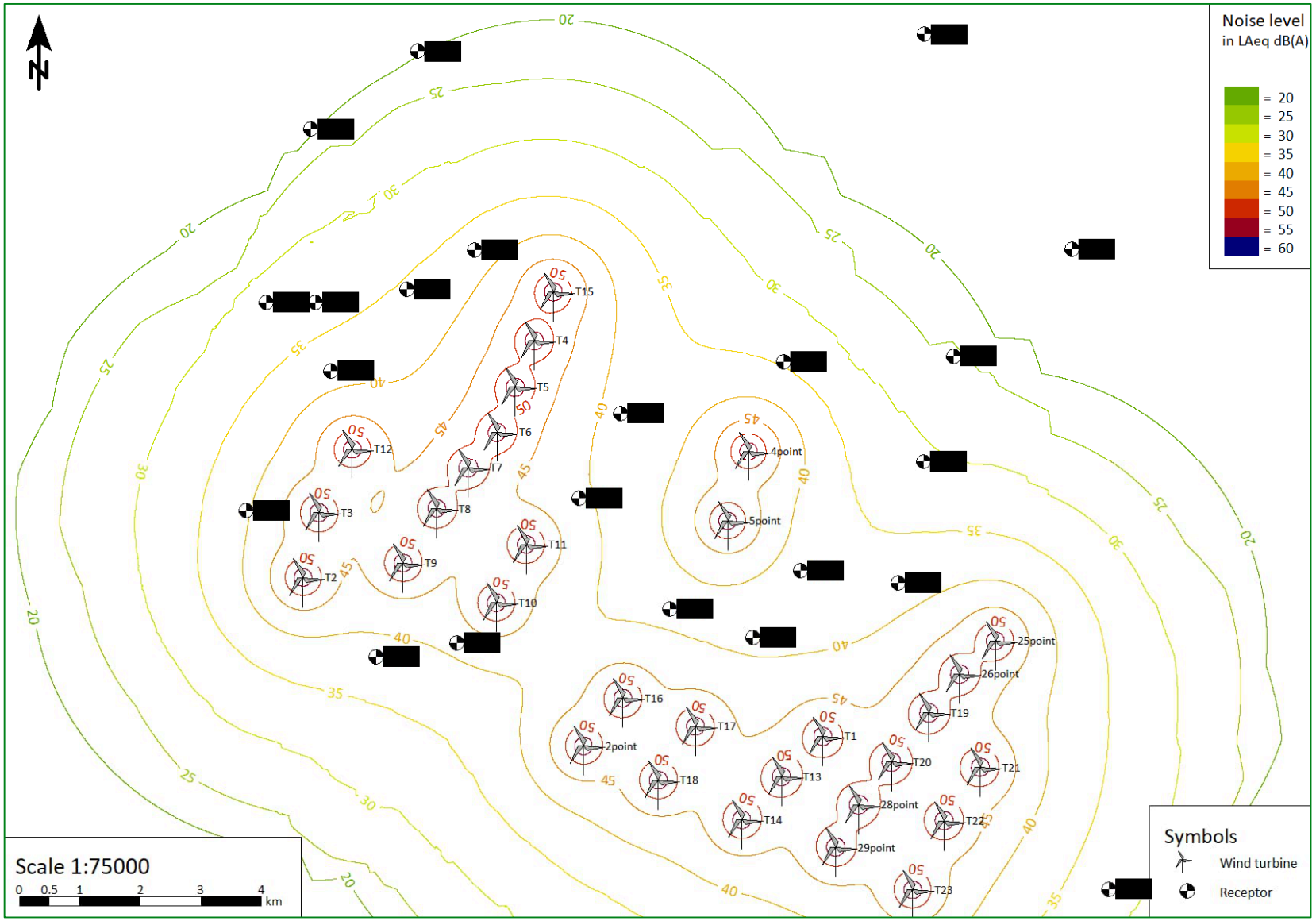


FIGURE 7-9: WIND TURBINE NOISE CONTOUR MAP

Operational Traffic Noise

Operational traffic noise will be limited to maintenance vehicles and movement of employees to and from the Project Site. Maintenance vehicles will use the access road for initial service and routine maintenance. It is assumed as a maximum, that five (5) passenger vehicle and one (1) van/light-duty truck will visit the Project Site on any given day. Given the limited number of daily vehicle movements, no adverse road traffic noise impacts are anticipated during the operational phase of the Project.

The overall impact significance of operational noise is summarised in Table 7-31 below.

TABLE 7-34: IMPACT FROM NOISE DURING OPERATIONAL PHASE (WIND TURBINE, BESS, SUBSTATION AND OPERATIONAL TRAFFIC NOISE)

Impact	Noise Impact during Operational Phase (Wind Turbine, BESS, Substation and Operational Traffic Noise)				
Nature	Negative	Positive	Neutral		
	Noise disturbance during operation phase.				
Type	Direct	Indirect	Induced		
	Impact from noise emissions in the operational phase is direct.				
Duration	Temporary	Short-term	Long-term	Permanent	
	Impact duration of operational traffic will be temporary. Impact duration of industrial noise and wind turbine noise is long term in the Project lifetime.				
Extent	Local	Regional	International		
	Impact is expected to be limited to the vicinity of the Project Site and therefore is considered local.				
Scale	Owing to the large separation distance of NSR to noise sources (WTGs and substation/BESS), disturbance impacts are not likely to occur. Conservative quantitative modelling of WTGs, BESS and substation generated noise indicated no IFC criteria noise exceedance is expected to occur.				
Frequency	Operational noise from WTGs may occur continuously or intermittently depending on wind conditions and WTG operations. Operational noise from BESS and substation is continuous and operational traffic is intermittent.				
Magnitude	Positive	Negligible	Small	Medium	Large
	WTGs and substation/BESS are sited to be distant from NSRs and potential disturbance from noise exposure are not likely to occur, and therefore impact magnitude is considered negligible.				
Resource/Receptor Sensitivity	Low	Medium	High		
	General population is classified as receptor with medium sensitivity.				
Significance	Negligible	Minor	Moderate	Major	
	The significance of impact is considered negligible during operation phase.				

7.4.4.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

Construction Phase

- Notify the local communities and herders on the schedule and location of construction work well in advance to allow herders to establish a settlement at an adequate distance from the designated construction sites;
- During construction of the Project, good practice construction noise mitigation and management measures should be implemented to minimise noise impact levels as far as practicable. A range of mitigation and management measures are available and those that are considered feasible, reasonable and practical to implement the specific tasks:
  - Avoid using multiple high noise emitting machines and equipment simultaneously at the same specific location;
  - Schedule high noise emitting construction activities to less sensitive times for the local communities and herders, such as when they are not at that location during specific times of the day;
  - Limit the number of heavy vehicles required for the Project to only those that are necessary;
  - Heavy vehicles should limit use of engine breaking to prevent excessive noise;
  - Strictly comply with technical requirements in the process of installing equipment and machines; and
  - Ensure all machines used on the site are in good working conditions and fully maintained, with particular emphasis on exhaust silencers, covers on engines and transmissions and squeaking or rattling components. Excessively noisy machines should be repaired or removed from the site.
- Any works that are required during the night-time period (10pm to 7am) should be notified prior to local communities, justified and task-specific noise mitigation and management measures should be implemented to reduce noise impacts to acceptable levels. These additional measures should consider the potential for sleep disturbance impacts that could occur during the night-time period due to “peak” or “maximum” noise level events e.g. metal on metal contact, or general clangs and bangs.
- Works associated with the OHL and access road construction often require activities in closer proximity to receptors. In these circumstances, task-specific noise mitigations and management measures should be implemented (when works are close to receptors) to reduce noise impacts as practical as possible;
- If any validated noise complaints are received through the grievance mechanism, the problem source and any potential noise reducing measures should be identified and evaluated for implementation during the works. If the noise complaint cannot be validated, no further mitigation or management measures are required.

It is important for the construction contractors to remain aware of the potential for noise nuisance, or an unacceptable impact on the amenity of receptors. The contractor should continue to plan for and manage construction works accordingly by utilising good industry practice for noise mitigation as mentioned above.

Operational Phase

Wind Turbine Noise

No project-specific noise mitigation measures such as serrated trailing edge technology for turbine blades, micro siting or curtailment is considered necessary based on the operational noise assessment conducted.

Even though NSRs are distant from WTGs, the following safeguards are recommended:

- Routine maintenance of wind turbines to be conducted, with specific attention to equipment degradation that may cause further noise impacts. Any equipment that is abnormally noisy should be evaluated and repaired as necessary to return emissions to typical operating performance; and
- A Sound Performance Warranty will be drawn up with the manufacturer of the turbines for this Project to ensure that the noise output will not contain any significant audible tones.

BESS and Substation Noise

Given operational phase noise impacts are assessed as negligible, no additional mitigation and management measures are recommended for the BESS and substation.

7.4.4.4 MONITORING AND AUDITING

Construction Phase

Noise monitoring is not considered to be required during the construction phase, provided that mitigation and management measures presented above be implemented.

Operational Phase

During the operation of the wind turbines, BESS and substation, a noise monitoring programme shall be implemented and should include the following, as a minimum:

- The proposed residential monitoring locations (including demonstration of any necessary access arrangements/consents);
- The proposed number of noise monitoring periods and the duration of each noise monitoring period;
- The proposed make and model of equipment and wind shields used for noise monitoring;
- The proposed method for determining wind speed and rainfall at microphone height;
- Details of any additional noise measurements to assist in the determination of the contribution of noise from the wind farm;
- The measured background noise levels at 1.5m height at the proposed residential monitoring locations; and
- The proposed method of determining wind speed at hub height (from the Wind Farm's SCADA system for example)).

7.4.4.5 RESIDUAL IMPACTS

Construction Phase

After implementation of the mitigation and management measures outlined above, the significance of residual impacts is anticipated to be negligible.

Operational Phase

Wind Turbine Noise

The significance of residual impacts is anticipated to be negligible.

BESS and Substation Noise

The significance of residual impacts is anticipated to be negligible.

Operational Road Traffic Noise

The significance of residual impacts is anticipated to be negligible.

7.5 SOIL IMPACT ASSESSMENT

7.5.1 SCOPE OF ASSESSMENT

This Section discusses the potential impacts to soil cover of the Project's construction and operation activities.

As per the Scoping Study (Chapter 5), the scope of Soil Environment Impact Assessment including the activities, potential impacts, and identified impact receptors is detailed in *Table 7-35* below.

TABLE 7-35: SCOPES OF SOIL ENVIRONMENTAL ASSESSMENT

Phase	Activities	Potential Impacts	Receptors
Construction	• Land preparation (site clearance, excavation, and levelling), fencing, and civil works; • Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL; • Wastes, emissions and discharges generation, handling, and disposal during construction; • Equipment and material transportation and supply	• Loss of soil stabilizing vegetation; • Soil compaction and erosion; • Soil contamination; • Land surface disturbance; • Subsoil disturbance; • Surface and subsoil contamination caused by construction and domestic waste in the case of insufficient project waste management; • Surface contamination caused by oil and fuel spills from storage and tanks at Project Site.	• Land users e.g., herders

7.5.2 SUMMARY OF BASELINE CONDITIONS

Based on the results of the environmental baseline assessment carried out 11 to 19 April 2025, it was found the soil cover at the WTG Area, Access Road and along OHL and was mostly gravelly, dry or moist, sand, and sandy loam. Hardened layers up to 0.5-3 cm thick were observed to have formed on the surface of the soil which were covered by gravel. The hardened layers perform the function of protecting the fragile and low humidity soils of the Gobi from being carried away by high winds and retaining moisture. Compared to more cohesive clayey soils for instance, the sandy soils and are easily broken and fragile by natural factors (e.g. wind erosion) and human and technical activities (e.g. vehicular traffic and construction activities).

Overall, within the surveyed area at the WTG Area and along the OHL, it was found the soils consisted of three subtypes of semi-desert brown soil, namely:

- Sand hardened and gravelly light brown soil;
- Semi desert gravelly thin light brown soil; and

- Gravelly light brown soil

The soil quality and heavy metal quantities in the soil samples were also analysed and compared to the maximum permissible amount of heavy metals in sandy soil in accordance with the MNS 5850: 2019 Standard (Soil quality - Maximum permissible levels of soil contaminants and elements). The average thickness of these topsoil was 5 to 20 cm. According to the results of laboratory tests, the overall level of soil fertility is low.

According to the laboratory analysis determining the content of heavy elements in the soil, arsenic (As) content at two out of six sampled locations slightly exceeded the Mongolian precautionary threshold levels but were well below the harmful (i.e. trigger threshold) level. For other elements, no values were found to exceed maximum permissible levels of the above standards. Depending on the composition of the parent rock, the content of heavy elements in the soil varies.

7.5.3 ASSESSMENT APPROACH AND CRITERIA

Impact on soil quality in the Project Site is predicted and assessed based on the sensitivity and magnitude criteria outlined in *Table 7-36* and *Table 7-37* below.

TABLE 7-36: SENSITIVITY ASSESSMENT CRITERIA FOR SOIL QUALITY (COMPACTION, EROSION AND CONTAMINATION)

Sensitivity Criteria	Contributing Criteria: Environment[4]	Contributing Criteria: Social[5]
Low	The soil quality does not support diverse habitat or populations and/or supports habitat or population of low quality.	The soil quality has little or no role in provisioning of services as agricultural uses for the local community.
Medium	The soil quality supports diverse habitat or population of flora and fauna and supports habitats commonly available in the Project AoI.	The soil has local importance in terms of provisioning services as agricultural services but there is ample capacity and/or adequate opportunity for alternative sources of comparable quality i.e., ready availability across the AoI.
High	The soil quality supports economically important or biologically unique species or provides essential habitat for such species.	The soil is wholly relied upon locally with no suitable technically or economically feasible alternatives or is important at a regional level for provisioning services.

[4] The extent to which the soil quality plays an ecosystem role in terms of supporting biodiversity. This includes its role as in supporting a lifecycle stage.
[5] The extent to which the soil quality provides a use (agricultural use) to the local communities and businesses, or is important in terms of national resource protection objectives, targets and legislation..

TABLE 7-37: CRITERIA FOR IMPACT MAGNITUDE FOR ASSESSMENT OF IMPACT TO SOIL

Magnitude Criteria	Negligible	Small	Medium	Large
Soil compaction, erosion and contamination	Qualitative - No perceptible or readily measurable change from baseline conditions	Perceptible change from baseline conditions but likely to easily revert to earlier stage with mitigation	Clearly evident (e.g., perceptible and readily measurable) change from baseline conditions and/or likely take time to revert back to earlier stage with mitigation	Major (e.g., order of magnitude) change in comparison to baseline conditions and/or likely difficult or may not to revert back to earlier stage with mitigation
	Scale - Localised area as particular activity area.	Scale - Project Site, activity areas and immediate vicinity not impacting any sensitive receptor.	Scale – Project Site, activity areas and immediate vicinity impacting sensitive receptors.	Scale – Regional or International
	Temporary – Short duration (few days) or one time as temporary.	Short-term – Only during particular activities or phase of the Project lifecycle as civil works or construction phase (few months)	Long term – Spread across several phases of the Project lifecycle (few years)	Permanent change

7.5.4 IMPACT ASSESSMENT

7.5.4.1 EXISTING/EMBEDDED MEASURES

Based on a review of information received from the Project Proponent, the following embedded controls are identified:

Construction Phase:

- Planning the location of construction sites: Pre-plan the placement of areas such as worker housing, kitchens, toilets, vehicle parking lots, repair areas, and construction material storage sites.
- Traffic management: Ensure that construction machinery and vehicles only use designated routes and avoid creating multiple access roads.
- Excavation minimization: Minimize the depth of excavation and handle excavated topsoil separately, in accordance with standards (MNS 5916:2008).
- Utilizing excess soil and materials: Use unused soil, gravel, and rock for backfilling, and stockpile any remaining materials in designated areas for planting vegetation.
- Waste management: Collect household and construction waste, as well as chemical containers, separately and arrange for their transportation to the centralized waste disposal site in agreement with relevant authorities in Tsogttsetsii sum.
- Proper storage of hazardous materials: Store petroleum products, fuels, lubricants, and chemicals in designated containers as per standards to prevent soil contamination, and take management measures to prevent leaks and spills.
- Immediate response to contamination: In case of chemical spills or contamination of the soil, immediately remove the contaminated soil, neutralize it, and dispose of it properly.
- Cleaning and rehabilitation: Complete cleaning and landscaping of the site within 30 days after construction work is finished.
- Restoration of damaged soil: The owner is responsible for restoring soil degradation and damage according to soil protection and environmental regulations, including the reclamation of areas affected by soil degradation during the construction.
- Green space planting: Plan to plant green vegetation and trees on areas equivalent to 10% of the total land area.
- Waste disposal facilities: Provide adequate and accessible waste disposal points and bins to prevent open dumping of waste.

Operation:

- No embedded measures for operation phase identified.

7.5.4.2 SIGNIFICANCE OF IMPACTS

Construction Phase

Potential Impact to Soil

The potential impacts from construction activities of WTGs' foundation, transmission line pylon and other components include:

- Loss of soil stabilizing vegetation;
- Soil compaction and erosion;
- Soil contamination;

- Land surface disturbance;
- Subsoil disturbance;
- Surface and subsoil contamination caused by construction and domestic waste in the case of insufficient project waste management; and
- Surface contamination caused by oil and fuel spills from storage and tanks at Project Site.

Site clearance, excavation, road construction and construction activities that are carried out during the construction phase will affect the top layers of soil the most. The removal of stabilised topsoil for the Project's construction activities may result in increased soil erosion, and if the utilised topsoil removal and storage methods do not comply with the standard requirements, it will result in the loss of fertile content of topsoil and in the worst case, desertification. Soil cover may also be degraded during the construction phase as a result of the creation of unmanaged new roads and paths for transport activities if internal roads and Access Road are not properly managed and pre-defined, leading to instances of trespassing through adjacent soil areas and creating new paths, thereby causing more soil disturbance and impacted soil if maintenance is conducted poorly and unclear signage is installed. Bare slopes and bare soil stockpiles may also cause erosion and sedimentation. The areas which will be affected by soil erosion will be the internal roads, access road and any spoil disposal areas and the impact magnitude is assessed as medium.

Construction activities are localised within the Project Site and the soil would be impacted for the duration of the construction phase (17 months) and the effects would last until the area is fully rehabilitated during the operation phase. Soils within the Project Site including the OHL route are used by local herders for grazing, therefore the sensitivity assessment for the impact to soil quality has been determined as medium, due to the possible reduction in available grazing areas.

The significance of impacts to soils from the construction activities is discussed and presented in *Table 7-38*. With proper implementation of the existing controls, the impact significance of impacts to has been assessed as Minor.

TABLE 7-38: IMPACT TO SOIL DURING CONSTRUCTION PHASE

Impact	Noise impacts du construction activities			
Nature	Negative	Positive	Neutral	
	Disturbance and erosion of soil of the area is considered negative			
Type	Direct	Indirect	Induced	
	Soil erosion directly affects local community's livelihood as local vegetation is the main feedstock for herders' livestock.			
Duration	Temporary	Short-term	Long-term	Permanent
	The impact duration is short-term during the construction phase and until the areas are fully rehabilitated.			
Extent	Local	Regional	International	
	Impacts are local			
Scale	Impacts are within the Project Site			

Impact	Noise impacts du construction activities				
Frequency	Intermittent over the construction period (17 months)				
Magnitude	Positive	Negligible	Small	Medium	Large
	The impact magnitude is small taking into account existing controls in place				
Resource/Receptor Sensitivity	Low		Medium	High	
	The soil has local importance in terms of provisioning services as agricultural services (pasture) but there is ample capacity and/or adequate opportunity for alternative sources of comparable quality. Soil disturbance and erosion has potential to affect local community's livelihood.				
Significance	Negligible	Minor	Moderate	Major	
	Impact significance is minor during construction phase.				

7.5.4.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

Construction Phase

Although impacts are assessed of minor significance, the following good practice controls are recommended which elaborate on proposed existing measures:

- Topsoil stripping activities during the construction phase shall comply with the standard MNS 5916:2008 and adhere to recommendations made by environmental experts and technical conditions for civil works;
- Topsoil stripped from all the construction areas should be temporarily stored separately from other soils and excavated materials and be used for the rehabilitation of temporary roads used during construction phase and other suitable locations;
- Topsoil stockpiling should be performed in accordance with the technical conditions for civil works;
- Topsoil removed from the construction area of WTGs and OHL poles should be used for rehabilitation of nearby landscape; lower-level soils and rocks removed should be used for permanent backfill and protection dams of unpaved roads and Substation, as appropriate;
- Implement a procedure prohibiting vehicles to travel on unapproved routes during construction phase;
- Implement the following measures to reduce the risk of soil contamination from contaminants and spills that may occur during storage and refuelling of materials and fuel. These include:
    - No waste will be stored on bare soil, possible leakages and contaminated runoff waters from waste storage areas will be prevented;
    - Regular mechanical inspections should be routinely carried out to prevent fuel, oil and other liquids spills from vehicles and equipment used during construction and operation phases;
    - Materials that may pollute groundwater shall be stored on impermeable materials such as concrete and geomembrane to prevent flowing of materials through storm water

drainage and rainwater; oil binding techniques should be utilized as appropriate. The spillage reservoirs should be constructed with sufficient capacity to store the entire contents of the storage tank with flammable lubricant materials. Secondary containment for fuel storage tank used:

  - Contaminated soil will be dug and disposed as hazardous waste;
  - Spill and leakage control procedures will be implemented;
  - Flammable lubricant materials storage tank, pipes and valves should be regularly checked for wear and tear and be replaced, if necessary;
  - In the event of a spillage or leakage from the storage tanks, proper pumps for collecting and special absorbent materials should be adequately placed at the location. Trays should be regularly inspected and cleaned to remove any accumulated residues; and
  - Ensure controls are in place to prevent leaving the vehicle unattended while refuelling and regularly check that the valve of the tank containing flammable lubricant materials is not left open.

- Implement measures to prevent soil degradation:
  - Maintain approved routes for maintenance vehicles when accessing Substation, BESS, WTGs, OHL and carry out necessary road maintenance works;
  - Road condition should be regularly inspected for any damaged road section; vehicles should be navigated to travel around the damaged road section; required road maintenance works should be carried out (if necessary); and
  - Monitor soil and vegetation cover during the operation phase, based on research and regional climate data to determine whether the vegetation is growing again on areas affected by groundworks during the construction phase of the Project.

7.5.4.4 MONITORING AND AUDITING

Monitoring of soil will be conducted in compliance with the monitoring program outlined in the Local Environmental Management Plan approved by the Mongolian authorities.

7.5.4.5 RESIDUAL IMPACTS

Construction Phase

Potential impact to soil: With the implementation of the existing controls and additional mitigation and management measures, as well as the monitoring and auditing outlined for construction above, the residual impacts are anticipated to be remained at minor.

7.6 WATER RESOURCES IMPACT ASSESSMENT

7.6.1 SCOPE OF ASSESSMENT

This Section discusses the potential impacts of the Project's construction and operation activities related to surface water and groundwater.

As per the Scoping Study (Chapter 5), activities causing potential impacts to surface water and groundwater availability and quality, as well as the receptors of the impacts, are detailed in *Table 7-39*.

TABLE 7-39: SCOPES OF WATER RESOURCES ASSESSMENT

Phase	Activities	Potential Impacts	Receptors
Construction	• Workforce mobilisation and presence • Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL Wastes, emissions and discharges generation, handling and disposal during construction • Operation of associated facilities such as the concrete batching plant, workers' accommodation facility • Water use associated with the above activities	On water resource competition: • Withdrawal of water e.g., via abstraction from wells entails the risk of exceeding the recharge capacity (noting this is not proposed onsite). On water quality: • Increased contaminants such as trace amount of heavy metals, oil and grease, high sediment, nutrients and other salts from concrete batching, organic load etc. washed into surface water bodies (such as rivers) from construction activities; • Waste discharged from construction activities and worker's activities; • Spillage of oil, chemicals, hazardous chemical from use of vehicles and construction machines during the construction phase.	Offsite • Groundwater supplies: domestic, business, irrigation and other water users Onsite • Groundwater users e.g., herders • Flora and Fauna
Operation	• Inspection; • O&M of WTGs and ancillary facilities such as storage area and associated infrastructure (Substation, BESS and Control Building); • Waste, emissions and discharge generation, handling, and disposal; • Vehicle movement; • Presence of workforce (maintenance and security) • Water use associated with the above activities	On water competition: • Withdrawal of water e.g., via abstraction from wells entails the risk of exceeding the recharge capacity (noting this is not proposed onsite). On water quality: • Spillage of oil, chemicals, hazardous chemicals from Substation and BESS or during maintenance operations; • Permanent employees of the Project will require toilets and sanitation facilities which require constant maintenance to avoid the	Offsite • Water supplies: domestic, business, irrigation and other water users Onsite • Groundwater users e.g., herders • Flora and Fauna

Phase	Activities	Potential Impacts	Receptors
		discharge of untreated wastewater which can affect groundwater quality.	
Unplanned events	• Leakage and spill incident • Fire and explosion	• Unplanned oil and chemical releases may damage the terrestrial environment including surface water (where present) and groundwater; • Fallout of ashes from fire and explosion may affect surface water quality	Offsite • Water supplies: domestic, business, irrigation and other water users Onsite • Groundwater users e.g., herders • Flora and Fauna

7.6.2 SUMMARY OF BASELINE CONDITIONS

7.6.2.1 WATER AVAILABILITY

Surface Water

Most riverbeds of the region have temporary or ephemeral runoffs and are usually dried most of the year. In the event of intense rains, which fall during summer and autumn, temporary runoffs overflow the dry riverbed. The overflowing of dry riverbeds can subsequently lead to floods. Surface water elements such as permanent gravels, backwater and ponds were not observed during the baseline assessment due to the lack of precipitation throughout the area, constant winds and high temperatures. As a result of high annual evaporation from extreme weather conditions in the region, post precipitation surface water evaporates in a short period of time.

The OHL crosses five dry river beds and one river derived from a spring (groundwater), though its occurrence was considered to be a result of higher than usual rainfall that occurred in the previous autumn. There are no known permanent surface water features on the Project Site. The Project does not expect to source water for construction activities from surface water.

Groundwater

Aquifers in the South Gobi Aimag provide significant water accumulation over hundreds of kilometres below ground. Productive aquifers near the project include the Zairmagtai aquifer which is reported to sustain abstraction rates of 29 L/s for the Tavan Tolgoi mine, with other wells in the surrounding region reported to be used for abstraction at rates in the order of 1.5 to 2.5 L/s.

In the South Gobi Region, herders rely on groundwater as the water supply source. In the region, it is reported aquifers located below the groundwater table (typically 50 meters below ground surface) are saturated with groundwater[6]. Owing to climatic conditions, shallow

[6] Tuinhof, A. and Buyanhisnig, N. (2010). Groundwater Assessment of the Southern Gobi Region. Mongolia Discussion Papers, East Asia and Pacific Sustainable Development Department. Washington, D.C.: World Bank

aquifers are reported to experience limited recharge (reported at about 1-2 millimetre per year, although some studies indicating 5-10 mm per year).

There are seven existing groundwater wells in the vicinity of the Project Site that are used by herders and residents as outlined in *Table 7-40*. Khar Toirom, which is a deep borehole well that accesses deep groundwater, is the nearest well within the WTG Area (*Figure 6-44*).

TABLE 7-40: WELLS IN THE VICINTY OF THE PROJECT SITE

Bagh, Soum	Well Name	Well Type	Remark
Bilgeh Bagh, Tsogt-Tsetsii Soum	Khar Toirom	Deep borehole well	Located in the land lease area
	Baruun Khargana	Deep borehole well	
	Sain Shand	Dug well	
	Gün Shand	Engineered well	
	Mukhar Ereg	Engineered well	
Mogoit Bagh, Bayan-Ovoo Soum	Khukh Tolgoi	Deep borehole well	Outside the lease area
Gavilud Bagh, Khanbogd soum	Khaya	Engineered well	Near the OHL route

According to the Focus Group Discussion (FGD) in Bilgeh bagh, households obtain water from wells, the soum centre, and bottled water. Herders store groundwater well water in containers for livestock. The women's group noted that water availability and quality are problematic, with water often having a strange taste and sometimes appearing rusty (noting that rusty appearance is typically associated with iron concentrations).

In Gavilud bagh, herders reported that some residents use purified water from the smart well at the soum centre or have water purifiers at home. To water their livestock, herders typically move closer to wells and water sources.

7.6.2.2 WATER QUALITY

Surface Water

There are no permanent surface water features on the Project Site with the exception of stream from Khaya Spring, located along the OTL route in Gaviluud bagh, Khanbogd soum. Surface water quality from this spring was found to be complaint with MNS 0900:2018 and MNS 6148:2010 with the exception of elevated sodium, chloride, and pH concentrations.

The Project will not withdraw its water demand for construction or operations from any surface water sources.

Groundwater

According to the baseline assessment, there are seven herder wells located in vicinity of the Project Site including deep borehole wells, dug wells and engineered wells, of which four were

accessible (unlocked) for sampling. Permitted thresholds for groundwater pollutants set by MNS 6148: 2010 and MNS 0900: 2018 of the drinking water standards of Mongolia were not exceeded, with the exception of small exceedance of nitrate at two wells (Gün Shand, Mukhar Ereg), and at small exceedance of arsenic at one well (Gün Shand).

The Project will not withdraw its water demand for construction or operations from any groundwater sources at or near the site. Project water demand will be provided by offsite sources and trucked (by water tanker) to the site. Groundwater to be provided by [redacted] is assumed to be of appropriate quality for use onsite, including drinking water, as both companies are providers of drinking water to other users.

7.6.3 ASSESSMENT APPROACH AND CRITERIA

For the assessment of water resource availability and water quality, the sensitivity and magnitude criteria are outlined in *Table 7-41* and *Table 7-42*.

TABLE 7-41: SENSITIVITY ASSESSMENT CRITERIA FOR WATER RESOURCES

Sensitivity Criteria	Contributing Criteria: Environment[7]	Contributing Criteria: Social[8]
Low	The water resource does not support diverse aquatic habitat or populations or supports aquatic habitat or population that is of low quality.	The water resource has little or no role in terms of provisioning services as agricultural water source, other domestic uses as washing, bathing, industrial use and waterways for the local community.
Medium	The water resource supports diverse populations of flora and fauna but is available in other water bodies in the region.	The water resources have local importance in terms of provisioning services but there is ample capacity and/or adequate opportunity for alternative sources of comparable quality.
High	The water resource supports economically important or biologically unique aquatic species or provides essential habitat for such species.	The water resources are wholly relied upon locally, with no suitable technically or economically feasible alternatives, or is important at a regional or transboundary watershed level for provisioning services.

TABLE 7-42: CRITERIA FOR IMPACT MAGNITUDE FOR WATER RESOURCE IMPACT ASSESSMENT

Magnitude Criteria	Negligible	Small	Medium	Large
General Criteria	No perceptible or readily measurable change from baseline conditions.	Perceptible change from baseline conditions but likely to be within applicable norms and standards for model of use.	Clearly evident (e.g. perceptible and readily measurable) change from baseline conditions and/or likely to approach and even occasionally exceed applicable norms and standards for mode of use.	Major changes in comparison to baseline conditions and/or likely to regularly or continually exceed applicable norms and standards for mode of use.

[7] The extent to which the water resource plays an ecosystem or amenity role in terms of supporting biodiversity either directly or indirectly, particularly with respect to dependent ecosystems

[8] The extent to which the water resource provides or could provide a use (drinking water, agricultural uses, washing and other domestic or industrial uses, use as waterways) to the local communities and businesses, or is important in terms of national resource protection objectives, targets, and legislation.

Magnitude Criteria	Negligible	Small	Medium	Large
Surface Water Quantity	There is likely to be negligible or no consumption of surface water by the Project at any time.	The Project will consume surface water, but the amounts abstracted are likely to be relatively small in comparison to the resources available at the time of use (i.e. taking into account seasonal fluctuation).	The Project will consume surface water, and the amounts abstracted are likely to be significant in comparison to the resource available at the time of use (i.e. taking into account seasonal fluctuation).	The Project will consume surface water, and the amounts abstracted are likely to be very significant in comparison to the resources available at the time of use (i.e. taking into account seasonal fluctuation).
Groundwater Quantity	There is likely to be negligible or no abstraction, use of or discharge to the groundwater by the Project at any time.	The Project will consume groundwater or deliver discharge to groundwater, but the amounts abstracted/discharged are likely to be relative small in comparison to the resource available at the time of use (i.e. taking into account seasonal fluctuation).	The Project will consume groundwater or discharge to the groundwater, and the amounts abstracted/discharged are likely to be significant in comparison to the resource available at the time of use (i.e. taking into account seasonal fluctuation).	The Project will consume groundwater or discharge to groundwater, and the amounts abstracted/discharged are likely to be very significant in comparison to the resource available at the time of use (i.e. taking into account seasonal fluctuation).
Water quality	▪ Water quality impacts are likely to be well within ambient levels or allowable criteria; ▪ Discharges are expected to be well within statutory limits; ▪ Potential short-term localized effects on water quality but likely to be highly transitory (e.g., lasting a matter of hours) and well within natural fluctuations.	▪ Water quality impacts are likely to be well within ambient levels or allowable criteria; ▪ Discharge are expected to be within statutory limits; ▪ Potential short-term localized effects on water quality but which are likely to return to equilibrium conditions within a short timeframe (e.g., hours or days at most).	▪ Water quality impacts are likely to result in occasional exceedances of ambient levels or allowable criteria ▪ Occasional breaches of statutory discharge limits (limited periods) expected; ▪ Potential localized effects on water quality which are likely to be fairly long lasting (e.g., weeks or months) and/or give rise to indirect ecological and/or socio-economic impacts. ▪	▪ Water quality impacts are likely to routinely exceed ambient criteria levels or allowable criteria over large areas; ▪ Repeated breaches of statutory discharge limits (over extended periods) expected; ▪ Potentially severe effects on water quality which are likely to be long-lasting (e.g., months or more) or permanent and/or give rise to indirect ecological and/or socio-economic impacts.

7.6.4 IMPACT ASSESSMENT

7.6.4.1 EXISTING/EMBEDDED MEASURES

Based on a review of information received from the Project Proponent, the following embedded controls are identified:

Construction Phase:

- Proper storage of hazardous materials: Store petroleum products, fuels, lubricants, and chemicals in designated containers as per standards to prevent contamination, and take management measures to prevent leaks and spills.
- Immediate response to contamination: In case of chemical spills or contamination of the soil, immediately remove the contaminated material, neutralize it, and dispose of it properly.
- Domestic liquid waste will be collected in designated sewage tanks and transported off site for disposal.
- Maintenance and Equipment Integrity: Ensure the quality and integrity of machinery and equipment, conducting regular maintenance services.

Operation phase:

- Take measures to prevent spills of oil, lubricants, and fuel from machinery to ground. In case of spills, immediately clean the contaminated material, neutralize it, and dispose of it properly.
- Domestic liquid waste will be collected in designated sewage tanks and transported off site for disposal.

7.6.4.2 SIGNIFICANCE OF IMPACTS

Construction Phase

Potential Impact due to Water Resources Competition

During the construction phase, water supply will be sourced from offsite groundwater sources. The requirement for water for construction will not put stress on local water resources at or near the site and there is no potential for a reduction in water availability due to the Project's water use that could impact local residents and herders.

The proposed offsite water sources have indicated they are able to provide the required supply of water for construction.

Surface Water: There are no known permanent surface water features on the Project Site and most of the rivers in the region have temporary runoff and are dried for most of the year. All identified surface water features are temporary in nature. As such, the water required for construction will not be sourced from the surface water thus Project activities will not affect surface water availability (water quantity). Therefore, the impact magnitude is assessed as negligible. Regarding receptor sensitivity, the sensitivity has been assessed as low. This is because there are no known permanent surface water bodies which are located within the Project Site, and therefore there are no bodies of water which herders will rely on for domestic uses.

Groundwater: The total water consumption of the Project's construction period is estimated to be 111,873 m3 (noting that approximately 25,000 m3 of water required for concrete /

cement purposes would be provided by the concrete / cement contractor, and only 86,000 m3 would be required by NZE). Water for construction will be brought in to site via water tankers and supplied by [redacted] Construction will last for approximately 27 months and during peak construction phase, a maximum of 8,885 m^3/month of water is estimated to be required (further details are provided in *Table 3-6 and Table 3-7*).

As groundwater will not be used at the site, there is no likely impact on available local groundwater resources. Therefore, the impact magnitude is assessed as negligible for the site and nearby area. However, sensitivity of groundwater resources are rated as high given reliance by herders on local wells.

Given the [redacted] companies have indicated their ability to provide the necessary amount of water for project construction (86,000 m3) and also have sufficient capacity to provide the full amount required for construction (111,873 m3, the impact magnitude is assessed as small for offsite sources.

TABLE 7-43: IMPACT ON WATER RESOURCE COMPETITION FROM CONSTRUCTION ACTIVITIES

Impact	Impact on water resource competition from the construction activities				
Nature	Negative	Positive	Neutral		
	There are no predicted changes to water availability from the water resources of the area near the site. There is small potential for negative impacts on offsite water resources from competition due to the construction activities.				
Type	Direct	Indirect	Induced		
	There are no predicted impacts onsite. The impacts on water availability sources offsite may have indirect effects on other users of the fresh water source.				
Duration	Temporary	Short-term	Long-term	Permanent	
	Impact duration to offsite is short-term during the construction phase (27 months)				
Extent	Local	Regional	International		
	Impacts are localised offsite and will not occur at the Project Site or the immediate surroundings.				
Scale	Local				
Frequency	Potentially intermittent offsite during the construction period (27 months). There are no predicted impacts onsite.				
Magnitude	Positive	Negligible	Small	Medium	Large
	The impact magnitude is negligible in term of surface water and groundwater availability onsite. The impact magnitude is assessed as small for offsite groundwater.				
	Low	Medium	High		

Impact	Impact on water resource competition from the construction activities			
Resource/Receptor Sensitivity	The water resources are relied upon locally and there are a series of users competing for this resource.			
Significance	Negligible	Minor	Moderate	Major
	The impact significance is assessed as negligible for onsite during the construction phase. The impact significance may be minor offsite during construction phase.			

Potential Impact on Water Quality

During the construction phase, workers will undertake works activities at the WTG Area, substation, BESS, and construction of temporary facilities and access roads. Project construction will require a peak workforce of 300 workers on-site. Potential impacts to water quality from construction activities and worker's activities could arise from:

- Runoff from construction site areas resulting increase in contaminants such as trace amount of heavy metals, oil and grease, organic load, suspended sediment etc. washed into surface water bodies (such as rivers) from construction areas, particularly following rains, or infiltrating groundwater.
- Wastewater discharged from construction activities and worker's activities including:
  - Sewage will arise from the construction workforce and from drainage from cooking activities and laundry facilities. Uncontrolled discharge of wastewater is generally characterised as having a high concentration of solids (suspended and dissolved), oil and grease, biochemical oxygen demand (BOD) and chemical oxygen demand (COD), nutrients (ammonia) and coliform bacteria counts.
  - Concrete washout at concrete batching plant could potentially contain chemicals (for example, alkaline water with elevated suspended solids)

Surface Water: There is potential for surface water quality to be impacted by contamination through spills of oils and fuels from damaged or malfunctioning vehicles and heavy machineries as they cross dry riverbeds during the construction phase, or through contamination caused by inadequate waste management during the construction phase. However, those are related to accidents that are unlikely to occur with the existing controls in place.

Groundwater: Groundwater quality could be negatively impacted due to contamination during the construction phase if improperly managed. Uncontrolled sewage, spill and leaks of oils and fuels, and concrete washout may contaminate groundwater through rainwater).

Overall, based on review of embedded measures, the Project includes appropriate measures to manage wastewater but some definition of sewage and sanitary wastewater management measures including provision of toilet facilities for the workforce during the and construction phase, as well as measures to manage concrete washout wastewater are incomplete.

The significance of impacts associated with wastewater is discussed and presented in *Table 7-44*. The impact significance of resulting water quality impacts has been assessed as Moderate.

TABLE 7-44: IMPACT ON WATER QUALITY FROM CONSTRUCTION ACTIVITIES AND WORKER'S ACTIVITIES

Impact	Impact on water quality due to construction activities and worker activities				
Nature	Negative	Positive	Neutral		
	Potential increased pollution of freshwater and groundwater is considered Negative. Decline in water quality due to elevated suspended solids and turbidity, nutrients, BOD and COD, oil and grease, *E. coli* and trace contaminants and alkali water.				
Type	Direct	Indirect	Induced		
	Pollution in freshwater and groundwater sources directly affect locals that are dependent on the fresh water source (groundwater).				
Duration	Temporary	Short-term	Long-term	Permanent	
	Impact duration is short-term during the construction phase (27 months)				
Extent	Local	Regional	International		
	Impacts are local.				
Scale	Impacts are within the Project Site and the immediate surroundings				
Frequency	Intermittent over the construction period (27 months)				
Magnitude	Positive	Negligible	Small	Medium	Large
	The impact magnitude is conservatively assessed as small given embedded measures. There is incomplete definition of wastewater management measures.				
Resource/Receptor Sensitivity	Low	Medium	High		
	The sensitivity of receptors is high as pollution of water resources could affect those locals that locally rely on use groundwater				
Significance	Negligible	Minor	Moderate	Major	
	Impact significance is moderate during construction phase in the absence of further mitigation.				

Operation Phase

Potential Impact due to Water Resource Competition and on Water Quality from Operation Activities

Potential impacts on water resource competition during operation phase are likely to be similar but reduced compared to the construction phase, based on the lower water use requirements. Water supply is proposed to be sourced from offsite groundwater sources that are the same as for construction, and this is the basis for this assessment.

However, an additional option for groundwater supply is also identified offsite [redacted] There is also the potential that a groundwater supply option will be identified at the Project Site, which would require appropriate approvals, including assessment of sustainability and impacts on existing users (specifically the local herders).

Potential impacts on water quality from operation activities include:

- Spillage of oil, chemicals, hazardous chemicals from Substation or BESS during maintenance operations;
- Permanent employees of the Project will require toilets and sanitation facilities which require constant maintenance to avoid the discharge of untreated wastewater which can affect groundwater quality. Requirement of water for domestic and construction purposes may put stress on local water resources to adversely affect local residents and herders; and

During the operation phase, an estimated workforce of 34 employees will be working on-site. During the operation, NZE estimates water consumption to be 42 m^3/day (approximately 15,330 m^3/year). Over the lifetime of the Project (20-25 years), a total of about 306,000 - 383,000 m^3 of groundwater would be required. The same offsite groundwater supply as proposed for the construction phase would be used. The Project's impact to water resource competition will be long term but given the consumption of groundwater is much lower than the maximum water supply during construction and able to be supplied by [redacted] the magnitude is assessed as negligible.

The significance of impact due to waste and wastewater discharge, small oil spillage during operation phase after implementation of mitigation measures is assessed as negligible and mostly associated with accidents, which are expected to be rare when good management of the Project infrastructure is in place and not expected to reach groundwater resources at wells used by herders.

TABLE 7-45: IMPACT ON WATER RESOURCE COMPETITION FROM OPERATION ACTIVITIES

Impact	Impact due to Water Resource Competition from Operation Activities			
Nature	Negative	Positive	Neutral	
	There are no predicted changes to water availability from the water resources of the area near the site. There is small potential for negative impacts on offsite water resources from competition due to the construction activities.			
Type	Direct	Indirect	Induced	
	There are no predicted impacts onsite. The impacts on water availability sources offsite may have indirect effects on other users of the fresh water source.			
Duration	Temporary	Short-term	Long-term	Permanent
	The impact duration is long-term during the operation phase (20-25 years)			
Extent	Local	Regional	International	
	Impacts will be localised offsite and will not occur at the Project Site or the immediate surroundings.			
Scale	Local			

Impact	Impact due to Water Resource Competition from Operation Activities				
Frequency	Potentially intermittent offsite during the construction period (27 months). There are no predicted impacts onsite.				
Magnitude	Positive	Negligible	Small	Medium	Large
	The impact magnitude is negligible in term of surface water and groundwater availability onsite. The impact magnitude is assessed as small for offsite groundwater.				
Resource/Receptor Sensitivity	Low	Medium	High		
	The water resources are relied upon locally and there are a series of users competing for this resource.				
Significance	Negligible	Minor	Moderate	Major	
	Impact significance is negligible for onsite during operation phase. The impact significance may be minor offsite during construction phase.				

TABLE 7-46: IMPACT ON WATER QUALITY FROM OPERATION ACTIVITIES

Impact	Impact on Water Quality from Operation Activities				
Nature	Negative	Positive	Neutral		
	Increased pollution of groundwater and freshwater for other users is considered negative				
Type	Direct	Indirect	Induced		
	Pollution in freshwater or groundwater sources directly affect users that are dependent on the water sources (groundwater).				
Duration	Temporary	Short-term	Long-term	Permanent	
	The impact duration is long-term during the operation phase (20-25 years)				
Extent	Local	Regional	International		
	Impacts will be local				
Scale	Impacts are within the Substation and the immediate surroundings				
Frequency	Infrequent - accidental events				
Magnitude	Positive	Negligible	Small	Medium	Large
	Assessed as negligible.				
Resource/Receptor Sensitivity	Low	Medium	High		
	The sensitivity of receptors is high as pollution of water resources would affect those locals that use groundwater for drinking purpose and rely on groundwater.				
Significance	Negligible	Minor	Moderate	Major	
	Impact significance is negligible during operation phase.				

7.6.4.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

Construction Phase

Potential Impact due to Water Resources Competition

Given impacts are assessed as negligible onsite, but recognising the high sensitivity of water resources and the potential for minor impacts offsite, the following controls shall be applied to reduce the potential for impacts from construction activities:

Water Conservation:

- Project will develop a Water (Usage) Management Plan, which will serve to enhance water use efficiency for the Project.
- Project Proponent shall have internal control unit, necessary equipment and appointed water utility officer as stipulated in the Law on Water (Article 30.1.2) and Law on Environmental Protection (Article 31.7);
- Optimum use of water during sprinkling on roads for dust suppression, concrete mixing for WTGs' foundation, etc.;
- Minimization of water consumption for domestic and potable purposes through environmental awareness trainings for workers at the accommodation facility,
- Regular routine inspection for the identification of water leakages and to prevent wasting water from water tankers (if used);
- Recycling and reusing water to the extent possible

Good practice measures:

- The Conditions associated with each water use approval should be followed, and adherence to such should be monitored and confirmed through routine inspections and / or audits.
- Monitoring of water consumption should be used to identify over-consumption and provide a basis for increasing water efficiency.

Potential Impact on Water Quality

Given impacts are assessed of moderate significance, the following controls shall be applied to reduce the potential for impacts from construction activities

Sewage from workforce:

- Temporary sanitary facilities, such as portable toilets, shall be provided on-site during the early stages of work and construction phase. Sufficient toilets at active work areas should be provided for site staff and workers and these should be serviced regularly by a competent and suitably qualified person.
- Sewage from toilets, kitchen and similar facilities produced at sites without sewage facilities, will be collected and treated offsite. This will require transport off-site to approved treatment facilities;
- Sewage treatment facilities (septic tank and sewage storage tank) at construction and associated facility site shall be provided with sufficient capacity to treat sewage from the peak workforce.
- A specialised contractor should be responsible for regular collection of sludge from septic tanks and disposal of the sewage off site.

- The septic tanks shall be well maintained for effective operation.
- Direct disposal of domestic wastewater into surface waters will not be allowed. The temporary toilet and domestic wastewater facilities should be managed in a manner that results in zero discharge of raw sewage to the environment

Concrete batching plant:

- Run off from cement area at the concrete batching plant shall be strictly controlled and contaminated water shall be collected, stored and either treated or disposed offsite, at an approved location.

General:

- Regular mechanical inspections should be routinely carried out to prevent fuel, oil and other liquids spills from vehicles and equipment used in construction phase
- Materials that may pollute groundwater shall be stored on impermeable materials (such as epoxy coated concrete), to prevent flowing of materials through storm water drainage and rainwater; oil trap techniques should be utilized as appropriate;
- Flammable lubricant materials storage tank pipes and valves should be regularly checked for wear and tear and be replaced, if necessary;
- In the event of a spillage or leakage from the storage tanks, proper pumps for collecting and special absorbent materials should be adequately placed at the location. Trays and blind pits, if any, should be regularly inspected and cleaned to remove any accumulated residues;
- Ensure controls are in place to prevent leaving the vehicle unattended while refuelling and regularly check that the valve of the tank containing flammable lubricant materials is closed tight;
- Sedimentation control measures will be taken for disturbed areas and around stockpiling areas to prevent sediment-laden water flow.
- Ad hoc washing of construction vehicles in watercourses shall be strictly prohibited.

Operation Phase

Potential Impact due to Water Resource Competition and on Water Quality from Operation Activities

Although impacts are assessed of negligible significance, the following good practice controls are recommended:

- Maintain sewage system in good condition;
- Regular mechanical inspections should be routinely carried out to prevent fuel, oil and other liquids spills from vehicles and equipment used in operation phase; and
- Materials that may pollute groundwater shall be stored on impermeable materials to prevent flowing of materials through storm water drainage and rainwater; oil trap techniques should be utilized as appropriate.

7.6.4.4 MONITORING AND AUDITING

Construction Phase

Monitoring of water quality will be conducted in compliance with the monitoring program outlined in the Local Environmental Management Plan approved by the Mongolian Authorities (if included) or as per permit requirements.

Operation Phase

Monitoring of water quality will be conducted in compliance with the monitoring program outlined in the Local Environmental Management Plan approved by the Mongolian Authorities (if included) or as per permit requirements.

7.6.4.5 RESIDUAL IMPACTS

Construction Phase

Water Resources Competition: With the implementation of the existing controls and additional mitigation and management measures, the residual impacts are anticipated to remain minor (offsite) or negligible (onsite) if the Project proceeds with no onsite groundwater abstraction.

Water Quality: With the implementation of the existing controls and additional mitigation and management measures, the residual impacts are anticipated to be negligible.

Operation Phase

Water Resources Competition and Water Quality: With the implementation of the existing controls and additional mitigation and management measures, the residual impacts are anticipated to be negligible.

7.7 BIODIVERSITY IMPACT ASSESSMENT

In accordance with IFC PS1 and PS6, the assessment process aims to predict and assess the Project's potential adverse impacts and risks to biodiversity values, in quantitative terms, where possible. The objectives of the biodiversity impact assessment are to identify and quantify the potential Project impacts; design measures to avoid, minimise, or restore/compensate potential adverse impacts; and identify likely residual impacts. The background assessment and baseline studies to identify relevant values have been reported in *Chapter 6: Environmental Baseline*. The remaining steps reported in this chapter include:

- Impact analysis to assess the extent and complexity of potential adverse impacts considering the two (2) parameters of habitat area (spatially) and threatened species individually;
- Development of mitigation measures to avoid and minimise potential adverse impacts to biodiversity with a priority given to impacts on features with significant biodiversity values; and
- Determine residual impacts. In the event significant residual impacts occur, biodiversity offsets need to be considered.

7.7.1 SCOPE OF ASSESSMENT

Table 7-47 broadly defines the threats to biodiversity values that have potential to occur as a result of a project. These threats to biodiversity are derived from IFC PS6 and relate to the activities that are likely to occur during construction and operation phases as outlined in *Chapter 5* Screening and Scoping. The Environmental, Health, and Safety (EHS) Guidelines for Wind Energy set out by the World Bank Group, and IUCN guide for mitigating biodiversity impacts associated with solar and wind energy development have also been considered in this chapter to recommend Good International Industry Practice (GIIP).

TABLE 7-47: POTENTIAL IMPACT TO BIODIVERSITY VALUES

Phase	Activities	Potential Impacts	Receptors
Construction	• Workforce mobilisation and presence • Land preparation (site clearance, excavation, and levelling), fencing, and civil works; • Construction of Access Road, internal roads, WTGs foundations, Substation, BESS and Control Building, and OHL; • Equipment and material transportation and supply	• Direct loss of habitat caused by construction of permanent and temporary facilities; • Indirect disturbance to or displacement of fauna caused by construction of facilities, movement of equipment and material, and presence of workforce; • Direct impacts from barrier creation by construction in the WTG Area, OHL, and facilities; • Indirect degradation of habitat from construction of facilities, and transport of equipment and material; • Direct mortality from vehicle collision, hunting, and poaching, from transport of equipment and material transport, and presence of workforce.	• Terrestrial habitats • Flora • Fauna
Operation	• Operation of WTGs and OHL	• Mortality caused by collision with turbines; • Mortality caused by electrocution on collision with the transmission line; • Direct displacement caused by barrier effects from the turbines.	• Avifauna and non-volant mammals (bats) • Mobile fauna (displacement impacts only)

Phase	Activities	Potential Impacts	Receptors

7.7.2 SUMMARY OF BASELINE CONDITIONS

Baseline studies through primary surveys and secondary desktop research have identified multiple species of conservation significance that potentially occur within the Project AoI, which is defined as a five (5) km radius from each WTG and a two (2) km buffer from the central line of the OHL and Access Road.

The Project AoI, including the WTG area and most of the OHL, is largely situated within the Eastern Gobi Desert Steppe Ecoregion, while the southern section of the transmission line where it connects to the Oyu Tolgoi substation lies within the Alashan Plateau Semi-Desert Ecoregion. The Project site also overlaps with locally protected areas, as well as located 26.4 km from the Galba Gobi Key Biodiversity Area and Important Bird and Biodiversity Area, and 36.3 km from the Small Gobi A Strictly Protected Area (from the closest point). The WTG area legally protected and internationally recognized areas of biodiversity importance.

The habitat assessment done for this Project has identified the Project's Biodiversity AoI as comprising of predominantly desert-steppe rangelands, a natural habitat constituting <99% of the total AoI. These rangelands are characterized by sparsely vegetated areas and various landscape features such as open desert steppe, mountains and hills, and dry riverbeds, with drought-adapted shrubs and low glasses thinly distributed throughout. The extent of modified habitats in the AoI is very limited, primarily consisting of the Oyu Tolgoi mine, existing roads, a coal processing facility adjacent to the proposed main access road, and small temporary settlements of nomadic herders.

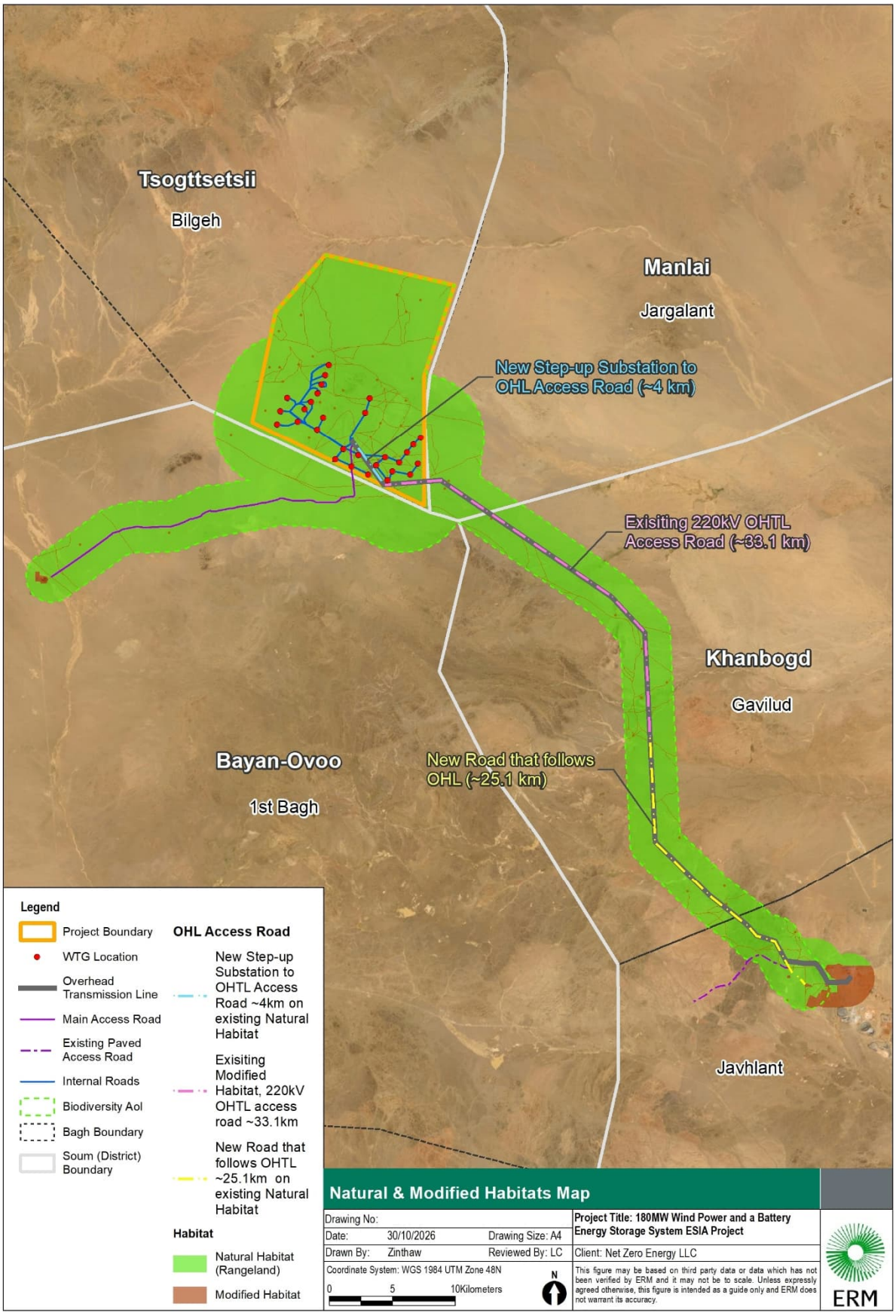


FIGURE 7-10: NATURAL AND MODIFIED HABITATS IN THE BIODIVERSITY AOI

109 plant species were recorded during the baseline flora surveys conducted in August 2024 and May 2025, which indicates relatively high species diversity. The majority of these species are assessed as Least Concern or Not Evaluated under the IUCN Red List (2025-2) and the Mongolian Red List (2011). 13 flora species of conservation concern have been identified, including those listed as Very Rare or Rare under the Mongolian Law on Natural Plants, or listed as EN or VU on the Mongolian Red List. No globally threatened flora species (CR, EN or VU on IUCN Red List) were observed during the baseline surveys.

A total of 16,977 birds belonging to 63 species have been identified during avifauna surveys conducted over six periods between August 2024 and May 2025, using a combination of vantage point surveys, transects and point counts, and carcass surveys. The majority of bird species identified during the baseline surveys are not globally or regionally threatened and not legally protected in Mongolia. In total, eight (8) bird species of conservation significance have been recorded in the Project area. Collision risk modelling conducted to simulate bird collision with the Project's wind turbines indicate that the predicted annual collision numbers are very low and not expected to have a significant effect on species' population stability. Cinereous Vulture (*Aegypius monachus*) and Black Kite (*Milvus migrans*) have relatively higher simulated collision rates compared to the other target species assessed in the CRM. The predicted annual collision rates are 2.73 and 2.41 individuals per year, respectively, equivalent to 0.016% and 0.00006% of their respective global populations, indicating a negligible impact. Other modelled species had lower predicted collision rates of 0.85 to 0.007 birds per year. Potential Biological Removal (PBR) analysis was conducted for CRM target species using local/national/regional population estimates where available (and global population estimates where data gaps exist) to identify fatality thresholds for each target species, as shown in the table below.

TABLE 7-48: ANNUAL FATALITY THRESHOLDS AND PREDICTED WTG COLLISIONS

Species	Basis of threshold	Fatality threshold (birds/yr)	Predicted WTG collisions (birds/yr)
Saker Falcon (*Falco cherrug*)	Global IUCN status EN	0	0.0071 Avoidance rate = 98%
Cinereous Vulture (*Aegypius monachus*)	Declining global trend	0	2.7345 Avoidance rate = 98%
Black Kite (*Milvus migrans*)	PBR 105,326 (> 100,000)	5	2.4124 Avoidance rate = 98%
Lesser Kestrel (*Falco naumanni*)	PBR 10,583 (1,000-100,000)	3	0.2587 Avoidance rate = 98%
Upland Buzzard (*Buteo hemilasius*)	PBR 790 (< 1,000)	0	0.2049 Avoidance rate = 98%
Whooper Swan (*Cygnus cygnus*)	PBR 2,315 (1,000-100,000)	3	0.5694 Avoidance rate = 99.5%
Pallas's Sandgrouse (*Syrrhaptes paradoxus*)	PBR 474,341 (> 100,000)	5	0.8466 Avoidance rate = 98%
Horned Lark (*Eremophila alpestris*)	PBR 6,037 (1,000-100,000)	3	0.7198 Avoidance rate = 98%

Note: The default avoidance rate for birds recommended by NatureScot for onshore wind farms is 98.0%, and thus is applied to all species listed above except for Whooper Swan, which NatureScot suggests an avoidance rate of 99.5%.

Only two (2) bat species were observed during the baseline surveys, both of which were only detected through passive acoustic monitoring while no bats were recorded from transects and active search/roost inspection, suggesting very low diversity and abundance in the Project area. Both species, the Parti-coloured Bat (*Vespertilio murinus*) and Gobi Serotine (*Cnephaeus gobiensis,* are classified as LC on the IUCN Red List and Mongolian Red List. Available evidence indicates that it is unlikely for either of these species' populations to be significantly affected by collision risk due to their low abundances in the Project area and/or behavioural characteristics.

17 species of non-volant mammals were recorded during the baseline surveys. Of these, four (4) mammal species of conservation significance were identified, while the rest are considered Least Concern on the IUCN Red List and/or Mongolian Red List. Additionally, the Argali (*Ovis ammon*) (NT, IUCN) was not observed during surveys but herds were reported by interviewed locals to occur in the WTG area.

68 insect species belonging to eight (8) orders were recorded in the surveys, along with three (3) species of reptiles. None of these insects or reptiles are considered to be of conservation significance. In addition, no invasive species have been identified in the Project area during the six baseline survey events.

Lastly, the results of the Critical Habitat Assessment show that there are no Critical Habitat-qualifying biodiversity values for the Project, however there are a total of 62 species that qualify as Priority Biodiversity Features per EBRD ESR6 criteria and thresholds, as summarized below and listed in *Table 7-49*.

- Four (4) species meet the thresholds for criterion 2(b), i.e. species recorded in the Project's area of impact during baseline surveys that are classified as VU, EN or CR on the IUCN Red List. These include the Saker Falcon (*Falco cherrug*), Steppe Eagle (*Aquila nipalensis*), Great Bustard (*Otis tarda*), and Goitered Gazelle (*Gazella subgutturosa*). Note that these four species also qualify as PBFs under criterion 4(a).
- Five (5) species meet the thresholds for criterion 2(c), i.e. species recorded in the area of impact during baseline surveys that are EN or CR on the Mongolian Red List. These include the Short-toed Snake Eagle (*Circaetus gallicus*), Asiatic Wild Ass (*Equus hemionus*), Mongolian Gazelle (*Procapra gutturosa*), Argali (*Ovis ammon*), and *Amygdalus mongolica*. Note that the Short-toed Snake Eagle, Asiatic Wild Ass, Mongolian Gazelle, and Argali also qualify as PBFs under criterion 4(a).
- 61 migratory species meet the thresholds for criterion 4(a), i.e. migratory species recorded in the area of impact during baseline surveys, including 56 birds and 5 mammals considered PBFs in the EAAAs. A number of these species also meet criterion 2(b) and/or criterion 2(c), as mentioned above.

TABLE 7-49: SPECIES QUALIFYING AS PRIORITY BIODIVERSITY FEATURES (EBRD ESR6)

No.	Scientific Name	Common Name	IUCN Red List	Mongolian Red List	EBRD ESR6 Criteria
Avifauna					

No.	Scientific Name	Common Name	IUCN Red List	Mongolian Red List	EBRD ESR6 Criteria
1	*Falco cherrug*	Saker Falcon	EN	VU	Criteria 2(b), 4(a)
2	*Aquila nipalensis*	Steppe Eagle	EN	LC	Criteria 2(b), 4(a)
3	*Otis tarda*	Great Bustard	EN	VU	Criteria 2(b), 4(a)
4	*Circaetus gallicus*	Short-toed Snake Eagle	LC	EN	Criteria 2(c), 4(a)
5	*Aegypius monachus*	Cinereous Vulture	NT	LC	Criterion 4(a)
6	*Gyps himalayensis*	Himalayan Griffon	NT	LC	Criterion 4(a)
7	*Accipiter nisus*	Eurasian Sparrowhawk	LC	LC	Criterion 4(a)
8	*Alauda arvensis*	Eurasian Skylark	LC	LC	Criterion 4(a)
9	*Anthus hodgsoni*	Olive-backed Pipit	LC	LC	Criterion 4(a)
10	*Aquila chrysaetos*	Golden Eagle	LC	LC	Criterion 4(a)
11	*Buteo hemilasius*	Upland Buzzard	LC	NE	Criterion 4(a)
12	*Buteo japonicus*	Eastern Buzzard	LC	NE	Criterion 4(a)
13	*Calcarius lapponicus*	Lapland Longspur	LC	LC	Criterion 4(a)
14	*Calliope calliope*	Siberian Rubythroat	LC	LC	Criterion 4(a)
15	*Carpodacus erythrinus*	Common Rosefinch	LC	LC	Criterion 4(a)
16	*Charadrius leschenaultii*	Greater Sandplover	LC	LC	Criterion 4(a)
17	*Circus cyaneus*	Hen Harrier	LC	LC	Criterion 4(a)
18	*Corvus dauuricus*	Daurian Jackdaw	LC	LC	Criterion 4(a)
19	*Cuculus canorus*	Common Cuckoo	LC	LC	Criterion 4(a)
20	*Cuculus saturatus*	Oriental Cuckoo	LC	LC	Criterion 4(a)
21	*Curruca nana*	Asian Desert Warbler	LC	LC	Criterion 4(a)
22	*Cygnus cygnus*	Whooper Swan	LC	LC	Criterion 4(a)
23	*Emberiza pallasi*	Pallas's Bunting	LC	LC	Criterion 4(a)
24	*Emberiza pusilla*	Little Bunting	LC	LC	Criterion 4(a)

No.	Scientific Name	Common Name	IUCN Red List	Mongolian Red List	EBRD ESR6 Criteria
25	*Eremophila alpestris*	Horned Lark	LC	LC	Criterion 4(a)
26	*Falco amurensis*	Amur Falcon	LC	LC	Criterion 4(a)
27	*Falco columbarius*	Merlin	LC	LC	Criterion 4(a)
28	*Falco naumanni*	Lesser Kestrel	LC	LC	Criterion 4(a)
29	*Falco tinnunculus*	Common Kestrel	LC	LC	Criterion 4(a)
30	*Ficedula albicilla*	Red-throated Flycatcher	LC	LC	Criterion 4(a)
31	*Geokichla sibirica*	Siberian Thrush	LC	LC	Criterion 4(a)
32	*Jynx torquilla*	Eurasian Wryneck	LC	LC	Criterion 4(a)
33	*Lanius cristatus*	Brown Shrike	LC	LC	Criterion 4(a)
34	*Lanius excubitor*	Great Grey Shrike	LC	LC	Criterion 4(a)
35	*Lanius isabellinus*	Isabelline Shrike	LC	LC	Criterion 4(a)
36	*Melanocorypha mongolica*	Mongolian Lark	LC	LC	Criterion 4(a)
37	*Milvus migrans*	Black Kite	LC	LC	Criterion 4(a)
38	*Motacilla alba*	White Wagtail	LC	LC	Criterion 4(a)
39	*Motacilla cinerea*	Grey Wagtail	LC	LC	Criterion 4(a)
40	*Motacilla citreola*	Citrine Wagtail	LC	LC	Criterion 4(a)
41	*Muscicapa dauurica*	Asian Brown Flycatcher	LC	LC	Criterion 4(a)
42	*Oenanthe deserti*	Desert Wheatear	LC	LC	Criterion 4(a)
43	*Oenanthe oenanthe*	Northern Wheatear	LC	LC	Criterion 4(a)
44	*Oenanthe pleschanka*	Pied Wheatear	LC	LC	Criterion 4(a)
45	*Pernis ptilorhynchus*	Oriental Honey-buzzard	LC	LC	Criterion 4(a)
46	*Phalacrocorax carbo*	Great Cormorant	LC	LC	Criterion 4(a)
47	*Phoenicurus auroreus*	Daurian Redstart	LC	LC	Criterion 4(a)
48	*Phylloscopus proregulus*	Pallas's Leaf Warbler	LC	LC	Criterion 4(a)
49	*Phylloscopus trochiloides*	Greenish Warbler	LC	LC	Criterion 4(a)

No.	Scientific Name	Common Name	IUCN Red List	Mongolian Red List	EBRD ESR6 Criteria
50	*Platalea leucorodia*	Eurasian Spoonbill	LC	LC	Criterion 4(a)
51	*Syrrhaptes paradoxus*	Pallas's Sandgrouse	LC	LC	Criterion 4(a)
52	*Tadorna ferruginea*	Ruddy Shelduck	LC	LC	Criterion 4(a)
53	*Turdus eunomus*	Dusky Thrush	LC	LC	Criterion 4(a)
54	*Turdus ruficollis*	Red-throated Thrush	LC	LC	Criterion 4(a)
55	*Upupa epops*	Eurasian Hoopoe	LC	LC	Criterion 4(a)
56	*Zoothera aurea*	White's Thrush	LC	LC	Criterion 4(a)
Mammals					
57	*Equus hemionus*	Asiatic Wild Ass	NT	EN	Criteria 2(c), 4(a)
58	*Gazella subgutturosa*	Goitered Gazelle	VU	VU	Criterion 2(b), 4(a)
59	*Procapra gutturosa*	Mongolian Gazelle	LC	EN	Criteria 2(c), 4(a)
60	*Ovis ammon*	Argali	NT	EN	Criteria 2(c), 4(a)
61	*Vespertilio murinus*	Parti-coloured Bat	LC	LC	Criterion 4(a)
Flora					
62	*Amygdalus mongolica*	-	NE	EN	Criterion 2(c)

Note: EN – Endangered; VU – Vulnerable; NT – Near Threatened; DD – Data Deficient; LC – Least Concern; NE – Not Evaluated.

7.7.3 ASSESSMENT APPROACH AND CRITERIA

In order to assess the significance of the impacts due to the Project before and after mitigation, the following IA matrices have been used to classify the severity of the impacts. The matrix for habitat classification is presented in Table, while Table defines the criteria that will be used to evaluate the significance of the impacted species. The matrices outline the sensitivity of the receptor based on IFC PS6 thresholds, which have also been described in *Chapter 6: Biodiversity Baseline*, and the magnitude of effect, which is based on changes to ecological conditions due to the Project.

TABLE 7-50: HABITAT IMPACT ASSESSMENT – SIGNIFICANCE CRITERIA

Habitat Sensitivity/ Value		Magnitude of Effect			
		Negligible	Small	Medium	Large
		Effect is within the normal range of variation	Affects a small area of habitat, but without the loss of viability/function of the habitat	Affects a sufficient proportion of the habitat to the extent that the viability/ function of part of the habitat or the entire habitat is reduced but does not threaten the long-term viability of the habitat or species dependent on it.	Affects the entire habitat or a significant proportion of the habitat to the extent that the viability/ function of the entire habitat is reduced and the long-term viability of the habitat and the species dependent on it are threatened.
Low	Habitats with no international, national or local designation/recognition;; habitats of significance for species of Least Concern (LC); habitats which are common and widespread within the region.	Negligible	Negligible	Minor	Moderate
Medium	Habitats within nationally designated or recognised areas; habitats of significant importance to globally Vulnerable (VU), Near Threatened (NT) or Data Deficient (DD) species; habitats of significant importance for nationally restricted range species; habitats supporting nationally significant concentrations of migratory species and/or congregatory species; nationally threatened or unique ecosystems.	Negligible	Minor	Moderate	Major
High	Habitats within internationally designated or recognised areas; habitats of importance to globally Critically Endangered (CR) or Endangered species (EN); habitats of importance to endemic and/or globally restricted-range species; habitats supporting globally significant concentrations of migratory species and or congregatory species; highly threatened and/or unique ecosystems; and areas associated with key evolutionary species	Negligible	Moderate	Major	Major

TABLE 7-51: SPECIES IMPACT ASSESSMENT – SIGNIFICANCE CRITERIA

Species Sensitivity/ Value		Magnitude of Effect			
		Negligible	Small	Medium	Large
		Effect is within the normal range of the variation	Affects a small proportion of a population but does not substantially affect other species dependent on it, or the populations of the species itself	Affects a sufficient proportion of a species population that it may bring about a substantial change in abundance and/or reduction in distribution over one or more generations but does not threaten the long-term viability of that population or any population dependent on it.	Affects an entire population or species at sufficient scale to cause a substantial decline in abundance and/or change in distribution beyond with natural recruitment (reproduction, immigration from unaffected areas) so that that it may not return that population or species, or any population or species dependent upon it, to its former level within several generations, or when there is no possibility of recovery.
Low	Species which are included on the IUCN Red List of Threatened Species as Least Concern (LC).	Negligible	Negligible	Minor	Moderate
Medium	Species included on the IUCN Red List of Threatened Species as Vulnerable (VU), Near Threatened (NT) or Data Deficient (DD). Species protected under national legislation. Nationally restricted range species. Nationally important number of migratory or congregatory species.	Negligible	Minor	Moderate	Major

Species Sensitivity/ Value		Magnitude of Effect			
High	Species included on the IUCN Red List of Threatened Species as Critically Endangered (CR) or Endangered (EN); species having a globally restricted range (i.e., plants endemic to a site or found globally at fewer than ten (10) sites, fauna having a distribution range (or globally breeding range for bird species) of less than 50,000 km^2; internationally important numbers of migratory or congregatory species; and key evolutionary species.	Negligible	Moderate	Major	Major

7.7.4 EXISTING/EMBEDDED MEASURES

Based on a review of information received from the Project Proponent, embedded controls included in the Project's draft DEIA are listed in *Table 7-52* below. Existing measures in the DEIA are referenced verbatim and categorised according to relevance to Project impacts listed in *Table 7-47*. The DEIA lists a number of measures within its Mitigation Measures Plan and Environmental Monitoring Program, both of which include specific budgets and implementation timelines. The DEIA also lists other measures within the report's text that are not explicitly included in a management or monitoring plan and thus do not have associated budgets and implementation timelines, therefore it is unclear whether the Project commits to these measures as part of the DEIA. Therefore, for the purpose of this impact assessment, only measures explicitly included in the DEIA's 'Mitigation Measures Plan' and 'Environmental Monitoring Program' with associated budgets and timelines are considered as existing/embedded controls, and thus taken into consideration when additional mitigation measures are recommended in *Section 7.7.5*. Other measures in DEIA (without associated budget or timeline), as shown in the fourth column in the table below, are not considered existing/embedded measures due to uncertainty over the Project's commitment to these actions.

TABLE 7-52: EXISTING/EMBEDDED MEASURES IN THE PROJECT'S DEIA

No.	Impact	Existing Measures in DEIA's Mitigation Measures Plan (with associated budget and timeline)	Existing Measures in DEIA's Environmental Monitoring Program (with associated budget and timeline)	Other Measures in DEIA (without associated budget or timeline)
Construction Phase				
1	Direct loss of habitat caused by construction of permanent and temporary facilities;	*No existing measures in DEIA's Mitigation Measures Plan related to this impact.*	*No existing measures in DEIA's Environmental Monitoring Program related to this impact.*	• Revegetation and Landscaping: After constructing the wind power plant, roads, and associated infrastructure, the areas impacted by waste and the newly created roads should be rehabilitated. This includes vegetation restoration, landscaping, and planting efforts that match the area's impacted radius or a corresponding area. • Protecting and Restoring Valuable Vegetation: Special attention should be given to protecting valuable pasture and forage plants in the area. The restoration and planting of native plants should be carried out by professional organizations. • The rehabilitation of damaged land will follow the "Rehabilitation of

No.	Impact	Existing Measures in DEIA's Mitigation Measures Plan (with associated budget and timeline)	Existing Measures in DEIA's Environmental Monitoring Program (with associated budget and timeline)	Other Measures in DEIA (without associated budget or timeline)
				Damaged Land, Technical General Requirements" standard MNS 5918:2008. To address long-term impacts, the scope of vegetation restoration in the environmental plan should be expanded annually, covering more rehabilitated areas.[10] • Use excavated and unused soil, gravel, and rock from construction works for backfilling the foundations 2of wind turbines and transmission line supports, avoiding disturbance of new areas as much as possible, and stockpile any remaining materials in designated areas for planting vegetation.
2	Indirect disturbance to or displacement of fauna caused by construction of facilities, movement of equipment and material, and presence of workforce;	• Minimize machinery use in non-operational areas, avoid disturbing the soil, and travel only along designated routes across the entire Project site, continuously between 2026-2030. • Complete construction in a short period and prohibit construction during nighttime in 2026 to mitigate risks to migration of mammals.	*No existing measures in DEIA's Environmental Monitoring Program related to this impact.*	• Ensure that the noise levels produced by machinery and equipment comply with national standards, and conduct appropriate noise-reducing maintenance. • When necessary, install temporary barriers or noise dampening structures around noise-generating equipment during construction work. • Collaborate with Local Authorities: Work with the local government, environmental offices, and environmental experts from the sum (district) to protect the biological species and population in the region. Provide assistance to them when necessary and exchange recommendations. • Conduct Research on Local Wildlife: Research the wildlife species,

[10] It should be noted that the Project's DEIA includes these measures, but also "determined that no land rehabilitation measures are necessary" when discussing a Land Rehabilitation and Landscaping Plan.

No.	Impact	Existing Measures in DEIA's Mitigation Measures Plan (with associated budget and timeline)	Existing Measures in DEIA's Environmental Monitoring Program (with associated budget and timeline)	Other Measures in DEIA (without associated budget or timeline)
				distribution, and population in the area where the project will be implemented. Create a database and information system for this research.
3	Direct impacts from barrier creation by construction in the WTG Area, OHL, and facilities;	• Complete construction in a short period and prohibit construction during nighttime in 2026 to mitigate risks to migration of mammals.	*No existing measures in DEIA's Environmental Monitoring Program related to this impact.*	• Collaborate with Local Authorities: Work with the local government, environmental offices, and environmental experts from the sum (district) to protect the biological species and population in the region. Provide assistance to them when necessary and exchange recommendations. • Conduct Research on Local Wildlife: Research the wildlife species, distribution, and population in the area where the project will be implemented. Create a database and information system for this research.
4	Indirect degradation of habitat from construction of facilities, and transport of equipment and material;	• Place domestic solid waste points, liquid waste disposal points, and vehicle parking areas far from gullies, channels, and ditches. • Minimize machinery use in non-operational areas, avoid disturbing the soil, and travel only along designated routes across the entire Project site, continuously between 2026-2030. • To address soil erosion and degradation, avoid creating multiple tracks/paths, place road signs and markings around vehicle parking areas, near the substation, embankments, and bridges during the first year of construction. • Conduct soil monitoring surveys by professional organizations 1-2 times	• One-time monitoring for soil condition and quality at 14 points at the workers' camp and every ten (10) km along construction areas and tracks, with sampling twice a year during construction and the first year of operation. • Flora monitoring surveys by a professional organization including vegetation mapping at 14 monitoring points at the workers' temporary camp during construction, as well as the construction site or every ten (10) km along the project route, and record any changes in the results. Sampling to be conducted twice in the first year during construction in summer and autumn of 2026.	• Collaborate with Local Authorities: Work with the local government, environmental offices, and environmental experts from the sum (district) to protect the biological species and population in the region. Provide assistance to them when necessary and exchange recommendations.

No.	Impact	Existing Measures in DEIA's Mitigation Measures Plan (with associated budget and timeline)	Existing Measures in DEIA's Environmental Monitoring Program (with associated budget and timeline)	Other Measures in DEIA (without associated budget or timeline)
		per year and regularly track the impacts during construction in 2026.		
5	Direct mortality from vehicle collision, hunting, and poaching, from transport of equipment and material transport, and presence of workforce.	• Minimize machinery use in non-operational areas, avoid disturbing the soil, and travel only along designated routes across the entire Project site, continuously between 2026-2030. • Complete construction in a short period and prohibit construction during nighttime in 2026 to mitigate risks to migration of mammals.	*No existing measures in DEIA's Environmental Monitoring Program related to this impact.*	• Collaborate with Local Authorities: Work with the local government, environmental offices, and environmental experts from the sum (district) to protect the biological species and population in the region. Provide assistance to them when necessary and exchange recommendations. • Conduct Research on Local Wildlife: Research the wildlife species, distribution, and population in the area where the project will be implemented. Create a database and information system for this research. • Internal Regulation on Hunting: Include a clause in the internal regulations prohibiting the hunting of wild animals and ensure that this is enforced through regular monitoring. • Engage with Local Livestock Farmers: Regularly meet with herders who live near the project area to address any concerns related to wild animals and livestock. Respond to inquiries and resolve issues promptly. •
Operation Phase				
1	Mortality caused by collision with turbines;	*No existing measures in DEIA's Mitigation Measures Plan related to this impact.*	*No existing measures in DEIA's Environmental Monitoring Program related to this impact.*	*No other measures listed in DEIA related to this impact.*

No.	Impact	Existing Measures in DEIA's Mitigation Measures Plan (with associated budget and timeline)	Existing Measures in DEIA's Environmental Monitoring Program (with associated budget and timeline)	Other Measures in DEIA (without associated budget or timeline)
2	Mortality caused by electrocution or collision with the transmission line;	• Install "line marking" devices during construction in 2026. • Use bird protection devices made from polymer-coated insulating materials during construction in 2026. • Conduct regular bird monitoring surveys by professional organizations along the 500 kV transmission line annually between 2026-2030 (which is also included in the DEIA's Environmental Monitoring Program).	• Regular inspection of installed polymer insulators and "line marking" devices to monitor their effectiveness, as well as record and photograph dead birds and bird nests on support poles (with coordinates logged). To be conducted once per month along the National Power Transmission Grid, between 2026-2030. • Conduct bird monitoring surveys with professional organizations once per year along the National Power Transmission Grid, including capture and identification of birds, between 2026-2030.	• Bird Protection from Electrical Infrastructure: High-voltage transmission lines can cause birds to collide and die. There are bird repellent devices available on the market, and their use can increase the visibility of power lines, helping birds avoid them. • Protection of Endangered Birds: Many nocturnal predator birds are endangered and protected by international conventions and agreements. To protect them, consider modifying the high voltage line structures and adding insulating materials to prevent electrocution. • Placing Warning Devices for Birds: In areas near rivers, lakes, and springs, place materials such as balloons or discs on power lines to make them visible to flying birds and reduce the risk of collisions. • Optimally locate overhead transmission lines in local areas to reduce their density as much as possible. • Equip power line infrastructure with bird-safe protective devices that do not require complex additional works, or replacing equipment with bird-safe designs. • Conducting regular ornithological monitoring surveys in areas with high risk of bird collisions or electrocution by professional organizations along the 500 kV transmission line annually between 2026-2030 (included in the Environmental Monitoring Program). • Using bird protection devices made of polymer-coated insulating materials. It should be noted that this measure is only recommended for construction

No.	Impact	Existing Measures in DEIA's Mitigation Measures Plan (with associated budget and timeline)	Existing Measures in DEIA's Environmental Monitoring Program (with associated budget and timeline)	Other Measures in DEIA (without associated budget or timeline)
				in 2026 per the Project DEIA's Mitigation Measures Plan. • Relocating overhead power transmission lines away from habitats of rare and valuable bird species, areas with large congregations of migratory birds, and specially protected natural zones. • Considering natural features and factors that influence wildlife and resident bird species when selecting the route for new overhead transmission lines. • Designing transmission line routes to be as straight as possible to minimize the number of angular anchor points, which pose the highest risk to birds. • Install "line marking" devices such as spheres, swinging plates, vibration dampers, ribbons, swan deterrents, Firefly Bird Flight Diverters, bird flappers, marked spheres, ribbons, magnetic films, flags, fishing floats, aviation balls, transverse ribbons, etc. It should be noted that this measure is only recommended for construction in 2026 per the Project DEIA's Mitigation Measures Plan.
3	Direct displacement caused by barrier effects from the turbines.	• *No existing measures in DEIA's Mitigation Measures Plan related to this impact.*	• *No existing measures in DEIA's Environmental Monitoring Program related to this impact.*	• *No other measures listed in DEIA related to this impact.*

7.7.5 IMPACT ASSESSMENT

7.7.5.1 CONSTRUCTION PHASE

Direct Loss of Terrestrial Habitat

Sources of Impact

- Land preparation (site clearance, excavation and levelling), fencing, and civil works; and
- Construction of access road, internal roads, WTG foundations, substation, BESS, Control Building, and OHL.

Significance of Impact

With regards to habitats, the geospatial assessment undertaken to define natural habitat and modified habitat has classified the majority of the Project's Biodiversity AoI (>99%) as natural habitat. The habitat that will be directly lost is natural habitat—including mountains, hills and hillocks, open areas of desert steppe, and dry riverbeds (refer to *Chapter 6* for details on habitats in which these species' were predominantly found). These habitats have been found to support three (3) high sensitivity and 23 medium sensitivity species (elaborated further in the following paragraphs), while the majority are of low sensitivity. Thus, the Project is considered to be located in a medium sensitivity habitat.

The magnitude of effect in relation to the direct loss of terrestrial habitat are evaluated based on the extension of the area of disturbance during construction activities and permanent habitat loss. The estimated total area of disturbance resulting from temporary and permanent Project facilities is approximately 130.31 ha (*Table 7-53*). The total area of natural rangeland habitats affected by temporary structures (such as the PV and BESS system, temporary camp, concrete batching areas, laydown areas, and WTG installation areas) is 25.11 ha. The total area of natural habitat impacted by permanent facilities is 66.56 ha (*Table 7-54*). It should be noted that, for all areas of natural habitat affected by the construction and installation of permanent Project facilities, permanent habitat loss cannot be mitigated by measures to minimize or rehabilitate affected areas, such as those affected in the short-term by temporary structures like storage/stockpile areas or the PV/BESS system. Note that sections of existing access roads considered permanent structures and that will be used/upgraded by the Project (i.e. access road to the WTG area and existing 220kV OHL access road) are modified habitats, and thus no net loss do not apply to these areas.

Overall, compared to the Galba Gobi KBA/IBA (8,283.28 km^2) or the Small Gobi A SPA (11,478 km^2) the total area disturbed by permanent and temporary Project facilities is negligible (1.42 km^2). Natural habitats found in the Project AoI (such as mountains and hills, open areas of desert steppe, and dry riverbeds and drainage channels) are also common and widespread across this region, and account for 64,242 ha (equivalent to 642.4 km^2). However, due to the size of permanent habitat loss (0.78 km^2), the magnitude of impact is assessed as small for habitats.

To achieve no net loss of natural habitats in accordance with IFC PS6 requirements, habitat restoration and remediation measures are recommended for all natural rangeland habitat areas affected by temporary facilities, while compensation/offsets (such as off-site restoration) are recommended to address residual impacts of natural habitat areas affected by permanent

loss. Mitigation measures, residual impact, and no net loss assessment for permanent natural habitat loss are presented in subsequent sections.

TABLE 7-53: TOTAL AREA OF DISTURBANCE FROM TEMPORARY AND PERMANENT FACILITIES

Project Facility	Facility Type	Habitat Affected	Number	Unit area of foundation (m^2)	Disturbed Area (ha)
WTGs (including foundation)	Permanent	Natural	29	330	0.96
60 x 45m WTG hardstand excluding foundation	Permanent	Natural	29	2,370	6.87
OHL towers	Permanent	Natural and Modified	228	400	9.12
Substation and O&M Building	Permanent	Natural	1	49,920	4.99
Access Road to WTG area (30.9 km length, 8 m width) (only upgrades to existing road, no new construction, i.e. modified habitat)	Permanent	Modified	1	247,200	24.72
Internal Roads within 29 WTG area (~56.1 km length, 6 m width)	Permanent	Natural	1	336,600	33.66
Access road along OHL (65 km length, 4 m width), excluding OHL towers foundation area • New Unpaved Section: Step-up Substation to OHL Access Road ~4 km • Existing road to be upgraded: 220kV OHL access road ~33.1 km (i.e. modified habitat) • New Unpaved Section: that follows OHL ~25.1 km	Permanent	Natural and Modified	 1 1 1	 16,000 132,400 100,400	 1.60 13.24 10.04
Photo Voltaic / BESS System	Temporary	Natural	1	11,076	1.11
Camp	Temporary	Natural	1	15,222	1.52
Concrete Batching Area	Temporary	Natural	1	15,001	1.50
Laydown Area	Temporary	Natural	1	21,030	2.10
Hardstand Parking Area	Temporary	Natural	1	3,816	0.38
Portable Fuel Station	Temporary	Natural	1	400	0.04
Office Facility	Temporary	Natural	1	1,800	0.18
60 x 105 m WTG excavation, crane hardstand and laydown areas	Temporary	Natural	29	6,300	18.27
Total					130.31

TABLE 7-54: TOTAL AREA OF NATURAL HABITATS AFFECTED BY PERMANENT FACILITIES

Facility	Type	Number	Unit area of foundation (m^2)	Disturbed Area (ha)
WTGs (including foundation)	Permanent	29	330	0.96
60 x 45m WTG hardstand excluding foundation	Permanent	29	2,370	6.87
OHL towers (excluding 17 towers located in OT Mine area i.e. modified habitat)	Permanent	211	400	8.44
Substation and O&M Building	Permanent	1	49,920	4.99
Internal Roads within 29 WTG area (~56.1 km length, 6 m width)	Permanent	1	336,600	33.66
Access road along OHL (65 km length, 4 m width), excluding OHL towers foundation area* • New Unpaved Section: Step-up Substation to OHL Access Road ~4 km • New Unpaved Section: that follows OHL ~25.1 km	Permanent	 1 1	 16,000 100,400	 1.60 10.04
Total				66.56 ha

*Note that the 30.9km access road to the WTG area and 33.1km existing road to be part of the OHL access road are both existing roads that will be upgraded, therefore they are considered to be modified habitat and not included in this table.

Regarding the impact from direct loss of terrestrial habitat on species, species of various levels of sensitivity have been identified. The baseline survey has identified 109 plant species, four (4) of which are listed as 'Very Rare' and five (5) species are listed as 'Rare' under Mongolia's Law on Fauna and relevant government resolutions that designate flora species' legal protection status. In addition, one (1) species is classified as Endangered (EN) and two (2) species are assessed to be Vulnerable (VU) on the Mongolian Red List. All these species are classified as Least Concern (LC) on the IUCN Red List (version 2025-2) except for one species listed as Data Deficient (DD). In total, there are 13 flora species of conservation significance, none of which are classified as Critically Endangered (CR) or EN on the IUCN Red List, have a globally restricted range of less than 50,000 km^2, or are key evolutionary species, but they are protected under national legislation and/or listed as DD on the IUCN Red List. Therefore, the sensitivity level of plant species is assessed to be medium.

68 species of insects were identified within the Project Study Area, the majority of which are not evaluated on the IUCN Red List while seven (7) species are listed as LC. One (1) species is listed as Rare in the appendix to Government Resolution No. 7 of 2012. Overall, insect species found in the Project area are assessed to have low sensitivity.

Three (3) species of reptiles were observed in the Project Study Area: Multiocellated Racerunner (*Eremias multiocellata*), Toad-headed Agama (*Phrynocephalus versicolor*) and Gobi Racerunner (*Eremias przewalskii*). All three of these species are categorized as Least Concern on the IUCN Red List and Mongolian Red List, and are not considered Very Rare or Rare fauna

under Mongolia legislation. Therefore, herpetofauna species identified in the Project area are assessed to have low sensitivity.

Bird species considered to have high sensitivity/biodiversity value include the EN Steppe Eagle (*Aquila nipalensis*), EN Saker Falcon (*Falco cherrug*), and EN Great Bustard (*Otis tarda*). Bird species with medium sensitivity/biodiversity value are nationally threatened and legally protected species (i.e. CR or EN on the Mongolian Red List or Very Rare/Rare under Mongolian law) as well as VU, NT, and DD species on the IUCN Red List, including the Cinereous Vulture (*Aegypius monachus*), Short-toed Snake Eagle (*Circaetus gallicus*), Bearded Vulture (*Gypaetus barbatus*), Mongolian Ground Jay (*Podoces hendersoni*), and Himalayan Griffon (*Gyps himalayensis*).

Five (5) mammal species of medium sensitivity were identified in the Project area, including the VU Goitered Gazelle (*Gazella subgutturosa*), NT Asiatic Wild Ass (*Equus hemionus*), protected Mongolian Gazelle (*Procapra gutturosa*), NT Argali (*Ovis ammon*), and the DD and protected Five-toed Pygmy Jerboa (*Cardiocranius paradoxus)*. Only two (2) volant mammal (bat) species were recorded in the Project area during the biodiversity baseline surveys, both of which are evaluated as Least Concern on the IUCN Red List, therefore the sensitivity of volant mammals is low.

Of all terrestrial flora and fauna identified in the Project area, the majority are of low sensitivity, 23 species are of medium sensitivity, and only three (3) are high sensitivity species, therefore the overall sensitivity for all terrestrial species is assessed to be medium.

The magnitude of impacts has also been assessed for different species. As plants are not mobile, site clearance and soil disturbance will inevitably remove some of the existing vegetation. This loss is exacerbated by the overgrazing phenomenon in the Gobi region[12], which is reducing the potential of the population to regenerate and recover from the loss of individual plants. There are existing measures in the Project's DEIA related to the rehabilitation of areas impacted by waste and newly created roads, including vegetation restoration, landscaping, and planting efforts that match the area's impacted radius. The main access road will be upgrading an existing dirt road and therefore on a surface without vegetation. Moreover, the total area that will undergo site clearance and vegetation removal for Project facilities (WTGs, OHL towers, substation, BESS, etc.) is negligible compared to the distribution of plant species identified during baseline surveys.

Nevertheless, there are 12 species that are also legally protected under the Mongolian Law on Natural Plants, including six (6) 'Very Rare' species (*Artemisia xanthochroa, Asterothamnus centraliasiaticus, Chesneya mongolica, Olgaea leucophylla, Potaninia mongolica, Tugarinovia mongolica*) and six (6) 'Rare' species (*Amygdalus mongolica, Caryopteris mongholica, Ephedra sinica, Oxytropis aciphylla, Stellaria dichotoma, Vincetoxicum sibiricum*). Furthermore, *Amygdalus mongolica* is considered a priority biodiversity feature (PBF) for which not net loss is required. In accordance with the mitigation hierarchy, removal of these plants should be avoided where possible and retained on-site, clearly demarcated and fenced off, and monitored for survival rate. If removal is unavoidable, individuals of protected species to be removed should be inventoried then transplanted or replanted in suitable undisturbed habitats nearby,

[12] Han, J., Dai, H., Gu, Zhaolin, 2021. Sandstorms and desertifcation in Mongolia, an example of future climate events: a review. Environmental Chemistry Letters (2021) 19:4063–4073 https://doi.org/10.1007/s10311-021-01285-w

and monitored for survival. For any species, individuals or patches of plants that cannot be easily transplanted, micro-siting of OHL foundations, access roads, and temporary facilities should be undertaken. For plants that overlap with the wind turbine foundations and cannot be easily transplanted, compensatory planting should be conducted. Any removal or transplantation would also require compliance with Mongolian legislation including (but not limited to) the Law on Natural Plants (1995)[13], the Law on Environmental Protection (1995)[14] and the Law on Fees for Natural Resources Use (2022)[15], such as payment of relevant fees and/or obtaining appropriate permits/licences. In accordance with the mitigation hierarchy, removal of these plants should be avoided where possible and retained on-site, clearly demarcated and fenced off, and monitored for survival rate. If removal is unavoidable, individuals of protected species to be removed should be inventoried then transplanted or replanted in suitable undisturbed habitats nearby, and monitored for survival. For any species, individuals or patches of plants that cannot be easily transplanted, micro-siting of OHL foundations, access roads, and temporary facilities should be undertaken. For plants that overlap with the wind turbine foundations and cannot be easily transplanted, compensatory planting should be conducted. Any removal or transplantation would also require compliance with Mongolian legislation including (but not limited to) the Law on Natural Plants (1995)[16], the Law on Environmental Protection (1995)[17] and the Law on Fees for Natural Resources Use (2022)[18], such as payment of relevant fees and/or obtaining appropriate permits/licences.

Regarding the magnitude of impact for insects and reptiles (all of which are of low biodiversity value), as the species identified in the Project Study Area are mobile and widespread, it is assumed that the effect of soil disturbance will be within the normal range of variation. Soil disturbance during the construction phase is also not expected to reduce significantly birds' feeding area or nesting area, and it is not expected to have any significant effect on the population. Medium sensitivity mammal species identified have wide areas of distribution and nomadic migratory patterns, therefore localized soil disturbance is not expected to affect their overall grazing area. In addition, embedded controls such as revegetation and landscaping will rehabilitate some disturbed areas and allow for eventual return of species displaced during construction. Bats and other mammals are unlikely to be impacted by the occupation of soil by Project facilities.

Overall, the magnitude of impact on species is considered small as the loss of habitat will affect a small proportion of species' populations but will not substantially affect other species dependent on it, or the populations of the species themselves. Mobile species, including birds, mammals, and invertebrates (reptiles and insects) can move away once loss of habitat occurs to other areas of the same habitat, which have been assessed as being widespread and common in the region. Furthermore, permanent habitat loss resulting from the Project will only occur in small areas (e.g. WTG base, OHL towers) distributed over the entire Project boundary, which does not significantly hinder wildlife access and movement, therefore unlikely to significantly affect resident fauna species' long-term viability.

[13] https://legalinfo.mn/en/edtl/16531498304851
[14] https://faolex.fao.org/docs/pdf/mon32709.pdf
[15] https://faolex.fao.org/docs/pdf/mon185630E.pdf
[19] van der Ree, R., Smith, D.J. and Grilo, C., 2015. *Handbook of road ecology*. John Wiley & Sons.
[19] van der Ree, R., Smith, D.J. and Grilo, C., 2015. *Handbook of road ecology*. John Wiley & Sons.
[19] van der Ree, R., Smith, D.J. and Grilo, C., 2015. *Handbook of road ecology*. John Wiley & Sons.

It should be noted that priority biodiversity features (including one (1) flora and 26 fauna species, as summarised in *Section 7.7.2*) are considered high sensitivity biodiversity receptors for which no net loss is required. The no net loss assessment for natural rangeland habitats and these PBFs are discussed further in *Section 7.7.5.6*.

Table *7-55* below provide a summary of impacts to terrestrial habitats and species as a result of direct loss of habitat which has minor significance.

TABLE 7-55: IMPACT SIGNIFICANCE FROM LOSS OF TERRESTRIAL HABITAT

Impact	Loss of habitat caused by construction of permanent and temporary Project Infrastructure				
Nature	Negative	Positive	Neutral		
	Impact nature is negative.				
Type	Direct	Indirect	Induced		
	Impact type is direct.				
Duration	Temporary	Short-term	Long-term	Permanent	
	The impact will be long-term, and loss of habitat will continue into operation of the Project. However, after completion of the operational lifecycle and potential decommissioning, the land occupied by facilities can potentially recover to its original state.				
Extent/Scale	Local	Regional	International		
Frequency	The impact is considered a one-off event.				
Magnitude	Positive	Negligible	Small	Medium	Large
	Magnitude is small for both habitats and species, as the impact will affect a small area of habitat, but without the loss of viability/function of the habitat, and the impact will affect only a small proportion of species' populations.				
Resource/Receptor Sensitivity	Low	Medium	High		
	Receptors include medium sensitivity natural habitat and medium sensitivity terrestrial species.				
Significance	Negligible	Minor	Moderate	Major	
	Significance of impact is considered moderate for terrestrial habitats and minor for terrestrial species.				

Indirect Disturbance to or Displacement of Fauna

Sources of Impact

- Workforce mobilization and presence;
- Construction of access road, internal roads, WTG foundations, substation, BESS, Control Building, and OHL; and
- Equipment and material transportation and supply.

Significance of Impact

Disturbance and displacement may arise from Project's construction activities. Disturbance and displacement mainly occur by the presence of the machineries and workers on the site through visual, noise and vibration impacts. The habitat loss can cause indirect influence disturbance or displacement.

Project machinery, vehicles and equipment indirectly cause light, noise and vibration emissions. Noise, light and vibration disturbances have the potential to influence breeding, roosting or foraging behaviour of fauna.[19] It is likely these disturbances will be exacerbated during the construction phase, and they are expected to continue throughout the operation phase, although to a lesser extent.

Noise will be the primary disturbance caused by the Project, and will be closely associated with movement of materials, and other typical construction activities. These activities will introduce noise sources, which are not currently present in the Project Study Area. More specifically, noise can impact communication potential, which in turn can affect breeding potential, predator detection and social interactions.

Lighting associated with the Project has the potential to inhibit fauna movement patterns, particularly nocturnal species.[20] Similarly, introducing light sources has the potential to disrupt foraging and dispersal activities of resident species. Lighting at the transportation stage is expected to have minimal impacts as the only major source will be lighting on vehicles. Moreover, nighttime construction is prohibited as part of the Project's embedded controls to mitigate risks to migrating mammals and nocturnal species.

It is expected that vibration impacts associated with the movement of any heavy vehicles/machinery will occur. Species that rely on vibration for prey/predator detection can also be negatively affected. Impacting these key behavioural attributes can often result in the manipulation of an individual's range.

Additionally, invasive species could be introduced accidentally as a result of contaminated freight or movement of contaminated products (including wooden pallets and other bracing material used to keep cargo in position), plants, or food products. The impact from potential invasive species during construction is discussed further in *Section 'Indirect Degradation of Habitat'*.

Supply of materials for construction such as gravel, sand, and water will be procured from existing sources in the vicinity of the Project site while cement will be trucked in from Ulaanbaatar, and the wind turbines, BESS equipment, and reinforcement steel for construction will be transported from suppliers in China. Therefore, the introduction of invasive species into the Project area could potentially occur, though the impact on local fauna would depend on the specific species introduced. Overall, it is recommended that good international industry practice (GIIP) is followed to decrease the likelihood of any invasive species being brought to the Project Site (refer to *Section 'Additional Mitigation and Management Measures'*).

The duration of construction activities is expected to last 17 months. Similarly, it should be noted that the noise, light and vibration disturbances will not be continuous or focused on any one specific location for the entire construction period. Noise, light and vibration disturbance are unlikely to occur at all locations simultaneously and will be localised. This is considered to

[19] van der Ree, R., Smith, D.J. and Grilo, C., 2015. *Handbook of road ecology*. John Wiley & Sons.
[20] Longcore, T. and Rich, C., 2004. Ecological light pollution. *Frontiers in Ecology and the Environment*, *2*(4), pp.191-198.

be a localised and temporary impact, and the species are likely to vacate the area of the Project during construction, with potential to return upon cessation of construction activities. At the time of writing this report, it is assumed that construction activities will mostly occur during daytime based on the DEIA's recommendation of prohibiting nighttime construction. Adhering to the precautionary principle, it is conservatively assumed that there will be short periods where construction could continue for 24 hours a day, resulting in temporary impacts from disturbance to fauna at night-time due to lighting. However, night-time noise limits are expected to be complied with.

Furthermore, revegetation, landscaping, and rehabilitation of Project-affected areas are already included in the DEIA's management plan, which will help to facilitate the return of some displaced species through habitat restoration.

[redacted] have been found on existing transmission towers in the vicinity of the Project's OHL, while no other nests of other avifauna species were recorded during the six baseline surveys conducted between August 2024 and May 2025, including from active nest search. Given the rarity of favourable nesting sites for birds breeding in the Project area (such as full grown trees, rocky outcrops, cliffs), as well as the localised and temporary nature of this impact, the magnitude of impact from construction work for the Project's facilities is expected to be small for bird species.

With respect to non-volant mammals, the construction phase entails intense vehicle movement, groundwork and increased human activity, which may affect animal behaviour and spatial distribution. This is considered to be a localized impact, and the species present are likely to vacate the area of the Project during construction. If existing measures outlined in the DEIA are applied sufficiently, the magnitude of effect is considered to be small.

The overall magnitude of impacts from disturbance or displacement, taking into account embedded controls, is small.

Resident mammals, birds and herpetofauna species within the Project Study Area are likely to be disturbed at some level by the noise, light and vibration.

Three (3) high sensitivity species identified in the Project area are the Steppe Eagle (*Aquila nipalensis*), Saker Falcon (*Falco cherrug*), and Great Bustard (*Otis tarda*). Medium sensitivity birds and mammals include Cinereous Vulture (*Aegypius monachus*), Goitered Gazelle (*Gazella subgutturosa*), Asiatic Wild Ass (*Equus hemionus*), Short-toed Snake Eagle (*Circaetus gallicus*), Bearded Vulture (*Gypaetus barbatus*), Mongolian Ground Jay (*Podoces hendersoni*), Himalayan Griffon (*Gyps himalayensis*), Mongolian Gazelle (*Procapra gutturosa*), and the Five-toed Pygmy Jerboa (*Cardiocranius paradoxus)*. Sensitivity of insect and reptile species is low as these species are of Least Concern or not evaluated on the IUCN Red List, and are also not regionally threatened or nationally protected.

Overall, conservative measures suggest sensitivity of affected terrestrial fauna is medium.

Therefore, the impact from these activities is expected to be minor.

TABLE 7-56: IMPACT SIGNIFICANCE FROM DISTURBANCE TO OR DISPLACEMENT OF FAUNA

Impact	Disturbance and displacement may arise from construction activities at the Project to mobile fauna			
Nature	**Negative**	Positive	Neutral	
	The impact from disturbance and displacement will be negative.			
Type	**Direct**	**Indirect**	Induced	
	The impacts related to noise, vibration, light and pollution are direct. The impacts relate to displacement and potential invasive species caused by habitat loss are indirect.			
Duration	**Temporary**	Short-term	Long-term	Permanent
	The impacts will be temporary and intermittent over the construction phase (17 months).			
Extent/Scale	**Local**	Regional	International	
	The impact will be localized across the WTG Area, OHL, and access road construction sites, as well as transport routes.			
Frequency	The disturbance caused by construction activities from noise and vibration will be infrequent and intermittent throughout the construction phase. Impacts from light will be continuous during active construction periods (excluding winter break periods).			
Magnitude	Positive	Negligible	**Small**	Medium	Large
	The impact will affect a small proportion of species' populations but will not substantially affect other species dependent on it, or the populations of the species themselves.			
Resource/Receptor Sensitivity	Low	**Medium**	High	
	Receptor sensitivity is medium for affected terrestrial species.			
Significance	Negligible	**Minor**	Moderate	Major
	Overall significance of impact on affected fauna (birds and mammals) is considered minor.			

Direct Impacts from Barrier Creation

Sources of Impact

- Construction of access road, internal roads, WTG foundations, substation, BESS, Control Building, and OHL.

Significance of Impact

Barrier effects are defined as any obstacle (including the Project components) that acts as a barrier to fauna movements, so that they avoid the vicinity of the obstacle and choose another route, leading to potential displacement. For this Project, barriers may be created by fencing installed during construction activities, or roads created to access and maintain turbines and infrastructures. The barrier effects on the population of particular species are unique, as each species responds individually to a range of processes related to its requirements for food, shelter, space, suitable climatic conditions and processes. Small mammals will likely be impacted at a local scale, whilst larger fauna are unlikely to be impacted given that barriers

will be localised within close proximity of each turbine laydown area as well as wired fence around the ~2 ha substation. Barriers created will come from the constructed Project facilities in the WTG Area (including wind turbines and their foundations, BESS, substation, control building, etc.) and the 65 km long OHL will comprise 218 suspension towers with a right-of way width of 13.5 m.

Edge effects are defined as any difference in environment between the edge and the interior of a particular vegetation patch caused by creation of barriers.[21] Edge effects are largely associated with forest and dense vegetation cover habitats, which are not relevant to the Project, as it is predominantly characterized by sparse vegetation cover.

Impacts that first arise from barrier creation during construction will persist through operation, particularly due to presence of the wind turbines. Impact to fauna from operation is assessed separately in *Section 'Direct Displacement from Barriers'*.

Of all terrestrial flora and fauna identified in the Project area, the majority are of low sensitivity, 23 species are of medium sensitivity, and only three (3) are high sensitivity species, therefore the overall sensitivity for all terrestrial species is assessed to be medium (refer back to sections above for more details).

Barrier effects may reduce the food sources for these species. However, they can utilize adjacent areas to forage, and the Project site is unlikely to play an important role to supply food sources for these species. The barriers will encompass a small area relative to the Project AoI, such that threatened species of medium and high biodiversity value can move to nearby areas for food and shelter. As such, the magnitude of impact to species is considered small as a small proportion of the populations may be affected, but the impact will not substantially affect other species dependent on it, or the populations of the species itself. Overall, the significance of impact will be minor.

TABLE 7-57: IMPACT SIGNIFICANCE FROM BARRIER CREATION

Impact	Barrier creation caused by the presence of the Project components during construction			
Nature	Negative	Positive	Neutral	
	The impact is negative.			
Type	Direct	Indirect	Induced	
	Mobile fauna will be directly impacted by construction of facilities that constitute barriers.			
Duration	Temporary	Short-term	Long-term	Permanent
	Fences and corridors built for construction purposes will be temporary.			
Extent/Scale	Local	Regional	International	
	The impact will be localized to areas where barriers are created.			
Frequency	Construction will occur only once. The impact will occur intermittently over the active construction period (17 months).			

[21] Murcia, C. (1995). Edge effects in fragmented forests: implications for conservation. *Trends in ecology & evolution*, *10*(2), 58-62.

Impact	Barrier creation caused by the presence of the Project components during construction				
Magnitude	Positive	Negligible	Small	Medium	Large
	The overall impact is small for mobile fauna as the impact will affect a small proportion of a species' population but will not substantially affect other species dependent on it, or the populations of the species themselves.				
Resource/Receptor Sensitivity	Low	Medium	High		
	Receptor sensitivity for affected terrestrial fauna is medium.				
Significance	Negligible	Minor	Moderate	Major	
	Impact significance is minor during construction phase.				

Indirect Degradation of Habitat

Sources of Impact

- Construction of access road, internal roads, WTG foundations, substation, BESS, Control Building, and OHL; and
- Equipment and material transportation and supply.

Significance of Impact

A range of Project activities have the potential to lead to degradation of flora and fauna habitats during construction from indirect effects associated with excavation and land clearing, movement of vehicles, refuelling, hazardous materials storage, maintenance, and supply of raw materials. In general, these may result in: (i) dust, runoff and release of potential contaminants; and (ii) introduction or spread of invasive species. Construction activities have been assessed for these indirect impacts, including associated with construction of the access roads, erection of transmission towers, erection of wind turbines and installation of cables/wires and Project-associated infrastructure (such as the BESS, substation, and storage area).

Dust

During construction on land, movement of vehicles, clearing and excavation activities have the potential to generate dust that may settle on vegetation adjacent to the construction area (including internal roads). Excessive dust deposition on flora may act to suppress growth through limiting photosynthesis and the dusted foliage may also become unpalatable to foraging fauna. Construction activities will be temporary (17 months) and dust generation is likely to be localised to active construction areas. For birds, due to relatively large range and high mobility, this may not pose a substantial threat to species. As for non-volant mammals and herpetofauna, because of the low mobility, long-time exposure to dust (over years) can lead to mechanical, infectious, immunosuppressive, and allergic reactions in fauna.[22] However, changes in air quality comprise low risk to ecological features, and thus, the impact from release of dust is not considered to be significant to habitats in the Project AoI. Additionally, the East Gobi region of southern Mongolia experiences frequent sandstorms—including the

[22] Hartung, J., & Saleh, M. 2007. Composition of dust and effects on animals. Landbauforsch Volk, 308(566): 111-116.

severe East Asia sandstorm event in March 2021 that began in the Eastern Gobi desert steppe—such that fauna and flora in the region are likely adapted to such conditions and are unlikely to be significantly impacted by the localized and temporary dust generation from construction.[23, 24, 25]

Three (3) high sensitivity birds and 23 medium sensitivity flora and fauna have been identified in the Project area. However, as noted above, these are not expected to be significantly impacted by dust generation.

Release of Contaminants

Accidental release or spill of contaminants can be toxic to flora and fauna locally, if substances are released into the environment. Runoff from construction sites has potential to carry contaminants a substantial distance and contaminate water sources for species. Construction activities such as refuelling, storage and other activities that require oil and hazardous substances to be used are undertaken at risk of accidental release. The accidental release of contaminants is assessed in *Chapter 9: Unplanned Events* and has been assessed as negligible.

Land preparation will likely expose areas of the Project Site to soil erosion (wind and/or runoff) until the infrastructure construction or replanting is completed to stabilise the surface. Erosive processes can transport sediment through overland flow and via streams[26], causing ecological impacts (e.g. sedimentation and nutrient enrichment). This impact has the potential to degrade downstream habitat areas or change habitat characteristics, thus influencing suitability for native flora and fauna communities. As mentioned in *Section 7.6* and *Chapter 9: Unplanned Events*, the potential impacts on surface water quality from contamination are related to accidents that are unlikely to occur with embedded measures in place, and thus the impact from accidental spills and leakages are expected to be negligible. However, as indicated in the Water Resources Impact Assessment, incomplete existing controls regarding sewage and sanitary wastewater management may still impact the quality of groundwater, including those utilized flora species in the affected areas (hence the water quality impact significance being assessed as moderate), though these impacts are expected to be localized and would not impact a substantial proportion of affected species' populations. Potentially affected species include 13 flora species with medium sensitivity.

Invasive Species

Invasive species (flora and fauna) have the potential to be introduced or spread throughout the Project Site through increased movement of people, vehicles, machinery, and import of supply materials for construction. An increase in the prevalence of invasive species has the potential to reduce habitat health. Individuals or propagules (including eggs, larvae etc.) of invasive species can be contaminants or hitchhikers in materials being brought to the Project Site. Invasive flora species can rapidly germinate in disturbed areas and affect the ability of

[23] Han J., Dai H., Gu Z. 2021. Sandstorms and desertification in Mongolia, an example of future climate events: a review. Environ Chem Lett. 19(6):4063-4073. doi: 10.1007/s10311-021-01285-w.
[24] National Oceanic and Atmospheric Administration. 2024. Sandstorm Sweeps Across the Gobi Desert. https://www.nesdis.noaa.gov/news/sandstorm-sweeps-across-the-gobi-desert
[25] Borjigin, A., Bueh, C., Yong, M., Purevjav, G., & Xie, Z. 2024. Cross-Border Sand and Dust Storms between Mongolia and Northern China in Spring and Their Driving Weather Systems. Remote Sensing 16(12): 2164. https://doi.org/10.3390/rs16122164
[26] Loch, R.J., 2000. Effects of vegetation cover on runoff and erosion under simulated rain and overland flow on a rehabilitated site on the Meandu Mine, Tarong, Queensland. *Soil Research*, *38*(2), pp.299-312.

native vegetation communities to re-establish.[27] Introduced invasive species may adversely impact native fauna as a result of increased competition for resources, predation or habitat degradation.

Invasive species can be introduced to the Project area through many means including intentional introductions for agricultural or accidental introductions, which are usually the result of contaminated freight or movement of contaminated products (including wooden pallets and other bracing material used to keep cargo in position), plants, or food products. Individuals or propagules (including seeds and spores) of these invasive species can be contaminants or hitchhikers in materials being brought to the Project Site.

Supply of materials for construction such as gravel, sand, and water will be procured from existing sources in the vicinity of the Project site while cement will be trucked in from Ulaanbaatar, and the wind turbines, BESS equipment, and reinforcement steel for construction will be transported from suppliers in China. Therefore, the introduction of invasive species could occur but the effect on local fauna would depend on what species were introduced. The recommendation is to ensure the Project follows GIIPs to decrease the likelihood of any invasive species being brought to the Project site (refer to *Section 'Additional Mitigation and Management Measures'*).

No invasive species have been recorded during baseline surveys in the Project area. Habitats in the Project AoI are predominantly natural habitats that host native species as well as species of conservation significance.

Given the considerations described above for indirect degradation of habitat, the impact magnitude is considered negligible for dust, and small for release of contaminants and invasive species. Given sensitivity of habitat and species is overall assessed to be medium (see previous sections), the overall impact significance is therefore negligible to minor.

TABLE 7-58: IMPACT FROM INDIRECT DEGRADATION OF HABITATS

Impact	Degradation of habitats caused by dust, release of contaminants (runoff) and invasive species during construction activities.			
Nature	Negative	Positive	Neutral	
	The impact is negative.			
Type	Direct	Indirect	Induced	
	These impacts are an indirect consequence from dust emissions, release of runoff/contaminants, and potential introduction of invasive species during construction.			
Duration	Temporary	Short-term	Long-term	Permanent
	Impacts from dust and run-off will be temporary over the construction period (17 months). Introduced invasive species (if any) can have long-term impacts on habitats by altering the ecosystem.			
Extent/Scale	Local	Regional	International	

[27] Ramula, S., Knight, T.M., Burns, J.H. and Buckley, Y.M., 2008. General guidelines for invasive plant management based on comparative demography of invasive and native plant populations. *Journal of Applied Ecology*, *45*(4), pp.1124-1133.

Impact	Degradation of habitats caused by dust, release of contaminants (runoff) and invasive species during construction activities.				
	Impacts to terrestrial environments are localised and limited to where Project activities are required.				
Frequency	Release of dust and runoff would be localized and intermittent over the construction phase. Introduction of invasive species to the Project Site is considered infrequent (if at all).				
Magnitude	Positive	Negligible	Small	Medium	Large
	Impacts will be of small magnitude as invasive species and release of contaminants will likely affect a small area of habitat, but without the loss of viability/function of the habitat, and negligible for dust emissions.				
Resource/Receptor Sensitivity	Low	Medium	High		
	Sensitivity of terrestrial habitats and species is medium.				
Significance	Negligible	Minor	Moderate	Major	
	Impact significance is negligible for dust emissions and minor for release of contaminants and potential invasive species without implementation of mitigation.				

Direct Mortality Impacts from Vehicle Collision, Hunting, and Poaching

Sources of Impact

- Workforce mobilization and presence; and
- Equipment and material transportation and supply.

Significance of Impact

The use of heavy machinery, equipment and vehicles on-site as well as trucks to supply necessary materials to the Project area may increase the opportunity for strike with resident fauna. Truck movement throughout the construction phase will be used to supply construction materials to the site, including WTG and BESS equipment and reinforcement steel from China, construction water (Tsogtsetsii soum centre well), cement from Ulaanbaatar (500 km from the site), sand (40 km away), one-time shipment of gravel (40-60 tonnes) from quarries located 5-10 km from the site, and concrete from a mobile batching plant located 0.5 km from the Project site. Transport of the equipment will use an existing heavy-duty coal transportation road and the existing 30.9 km northern access road that will be upgraded as well as an existing road for access to the south of the OHL near the Oyu Tolgoi mine. Expected annual average daily traffic during peak construction include 440 heavy duty vehicle movements and 7,600 light daily duty vehicle movements, with lower figures anticipated for periods outside the peak stage. Large mammals (e.g. Asiatic Wild Ass, Mongolian Gazelle, and Goitered Gazelle) and birds are susceptible to injury or fatality from vehicle collision as large vehicles shipping construction materials and equipment are less able to brake or manoeuvre around animals. However, most construction phase traffic will mostly occur on pre-existing roads while on-site movements will mostly be confined to the WTG area and along the OHL, and vulnerable wildlife

in the region exhibit strong avoidance behaviour to linear infrastructure (e.g. decreased annual migration distances of nomadic ungulates in the South Gobi region[28, 29]).

With greater human activity in the Project Site and increased access points to the neighbouring habitats there is a risk of increased hunting and poaching activities leading to fauna mortality from workers and also local people who may have access to habitats that were previously restricted or difficult to access. Hunting of wildlife, including conservation significant species is known to occur in Mongolia. The Asiatic Wild Ass (*Equus hemionus*) is directly threatened illegal hunting for meat and skins for commercial use in some areas of Mongolia, while the Goitered Gazelle (*Gazella subgutturosa*) is illegally poached for meat and for sport.[30] Both species are of medium sensitivity and listed under CMS Appendix II (effective 17 May 2024), while the Asiatic Wild Ass is also listed under CITES Appendices I and II (effective 7 February 2025), demonstrating their vulnerability to hunting and poaching.[31, 32] Incidents of shootings and hunting / poaching of the Cinereous Vulture (*Aegypius monachus*), is also known to be increasing in Mongolia.[33] High sensitivity species found in the Project AoI that are subject to hunting pressure include the Saker Falcon (*Falco cherrug*) and Steppe Eagle (*Aquila nipalensis*), both of which are Endangered on the IUCN Red List.

The Project Study Area is small in comparison with the entire area where the birds and mammals can travel back and forth, which include the Galba Gobi KBA/IBA as well as the legally protected Small Gobi SPA (parts “A” and “B”). Considering the mobile nature of the fauna likely to be impacted, the relatively small number of construction workers on-site (250-300 total workers during peak construction period), and wildlife avoidance behaviour to existing infrastructure (to be utilized as transport corridors), the magnitude of impact from vehicle collision and hunting will be small, as the impact may affect a small proportion of a population but likely will not substantially affect other species dependent on it, or the populations of the species themselves. This assumes that embedded measures in the DEIA are sufficiently implemented, including prohibition on hunting and poaching of wildlife by personnel, as well as minimization of vehicles and machinery in non-operational areas and travelling only along designated routes across the entire Project site to avoid straying off roads and potentially striking fauna. The significance of impact is therefore considered to be minor.

[28] Ito TY, Lhagvasuren B, Tsunekawa A, Shinoda M, Takatsuki S, Buuveibaatar B, Chimeddorj B. 2013. Fragmentation of the habitat of wild ungulates by anthropogenic barriers in Mongolia. PLoS One 8(2):e56995. doi: 10.1371/journal.pone.0056995.
[29] Mendgen, P., Dejid, N., Olson, K., Bayarbaatar, B., Calabrese, J., Buyanaa, C., Dalannast, M., Fagan, W., Leimgruber, P. and Muller, T. 2023. Nomadic ungulate movements under threat: Declining mobility of Mongolian gazelles in the Eastern Steppe of Mongolia. Biological Conservation 286, 110271. https://doi.org/10.1016/j.biocon.2023.110271
[30] Clark, E. L., Munkhbat, J., Dulamtseren, S., Baillie, J. E. M., Batsaikhan, N., Samiya, R. and Stubbe, M. (compilers and editors) (2006). Mongolian Red List of Mammals. Regional Red List Series Vol. 1. Zoological Society of London, London.
[31] Convention on International Trade in Endangered Species of Wild Fauna and Flora. Appendices I, II and III valid from 7 February 2025. Available at: https://cites.org/sites/default/files/eng/app/2025/E-Appendices-2025-02-07.pdf
[32] Convention on the Conservation of Migratory Species of Wild Animals (CMS). Appendices I and II effective 17 May 2024. Available at: https://www.cms.int/sites/default/files/uploads/revised-appendices_cop14_e.pdf
[33] BirdLife International (2021). Species factsheet: Cinereous Vulture Aegypius monachus. Downloaded from https://datazone.birdlife.org/species/factsheet/cinereous-vulture-aegypius-monachus

TABLE 7-59: IMPACT FROM VEHICLE COLLISION, HUNTING AND POACHING ON FAUNA

Impact	Mortality to fauna from vehicle collision, hunting and poaching by local communities and/ or workers			
Nature	Negative	Positive	Neutral	
	The impact is negative.			
Type	Direct	Indirect	Induced	
	Any hunting and poaching impacts will be direct on fauna such as birds and mammals.			
Duration	Temporary	Short-term	Long-term	Permanent
	These impacts are likely to occur during construction phase (17 months).			
Extent/Scale	Local	Regional	International	
	Impacts to fauna are localised and limited to where Project activities are required and workforce is present.			
Frequency	Hunting and poaching will occur infrequently, if at all.			
Magnitude	Positive	Negligible	Small	Medium	Large
	Impacts will be of small magnitude as it will affect a small proportion of a population but does not substantially affect other species dependent on it, or the populations of the species itself			
Resource/Receptor Sensitivity	Low	Medium	High	
	Overall sensitivity of affected species is medium.			
Significance	Negligible	Minor	Moderate	Major
	Impact significance is minor.			

7.7.5.2 OPERATION PHASE

The operation phase is characterized by the presence of wind turbines (WTG Area) and the OHL (including poles), which has impacts on avifauna and bats due to mortality, either from collision with WTGs, or due to electrocution from collision with the OHL. The presence of WTGs and OHL poles also represent barriers to mobile fauna which can be displaced.

Direct Mortality of Volant Fauna – Collision with Wind Turbines

Sources of Impact

- Operation of WTGs and OHL.

Significance of Impact

The majority of bird fatalities that could occur due to the operation of a wind farm is caused by birds flying through the rotor swept area of wind turbines and subsequently colliding with the turbine blades. Impacts due to collisions with the OHL during operation phase are also assessed separately.

Mortalities from birds flying through the rotor swept area of operational turbines have the potential to result in impacts to individuals and populations of bird species. This height is

consistent with the height of flights recorded during field survey comprising the at-risk band (19 to 201 m). The majority of studies of collisions caused by wind turbines have recorded relatively low levels of mortality at the wind farm level[34], such as a fatality rate of 0.26 birds/year for wind farms in central Karnataka, India[35], mortality of 1.4 birds per turbine per year in Canada[36], and an average of 5.25 birds per turbine per year in the contiguous United States.[37] However, the cumulative impacts from collisions with all wind farms in a region or country can potentially affect species' population levels, which is discussed separately in *Chapter 10: Cumulative Impact Assessment.*

The quantification of risk from this impact has been evaluated using the Collision Risk Model (CRM), which is used to predict the number of bird collisions that might be caused by a wind farm development.[38] For this Project, a CRM was carried out based on data collected through six (6) Vantage Point (VP) surveys carried out from August 2024 to May 2025, with consideration of avoidance rates of 95%, 98%, 99% and 99.5% to illustrate uncertainty arising from avoidance behaviour. Where possible, species-specific avoidance rates were used to refine the model, with the 98% avoidance scenario as default.[39]

The results indicated that the probability of collision for each species was estimated to be very small, with the Cinereous Vulture (*Aegypius monachus*) having the highest predicted annual collision rate among the eight (8) species modelled with 2.7 bird collisions per year (assuming a 98% avoidance rate), followed by the Black Kite (*Milvus migrans*) with 2.4 bird collisions/year. Over the 20-25 years operation phase, this equates to 54 collided Cinereous Vultures and 48 Black Kites, compared to global populations of 16,800 - 22,800 Cinereous Vultures and 4.5 – 5.7 million Black Kites. A summary of findings of the CRM is shown in *Table 7-60* and more details are presented in *Chapter 6 Baseline*.

[34] Erickson, W.P., Johnson, G.D., Strickland, M.D., Young, D.P., Jr Sernja, K.J. & Good, R.E. 2001. Avian collisions with wind turbines: a summary of existing studies and comparisons to other sources of avian collision mortality in the United States. Western EcoSystems Technology Inc. National Wind Coordinating Committee Resource Document. http:// www.nationalwind.org/publications/avian.htm

[35] Kumara, H.N., Babu, S., Rao, G.B. et al. Responses of birds and mammals to long-established wind farms in India. Sci Rep 12, 1339 (2022). https://doi.org/10.1038/s41598-022-05159-1

[36] Zimmerling, J. R., A. C. Pomeroy, M. V. d'Entremont, and C. M. Francis. 2013. Canadian estimate of bird mortality due to collisions and direct habitat loss associated with wind turbine developments. Avian Conservation and Ecology 8(2): 10.

[37] Loss, S., Will, T., and Marra, P. 2013. Estimates of bird collision mortality at wind facilities in the contiguous United States. Biological Conservation 168:201-209. https://doi.org/10.1016/j.biocon.2013.10.007

[38] Band, W. 2024. Using a collision risk model to assess bird collision risks for onshore wind farms. NatureScot Research Report 909. Available at: https://www.nature.scot/doc/guidance-using-updated-collision-risk-model-assess-bird-collision-risk-onshore-wind-farms

TABLE 7-60: COLLISION RISK MODELLING RESULTS FOR BIRD SPECIES

Species	IUCN *	Potential Bird Transits Through Rotor per Year	Scenario (No. of Collision/Year)				Scenario (No. of Years to Lose One Individual)				Species Specific Avoidance Rate [39]**	Global Population Estimate***
			95% avoidance	98% avoidance	99% avoidance	99.5% avoidance	95% avoidance	98% avoidance	99% avoidance	99.5% avoidance		
Saker Falcon *Falco cherrug*	EN	7	0.0177	0.0071	0.0035	0.0018	56.6361	141.5902	283.1805	566.3610	98%	12,200 – 29,800
Cinereous Vulture *Aegypius monachus*	NT	2333	6.8361	2.7345	1.3672	0.6836	0.1463	0.3657	0.7314	1.4628	98%	16,800 – 22,800
Black Kite *Milvus migrans*	LC	2288	6.0310	2.4124	1.2062	0.6031	0.1658	0.4145	0.8291	1.6581	98%	4,000,000 – 5,700,000
Lesser Kestrel *Falco naumanni*	LC	251	0.6468	0.2587	0.1294	0.0647	1.5460	3.8651	7.7302	15.4605	95%	80,000 - 134,000
Upland Buzzard *Buteo hemilasius*	LC	195	0.5122	0.2049	0.1024	0.0512	1.9524	4.8811	9.7622	19.5243	98%	N/A
Whooper Swan *Cygnus cygnus*	LC	1740	5.6939	2.2776	1.1388	0.5694	0.1756	0.4391	0.8781	1.7563	99.5%	100,000 - 499,999

[39] NatureScot. 2025. Wind farm impacts on birds - Use of Avoidance Rates in the NatureScot Wind Farm Collision Risk Model (v4). https://www.nature.scot/doc/wind-farm-impacts-birds-use-avoidance-rates-naturescot-wind-farm-collision-risk-model

Species	IUCN *	Potential Bird Transits Through Rotor per Year	Scenario (No. of Collision/Year)				Scenario (No. of Years to Lose One Individual)				Species Specific Avoidance Rate [39]**	Global Population Estimate***
			95% avoidance	98% avoidance	99% avoidance	99.5% avoidance	95% avoidance	98% avoidance	99% avoidance	99.5% avoidance		
Pallas's Sandgrouse *Syrrhaptes paradoxus*	LC	1082	2.1164	0.8466	0.4233	0.2116	0.4725	1.1812	2.3625	4.7250	98%	Unknown
Horned Lark *Eremophila alpestris*	LC	671	1.7996	0.7198	0.3599	0.1800	0.5557	1.3892	2.7784	5.5568	98%	140,000,000

*EN = Endangered, NT = Near Threatened, LC = Least Concern.
**For species not listed in NatureScot's guidance on the *Use of Avoidance Rates in the NatureScot Wind Farm Collision Risk Model* (2025), NatureScot recommends a default avoidance rate of 98%, as is the case for some species in this table.
***Sourced from the IUCN Red List (2025-2).

Based on the results of the CRM, the collision effect throughout the Project's operation will affect a proportion of a population, but not substantially affecting other species dependent on it, or the populations of the species itself, therefore the magnitude of effect is considered to be small.

Sensitivity of receptors is considered high for three (3) species: EN Steppe Eagle (*Aquila nipalensis*), EN Saker Falcon (*Falco cherrug*), and EN Great Bustard (*Otis tarda*). Bird species with medium sensitivity (legally protected species and VU, NT, and DD species on the IUCN Red List) include the Cinereous Vulture (*Aegypius monachus*), Short-toed Snake Eagle (*Circaetus gallicus*), Bearded Vulture (*Gypaetus barbatus*), Mongolian Ground Jay (*Podoces hendersoni*), and Himalayan Griffon (*Gyps himalayensis*).

Embedded measures in the DEIA only include bird flight deterrents and monitoring surveys for the transmission line and not for wind turbines, therefore the significance of impact is considered to be moderate for the three high sensitivity birds and minor for medium sensitivity birds, and negligible for low sensitivity birds and bats.

TABLE 7-61: IMPACT ON VOLANT FAUNA MORTALITY FROM OPERATION OF WIND TURBINES

Impact	Mortality impacts to volant fauna from collision with wind turbines				
Nature	Negative	Positive	Neutral		
	The impact is negative.				
Type	Direct	Indirect	Induced		
	Mortality impacts during operation of collision with turbine blades will be direct.				
Duration	Temporary	Short-term	Long-term	Permanent	
	The impact will continue intermittently over the operation phase of the wind turbines (20-25 years)				
Extent/Scale	Local	Regional	International		
	Impacts will be localized to the area where birds collide with turbines.				
Frequency	The turbines will be operational 24 hours a day. Impact frequency is expected to be intermittent over the operation phase. However, the likelihood of occurrence, and thus collision of birds is low.				
Magnitude	Positive	Negligible	Small	Medium	Large
	The likelihood of collision for at-risk volant species is low, and it may affect a small proportion of species' populations but would not substantially affect other species dependent on it, or the populations of the species themselves.				
Resource/Receptor Sensitivity	Low	Medium	High		
	Affected volant species include three (3) high sensitivity birds, five (5) medium sensitivity birds, and other low sensitivity birds and bats.				
Significance	Negligible	Minor	Moderate	Major	

Impact	Mortality impacts to volant fauna from collision with wind turbines
	Significance of impact is considered moderate for high sensitivity birds, minor for medium sensitivity birds, and negligible for low sensitivity species.

Direct Mortality of Volant Fauna – Collision and Electrocution with OHL

Sources of Impact

- Operation of WTGs and OHL.

Significance of Impact

Mortality can occur when volant fauna (birds and bats) fly into transmission line wires and electrocutions occur when a individuals complete a circuit by touching two energized parts of strung wires, or a wire and another part of a tower structure to complete a circuit. Birds are likely to be impacted by collision with and electrocution by transmission lines including birds that soar and dive for prey. The majority of collisions occur in poor weather and with the top or earth wire which are finer and harder for birds to see. Collisions with the earth wire of transmission lines may also lead to significant fatalities for some species such as bustards. Larger perching bird species such as raptors are more susceptible to electrocution because their larger wingspan means they are more likely to create a short circuit between a live cable and another component resulting in electrocution. Electrocution rates at the pylons (or poles) of low- or medium-voltage lines can be high and disproportionately affect some species that use pylons of low-voltage lines as perches when hunting or for nesting.[40] Electrocutions are only frequent on power lines with voltages below 45 kV due to the distance between supports, the spacing between conducts, and the length of insulators.[41]

The Project's 220 kV OHL comprises a high voltage line. Bird mortality usually occurs when birds perched on transmission lines are touching two conductors – however, in high voltage line, conductors are typically further apart, such that the electrocution risk is lower.[42] Conversely, the risk from collision is higher due to longer transmission lines (around 65 km for the Project).

During carcass search surveys conducted along an existing transmission line in the vicinity of the Project, only eight (8) carcasses were found in total, including of the NT Cinereous Vulture (*Aegypius monachus*) and LC Northern Raven (*Corvus corax*), Pallas's Sandgrouse (*Syrrhaptes paradoxus*) and Carrion Crow (*Corvus corone*). Injuries noted from recorded carcasses show evidence of both collision and electrocution. The most frequently observed bird species in terms of abundance and number of observations along the Project's OHL (including from vantage points VP7 to VP11) are the Cinereous Vulture as well as LC species Horned Lark (*Eremophila alpestris*), Northern Raven (*Corvus corax*), and Pallas's Sandgrouse (*Syrrhaptes paradoxus*). In addition, EN Saker Falcons (*Falco cherug*) [redacted]

[40] Bennun, L., van Bochove, J., Ng, C., Fletcher, C., Wilson, D., Phair, N., Carbone, G. (2021). Mitigating biodiversity impacts associated with solar and wind energy development. Guidelines for project developers. Gland, Switzerland: IUCN and Cambridge, UK: The Biodiversity Consultancy.

[41] Martín Martín, J., Garrido López, J.R., Clavero Sousa, H. and Barrios, V. (eds.). Wildlife and power lines. Guidelines for preventing and mitigating wildlife mortality associated with electricity distribution networks. Gland, Switzerland: IUCN

[42] Ibid; Bevanger, K. (1998). Biological and conservation aspects of bird mortality caused by electricity power lines: a review. *Biological conservation*, *86*(1), 67-76.

Cinereous Vultures were among the three most abundant species observed during vantage point surveys at points VP8 and VP9, which are located along the northern to middle sections of the OHL route.

Sensitivity of receptors is considered high for three (3) species: EN Steppe Eagle (*Aquila nipalensis*), EN Saker Falcon (*Falco cherrug*), and EN Great Bustard (*Otis tarda*). Bird species with medium sensitivity (legally protected species and VU, NT, and DD species on the IUCN Red List) include the Cinereous Vulture (*Aegypius monachus*), Short-toed Snake Eagle (*Circaetus gallicus*), Bearded Vulture (*Gypaetus barbatus*), Mongolian Ground Jay (*Podoces hendersoni*), and Himalayan Griffon (*Gyps himalayensis*).

Given that embedded controls are included in the DEIA's management plan, including installation of "line marking devices", "bird protection devices made from polymer-coated insulating materials", and annual bird monitoring surveys by professional organizations along the transmission line, the magnitude of impact due to fauna mortality from electrocutions and collisions with the OHL is considered to be small as the effect will not cause a substantial change in the population of the species present, or other species dependent on them.

The overall significance of this impact therefore ranges from negligible to moderate for low, medium and high sensitivity species.

TABLE 7-62: IMPACT ON VOLANT FAUNA MORTALITY FROM OPERATION OF OHL

Impact	Mortality impacts to volant fauna from collision with and electrocution from OHL				
Nature	Negative	Positive	Neutral		
	Impact nature is negative.				
Type	Direct	Indirect	Induced		
	These impacts relate directly to collision risk of birds with the OHL.				
Duration	Temporary	Short-term	Long-term	Permanent	
	Impact duration is long-term over the operation phase (20-25 years).				
Extent/Scale	Local	Regional	International		
Frequency	The OHL will be operational 24 hours a day. Impact frequency is expected to be intermittent over the operation phase.				
Magnitude	Positive	Negligible	Small	Medium	Large
	Electrocution may affect a small proportion of populations but does not substantially affect other species dependent on them, or the populations of the species themselves.				
Resource/Receptor Sensitivity	Low	Medium	High		
	Affected volant species include three (3) high sensitivity birds, five (5) medium sensitivity birds, and other low sensitivity birds and bats.				
Significance	Negligible	Minor	Moderate	Major	

Impact	Mortality impacts to volant fauna from collision with and electrocution from OHL
	Significance of impact is considered moderate for high sensitivity birds, minor for medium sensitivity birds, and negligible for low sensitivity species.

Direct Displacement from Barriers

Sources of Impact

- Operation of WTGs and OHL.

Significance of Impact

The creation of barriers and subsequent impacts during construction have been discussed previously, including displacement and avoidance by fauna. The presence and operation of WTGs and OHL, in particular, represent long-term barriers for fauna and can cause displacement over the duration of the 20-25 years operation phase. However, the OHL route and the overall WTG area will not be fenced other than the substation and BESS with a relatively small size of 2.7 ha. In addition, low traffic volume associated with the Project is expected during the operational phase on internal roads within the WTG area, the unpaved maintenance road along the OHL, and the northern and southern access roads leading to the Project site.

Volant fauna such as birds and bats are not likely to be significantly impacted by the presence of the WTGs in terms of barrier creation as they can travel longer distances and move to surrounding habitats. Other mobile, non-volant fauna such as mammals and reptiles may be displaced, but are unlikely to be significantly impacted, especially as no permanent water bodies have been identified within the Project area. Additionally, the landscape in the Project's vicinity is primarily characterized by open areas of rolling hills and desert steppe plains that are common and widespread throughout the region, and thus can be used by displaced fauna.

Of all terrestrial fauna identified in the Project area, the majority are of low sensitivity, 10 species are of medium sensitivity, and only three (3) are high sensitivity species, therefore the overall sensitivity for all terrestrial species is assessed to be medium.

In the long-term, the magnitude of this impact is considered small as displacement of fauna is likely to affect a small proportion of species' populations without substantially affecting other species dependent on them, or the populations of the species themselves.

Overall, the significance of impact is minor.

TABLE 7-63: IMPACT ON FAUNA DISPLACEMENT FROM PRESENCE OF OPERATIONAL PROJECT FACILITIES

Impact	Displacement of fauna from presence of operational Project structures such as WTGs and OHL		
Nature	Negative	Positive	Neutral
	Impact nature is negative.		
Type	Direct	Indirect	Induced

Impact	Displacement of fauna from presence of operational Project structures such as WTGs and OHL			
	Fauna will be directly displaced due to the presence of operational Project facilities.			
Duration	Temporary	Short-term	Long-term	Permanent
	Impact duration is long-term and continuous over the operation phase (20-25 years).			
Extent/Scale	Local	Regional	International	
Frequency	The impact is localized to the area occupied by the WTG area and transmission towers for OHL, which represent barriers.			
Magnitude	Positive	Negligible	Small	Medium	Large
	Displacement may affect a small proportion of populations but does not substantially affect other species dependent on them, or the populations of the species themselves.			
Resource/Receptor Sensitivity	Low	Medium	High	
	Receptor sensitivity is medium for terrestrial fauna affected by barrier creation and displacement.			
Significance	Negligible	Minor	Moderate	Major
	Overall significance of impact is considered minor.			

7.7.5.3 ADDITIONAL MITIGATION, MANAGEMENT AND MONITORING PROCEDURES

The following sections present additional mitigation measures to be implemented (beyond existing controls in the DEIA) to address the Project's construction and operation impacts on biodiversity.

Given the presence of natural habitats in the Project area as well as 27 PBF flora and fauna species, mitigation measures for construction and operation phase impacts must be designed in line with the mitigation hierarchy to achieve no net loss[43] of these biodiversity receptors, in accordance with IFC PS6 and EBRD ESR6 requirements. Additional mitigation measures recommended in the following sections are intended for impact avoidance, minimisation, and restoration/rehabilitation. Subsequently the no net loss assessment for natural rangeland habitats and PBFs presented in *Section 7.7.5.6* provides analysis on residual impacts and additional actions (e.g. compensation/offsets) required to achieve NNL outcomes for these biodiversity receptors.

Overall, a Biodiversity Management Plan (BMP) should be developed for the Project to capture all embedded controls and all additional mitigation, management, and monitoring measures listed in this section, as well as document the roles and responsibilities of all parties, implementation schedule, and timeline for regular review and update. An initial Construction-phase Biodiversity Management Plan has been prepared in *Annex F*, while an Operation-phase BMP should be prepared prior to the end of construction.

[43] IFC PS6 footnote 9: No net loss is defined as the point at which project-related impacts on biodiversity are balanced by measures taken to avoid and minimize the project's impacts, to undertake on-site restoration and finally to offset significant residual impacts, if any, on an appropriate geographic scale (e.g., local, landscape-level, national, regional).

Construction Phase

Direct Loss of Terrestrial Habitat

In order to mitigate risks and impacts related to loss of terrestrial habitat, the following mitigation measures will be applied during construction (and continue through operation as necessary).

- Develop and implement a Priority Plant Conservation Plan, which should include the following:
  - Conduct pre-construction surveys targeting flora species prior to the start of any site clearance, earthworks, or land preparation activities. Qualified ecologists must be engaged to carry out such flora surveys and record the presence of any species of conservation significance in areas to be cleared, i.e. globally threatened, legally protected and/or restricted-range/endemic species, including the PBF species *Amygdalus mongolica*. These surveys should be carried out within the footprint of the foundations of WTGs, OHL towers, access roads and other planned temporary and permanent Project facilities. If plant species of conservation significance are found, these individuals must be documented clearly with photographs and georeferenced locations.
  - Based on the results of the pre-construction flora surveys, undertake micro-siting of all areas to be cleared for access roads, OHL tower foundations, and temporary facilities to avoid removal of flora species of conservation significance that are present in the areas to be cleared, where possible. Where there is limited room for movement of pre-agreed infrastructure locations, the focus will be on identification of opportunities for micro-siting (e.g. movement of infrastructure less than 300 m). Where infrastructure is more location-flexible (e.g. temporary structures like laydown areas, camps), full opportunities will be considered for micro- and larger-scale re-siting of such infrastructure. Micro-siting should be explored fully where there are protected/threatened plant species present that cannot be easily transplanted (e.g. those with fragile root systems). Where full avoidance of areas with flora species of conservation significance is not possible, constraints that make micro-siting impossible (e.g. topography) will be clearly documented.
  - Where flora of conservation significance are retained on-site and will not be removed, a 50 m exclusion buffer will be established and clearly demarcated using visible signage and flags/markers (and temporary fencing if appropriate) around these individuals. For any flora of conservation significance that are not directly affected by site clearance but are located within 50 m of planned construction works areas, these will also be clearly demarcated and applied an exclusion buffer to avoid accidental clearing. Demarcation shall be maintained throughout construction and reinstated immediately if damaged or displaced. All staff will be informed on the locations of any flora exclusion buffers.
  - Where construction activities are undertaken near flora exclusion buffers, vehicle and anthropogenic movements must be restricted to approved access routes and stockpiling should be prohibited near buffer boundaries.
  - For flora of conservation significance where removal cannot be avoided, a Plant Rescue and Translocation Protocol will be developed to transplant these individuals to suitable

nearby habitats that are not subject to disturbance, or to on-site areas that will be rehabilitated after construction. Any action to remove and transplant legally protected species must comply with relevant national laws and regulations, such as payment of fees and/or obtaining relevant permits or licences, and will be subject to the relevant authority/ies' decisions.

- All individuals that are retained on-site or translocated should be monitored for survival rate for at least three years.
- For flora of conservation significance where removal is unavoidable and translocation is not feasible, compensatory planting must be undertaken for cleared individuals. This can be integrated into the Habitat Restoration Plan discussed below.

- Areas planned for vegetation clearance shall be clearly determined and demarcated to avoid accidental clearing.
- Limit clearance of vegetation to the Project footprint only. Monitor habitat clearance closely during construction to minimise risk of inadvertent additional clearing. Where feasible, vegetation should be cut to ground level rather than completely stripped to preserve soil and seed banks.
- Restrict all construction activities including soil stripping, vegetation clearing, earthworks, access road construction, grading, etc. to the footprint of individual facilities only and as per the approved construction plan.
- Implement a procedure prohibiting vehicles to travel on unapproved routes during construction phase.
- During the construction phase, movement of vehicles will be prohibited outside of 100-meter corridor from the OHL and approved routes will be strictly followed.
- Provide training to staff and workers associated with the Project on biodiversity awareness (focusing on habitats, flora species of conservation significance, and flora exclusion buffers present in the Project area), as well as all rules, regulations, and restrictions on unauthorised clearing of vegetation, and the punishment that can be expected if any staff or worker or other person associated with the Project violates rules and regulations.
- Develop and implement a post-construction Habitat Rehabilitation Plan (HRP) for temporary areas used during construction (e.g. PV/BESS system, storage, laydown, and crane installation areas). The HRP should be prepared by qualified ecologists prior to the end of construction and integrated into the Project's Biodiversity Management Plan or developed as a standalone plan to be implemented in conjunction with the BMP. The HRP should evaluate options for passive natural recovery and/or active/assisted restoration (or a combination of the two), depending on the habitat type characteristics and known responses from literature/case-study examples. This Plan should also include all related embedded measures in the DEIA, as well as the following (at minimum):
  - Following the dismantling/decommissioning of temporary areas/facilities utilised during construction (e.g. temporary laydown areas, storage areas, etc.), post-construction habitat restoration and revegetation should be carried out in all disturbed areas using native flora species. All habitat restoration and planting methodologies to be used, native species to be planted, adaptive management measures, monitoring requirements, roles and responsibilities, and implementation timeline should be clearly documented in the HRP.

- Compensatory planting for any flora of conservation significance that are removed to be carried out as part of habitat rehabilitation activities.
- Embedded measure includes habitat rehabilitation and revegetation for “areas impacted by waste and newly created roads”. Adjacent areas affected by construction works as well as areas affected by installation works during the construction phase should also be rehabilitated in accordance with the surrounding land surface and create conditions for plant growth.
- Topsoil stripped from all construction areas will be temporarily stored separately from other soils and excavated materials will be used for the rehabilitation of temporary roads used during construction phase and other suitable locations.
- Topsoil removed from the construction area of WTGs and OHL poles will be used for rehabilitation of nearby landscape, while lower level soils and rocks removed will be used for permanent backfill of BESS/substation.
- Maintain the original soil layering and do not mix topsoil and subsoil layers. Reinstate soils in the reverse order (subsoil, then topsoil). Protect the reinstated bare soil surface with a physical barrier, such as a thin layer of mulch or geotextile/erosion control matting.
- All disturbed soil surfaces will be stabilized using temporary cover crops during construction. Long-term stabilization is to occur using a mix of species native to the area and suitable to local soil and climate characteristics to stabilise disturbed soil surfaces. All stabilized areas are to be monitored and maintained following construction activities.
- Avoid compaction of soils, for example though excessive vehicle tracking, and rip soils where compacted to allow for vegetation growth.
- Identify indigenous species for planting and suitable sources for seed and plants as appropriate (preferably using seed of local origin as far as possible, and only supplement with other seed where locally sourced seed is unavailable).
- Temporary fencing or other appropriate barriers should be installed where necessary in the short- to medium-term to prevent entry to the area and potential livestock overgrazing, allowing for vegetation regrowth and soil stabilization.

Indirect Disturbance to or Displacement of Fauna

Several mitigation measures listed under ‘Direct Loss of Terrestrial Habitat’ also apply for this impact (e.g. demarcation of clearance areas). Additional recommended measures not already mentioned are listed below:

- Pre-clearance surveys targeting fauna (including birds, bats, non-volant mammals, and herpetofauna) should be undertaken prior to any vegetation clearance, earthworks or ground disturbance. Surveys must include checks for active nests, burrows, roosts, breeding activity, and presence of any PBF fauna species and/or species of conservation significance. Any individuals found should be gently relocated to nearby suitable habitat to ensure their protection from construction-related impacts, in accordance with a Wildlife Shepherding Protocol.
- Vegetation clearance and ground disturbance activities will be planned to avoid sensitive breeding, nesting and roosting periods, whenever feasible.

- During the construction phase, movement of vehicles will be prohibited outside of 100 m corridor from the OHL and approved routes will be strictly followed.
- Vehicle noise levels will not exceed the level specified under Mongolian standards for noise and vibration. Low-noise emitting motorized equipment (for construction) will be selected. Other mitigation measures related to noise as detailed in *Section 7.4* should be followed.
- In case working night shifts is needed, work will be planned to comply with night-time noise level limits, and vehicle movement/operation should be restricted during nighttime to limit risk of impact to fauna due to visibility issues.
- Construction vehicles and equipment will be registered, permitted and meet emission standard established as per regulation requirements.
- Where possible, lighting should not be active during nighttime. Where lighting is required, it should not be directed towards areas likely to contain native fauna.
- Use appropriate lighting that minimizes ecological effects on wildlife and limits attraction of insects, e.g. using long wavelength light (warm white, orange, red, and infra-red) and low intensity lights where possible.
- Invasive species have the potential to enter or exit the Project Site via transportation of equipment, and materials. In order to avoid/minimize the introduction of invasive fauna species, a suitable Invasive Species Management Plan (ISMP) should be prepared to prevent the introduction of invasive species and to respond accordingly if such introduction occurs. The plan should include (but not be limited to) the following mitigations:
  - Source goods and materials locally where possible (including topsoil removed as part of construction works);
  - Prohibit the general access of vehicles, construction workers and machinery and storing of soils to rangelands outside of the construction zone and approved access routes to avoid the dispersion of invasive alien species within these habitats;
  - Clean boots prior to entering the Project site, and use vehicle pressure-wash down procedures to reduce the transmission of invasive species into and from the Project Site, including washing of vehicle tires and underbody to remove seeds of invasive plants;
  - Source goods and materials locally where possible;
  - Use only certified pest-free stock where possible; and
  - Control any small infestations early and appropriately, to avoid spreading infestation.

Direct Impacts from Barrier Creation

Several mitigation measures listed under ‘Direct Loss of Terrestrial Habitat’ also apply for this impact (e.g. habitat rehabilitation). Additional recommended measures not already mentioned are listed below:

- All temporary construction features, such as excavations, fencing, and stockpiles of soil or materials, must be fully removed upon completion of construction to enable natural habitat recovery and reduce long-term barriers to species movement.
- Utilize native flora as natural fencing instead of artificial barriers, where possible.

Indirect Degradation of Habitat

Several mitigation measures listed under 'Direct Loss of Terrestrial Habitat' also apply for this impact (e.g. habitat rehabilitation and Invasive Species Management Plan). Additional recommended measures not already mentioned are listed below:

- Dust management measures are the same as those outlined in *Section 7.2* for air quality impacts, particularly that all machinery and handheld equipment must comply with required air emission standards.
- Soil and water quality management measures as the same as those outlined in *Sections 7.5* and *7.67.6* for impacts to soil, surface water and groundwater.
- Leak and spillage plans and mitigation measures for avoiding accidental leaks are the same as those in *Chapter 9: Unplanned Events Impact Assessment*.

Direct Mortality Impacts from Vehicle Collision, Hunting, and Poaching

Several mitigation measures listed under previous sections also apply for this impact (e.g. Wildlife Check and Wildlife Injury Protocols). Additional recommended measures not already mentioned are listed below:

- All vehicles are to maintain a speed of a maximum of 30 km/hr within construction work areas to reduce the risk of fauna strikes. The speed limit may be revised upon further review with a wildlife expert, as necessary.
- All off-road driving and use of any non-approved access roads are strictly prohibited.
- Prior to starting construction work, the area will be checked for presence of fauna along tracks and in work areas, to reduce the likelihood of vehicle collision.
- Provide training to staff and workers on biodiversity awareness (including on fauna species of conservation significance in the Project area), as well as all rules, regulations and information concerning prohibitions on hunting, poaching, and collection of species, and the punishment that can be expected if any staff or worker or other person associated with the Project violates rules and regulations.
- Install wildlife warning signs at regular intervals along all internal roads and access roads.

Operation Phase

Direct Mortality of Volant Fauna – Collision with Wind Turbines

<u>General Mitigations</u>

- All tower structures are to be free of holes that can be used for nesting. Roosting habitats (wires and ledges) are to be kept to a minimum.
- Limit the operation of turbines when winds are not sufficient; eliminate "free-wheeling" (free spinning of rotors under low wind conditions when turbines are not generating power).
- Food waste shall be appropriately managed to avoid attracting birds, especially raptors to such food sources, in the WTG area.
- Operational lighting within Project areas will be limited to essential safety, security and maintenance requirements and, where practicable, designed or directed to minimise

unnecessary illumination of surrounding habitats. This will reduce attracting birds and bats to operational Project infrastructure and minimize collision risk.

- A Bird and Bat Adaptive Management Plan (BBAMP) will need to be developed in alignment with the requirements of IFC PS6 and EBRD ESR6, and informed by the handbook on Post-Construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries[47] (considered as GIIP by the IFC/EBRD as co-authors of the handbook). The BBAMP will be specific to managing collision risks to volant species during the operational phase of the Project, and should contain the following at minimum:
  - Summary of baseline and key operational impacts to birds and bats;
  - Identification of target species as per NatureScot guidance the PCFM Handbook (2023), and PBF volant species identified in this ESIA;
  - Ecologically-justified fatality thresholds for birds based on the results of the Collision Risk Assessment and PBR analysis;
  - Post-construction Fatality Monitoring (PCFM) program for the Project operational phase, aligned with the guidelines in the handbook from IFC, EBRD and KfW (2023) and national permitting conditions (where relevant). The PCFM will include systematic searches within defined turbine search areas / transects, recording of carcasses or injured individuals, identification where possible, photographic evidence, and assessment of collision risk. The results will be used, together with the PBR thresholds once developed / confirmed and specialist review, to inform adaptive management and the definition of SDOD activation parameters or other operational response measures, where required;
  - Development of an adaptive management framework and decision-tree with key responsive actions and interventions triggered by monitoring outcomes from the PCFM and exceedances of fatality thresholds;
  - Development of a Shutdown-on-Demand (SDOD) protocol in line with GIIPS, including confirmation of SDOD readiness of wind turbine models to be used[48], SDOD activation parameters and triggers for PBF volant species (including relevant species / risk conditions) based on PBR-informed fatality thresholds and PCFM results, implementation procedures, and adaptive management measures, and regular review and update in response to PCFM outcomes; and
  - Timeframes, roles and responsibilities, reporting, and review and update requirements.

Direct Mortality of Volant Fauna – Collision and Electrocution from OHL

To ensure that the impacts of the Project on bird species are of an acceptable level, the following mitigation measures are proposed:

- Installation of bird flight diverters (BFDs) should be carried out prior to operation across the full length of the Project's OHLs to reduce collision risk, in accordance with best

[47] IFC, European Bank for Reconstruction and Development, and KfW Group. 2023. Post-Construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries. Available at: https://www.ifc.org/en/insights-reports/2023/bird-bat-fatality-monitoring-onshore-wind-energy-facilities

[48] As of the time of writing, wind turbines to be installed for the Project have been confirmed to be capable of blade feathering, thereby allowing for implementation of SDOD if mortality rates exceed thresholds defined in the BBAMP.

international practices.[49, 50, 51] BFDs should be installed on ground wires at 5 m intervals if there is only one ground wire, or alternating at 10 m intervals if there are two parallel ground wires, ensuring continuous visual cues for approaching birds. If the power line does not have ground wires, BFDs should be placed on the conductors. Installation of earthing wire and attached BFDs must be completed immediately after the powerlines are strung or within 1 week of line stringing at the very latest.

- Based on best available practice for the South-East Gobi region of Mongolia (including the OT mine's transmission line as well as the Mongolian Ministry of Energy's Baganuur-Choir 220kV TL and Mangalgobi-Arvaikheer 220kV TL), flapper type devices are not recommended due to their high malfunction rate when deployed in this region.[53, 54, 55]
- BFDs should be sufficiently durable and effective in increasing wire detectability, therefore BFDs to be utilised for the Project must meet the following criteria (in line with EBRD requirements):
  - BFDs supplied by a reputable manufacturer with a minimum of ten (10) years' experience in the production of BFDs. Devices shall be designed for high-voltage systems, be corona-free, and designed to withstand environmental conditions at the most extreme end of those to be experienced in the project context. The manufacturer shall provide weather test data that meet the project-specific requirements.
  - The BFDs must demonstrate proven durability and long-term performance to (i) ensure long-term effectiveness in reducing collisions; (ii) reduce long-term maintenance and replacement costs; and (iii) avoid damage to the wire. The manufacturer should be able to demonstrate a minimum of five (5) years' (preferably ten (10) years') successful deployment on similar high-voltage lines and under harsh environmental conditions similar to the Project's context, with low (e.g., <5%) failure rates over that period.
  - To address low-light conditions, the BFD must incorporate reflective prismatic yellow elements and 24-hour photoluminescent (glow-in-the-dark) materials. LED or other active lighting solutions should not be used to reduce risk of attracting birds.
  - The device must exhibit natural movement or vibration in response to environmental conditions (usually wind) in order to enhance visibility. Designs relying on hinge or

[49] Martín Martín, J., Garrido López, J.R., Clavero Sousa, H. & Barrios, V. (Eds) (2022) Wildlife and power lines: guidelines for preventing and mitigating wildlife mortality associated with electricity distribution networks, 1st ed. IUCN, International Union for Conservation of Nature, Gland, Switzerland.
[50] McGowan, B. (2024) Preventing Avian Collisions: Global best practice & buyers guide (2024). Scientias-Energy, Ireland.
[51] Bernardino, J., Martins, R., Bispo, R. & Moriera, F. (2019) Re-assessing the effectiveness of wire marking to mitigate bird collisions with power lines: A meta-analysis and guidelines for field studies. Journal of Environmental Management 252: 109651.
[53] Dashnyam, B., Purevsuren, Ts., Amarsaikhan, S., Bataa, D., Buuveibaatar, B., and Dutson, G. 2016. Malfunction rates of bird fl ight diverters on powerlines in the Mongolian gobi. Mongolian Journal of Biological Sciences. 14(1-2):13-20.
[54] Mongolian Ministry of Energy. 2023. Baganuur-Choir 220kV Transmission Line Project: Environmental and Social Impact Assessment Report. Available at: https://documents1.worldbank.org/curated/en/099031324195029293/pdf/P17819011fce5400619680174 7bf89fb0b8.pdf
[55] Mongolian Bird Conservation Center prepared for the Ministry of Energy. 2025. Baseline surveys on Bird and Bat for the Proposed Mandalgobi-Arvaikheer 220kV double circuit electricity transmission line. Available at: https://documents1.worldbank.org/curated/en/099051325073540561/pdf/P509161-fcf42494-bc9f-4f91-987b-977689866fd8.pdf

swivel mechanisms that may present mechanical failure risks, as well as fully stationary designs, would not meet these requirements.

- Some suitable BFDs with fluorescent materials and natural motion include FireFly by Hammarprodukter and Hawk Eye by Power Line Sentry. However, consultations with these manufacturers, including on whether they meet the above criteria, must be carried out prior to BFD procurement.

- The OHL must be insulated to avoid bird electrocution. Insulating materials will be installed near supports and conductors on poles to reduce electrocution risk.
- Monthly inspection and maintenance of polymer-coated insulators and BFDs installed on OHL and replacement of defective devices to be carried out throughout the operational life of the Project (20-25 years).
- Ensure power towers and transmission lines meet safety standards (i.e., APLIC) and designed such that electrocution risk is avoided in line with guidance.
- A Bird and Bat Adaptive Management Plan (BBAMP) will need to be developed in alignment with the requirements of IFC PS6 and EBRD ESR6 and informed by the handbook on Post-Construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries[56]. The BBAMP will be specific to managing collision risks to volant species during the operational phase of the Project (including collisions with the Project's OHLs). See previous section for more details on BBAMP content to be covered.

Direct Displacement from Barriers

The following mitigation measures are proposed:

- Wildlife monitoring should be conducted before the start of construction and at the beginning of the operation phase (using the same methodologies, seasonal timings, and sampling effort as the ESIA baseline surveys) to compare the results and assess whether any barrier effects are indeed occurring. If monitoring shows significant displacement of PBF species due to barrier effects, adaptive management should be implemented (which may require additional conservation actions or compensation/offsets).

7.7.5.4 MONITORING AND AUDITING

Construction Phase

Direct Loss of Terrestrial Habitat

- Regular (weekly) checks and progress reporting for Pre-Clearance Protocol and micro-siting activities.
- Regular (weekly) checks during construction are to occur along all construction site boundaries to ensure compliance with clearing within marked boundaries.
- Records of non-compliance and corrective actions are to be kept and regularly reviewed (quarterly) for implementation of all specified mitigations and the workforce training program for fauna/flora awareness.

[56] IFC, European Bank for Reconstruction and Development, and KfW Group. 2023. Post-Construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities in Emerging Market Countries. Available at: https://www.ifc.org/en/insights-reports/2023/bird-bat-fatality-monitoring-onshore-wind-energy-facilities

- Quarterly monitoring of Habitat Rehabilitation Plan, including regular inspections by competent ecologists of rehabilitation success/failure and survival rate of planted species. Implement corrective actions if survival rates fall below a minimum threshold (to be defined in BMP).
- Quarterly monitoring of Plant Rescue and Translocation Protocol, including regular inspections of survival rate of all relocated species by competent ecologists to determine plant establishment. Implement corrective actions if survival rates fall below a minimum threshold (to be defined in BMP).

Indirect Disturbance to or Displacement of Fauna

Weekly checks and monthly progress reporting on implementation of mitigation measures (e.g. wildlife injury protocol), including documentation of non-compliances and corrective actions.

Direct Impacts from Barrier Creation

Visual assessment of barrier creation effect is preliminarily recommended to be conducted quarterly by competent ecologists.

Indirect Degradation of Habitat

- Quarterly monitoring of flora species and vegetation cover in and around the Project area, and fauna sightings. Monitoring details to be outlined in the BMP and re-assessed at the end of the construction phase to determine whether monitoring needs to continue during operation.
- Invasive species monitoring plan for construction and operation phases.

Direct Mortality Impacts from Vehicle Collision, Hunting, and Poaching

Preliminary suggestions include monitoring of mitigation measures to be carried out monthly during the construction phase to ensure compliance, and is subject to change based on the recommendations in the BMP.

Fauna injuries and mortalities from vehicle collision, hunting, poaching, or any other causes to be monitored on a weekly basis during construction phase.

Operation Phase

Direct Mortality of Volant Fauna – Collision with Wind Turbines

Details of long-term bird monitoring surveys during operation, including monitoring frequency and duration, are to be determined and shall be set out in the BMP. It is preliminarily recommended that annual bird monitoring surveys are conducted during periods of heightened bird activity such as breeding season and/or migration periods.

A long-term carcass monitoring programme is to be conducted on a weekly basis at the base of all turbines throughout the operation phase (20-25 years). The monitoring programme should be included and outlined in the BMP. The frequency will be revised based on the observations collected during the first year of operation, which will determine where additional mitigation may be necessary for specific turbines/clusters.

Direct Mortality of Volant Fauna – Collision and Electrocution from OHL

A carcass monitoring programme should be outlined in the BMP to understand the frequency of bird and bat collisions with and electrocution from the OHL. Preliminary suggestions include weekly monitoring for the duration of the operation phase (20-25 years), with a re-evaluation of mitigation measures following the first year of operation if collision frequency is larger than expected. Monitoring details are to be finalized in the BMP and should be designed to account for searcher efficiency and scavenger removal rates.

Direct Displacement from Barriers

Fauna and carcass monitoring programmes for the operation phase should be outlined in the BMP to understand fauna species' abundance, density, diversity, and distribution in the Project area compared to the wider region to evaluate the extent of barrier creation effects, and record frequency of collisions, accidents and fatalities of fauna species with Project infrastructure. The monitoring programme is preliminarily recommended to be conducted quarterly but the duration and frequency should be finalized in the BMP.

7.7.5.5 RESIDUAL IMPACTS

Given the application of all existing controls (as stated in *Section 7.7.4*) and additional mitigation measures (as presented in *Section 7.7.5.3*), the significance of residual impacts for construction and operation phase activities are as follows.

TABLE 7-64: SIGNIFICANCE OF RESIDUAL IMPACTS ON BIODIVERSITY

Impact	Receptor	Significance of Impact	Significance of Residual Impact
Construction Phase			
Direct Loss of Terrestrial Habitat	Habitat	Moderate	Moderate
	Species	Minor	Negligible
Indirect Disturbance to or Displacement of Fauna	Species	Minor	Negligible
Direct Impacts from Barrier Creation	Species	Minor	Negligible
Indirect Degradation of Habitat	Habitats and Species	Negligible to Minor	Negligible
Direct Mortality from Vehicle Collision, Hunting and Poaching	Species	Minor	Negligible
Operation Phase			
Direct Mortality from Collision with Wind Turbines	High Sensitivity Volant Species	Moderate	Minor
	Low and Medium Sensitivity Volant Species	Negligible to Minor	Negligible
Direct Mortality from Collision/ Electrocution from OHL	High Sensitivity Volant Species	Moderate	Minor
	Low and Medium Sensitivity Volant Species	Negligible to Minor	Negligible
Direct Displacement from Barriers	Species	Minor	Negligible

7.7.5.6 NO NET LOSS (NNL) ASSESSMENT

As established in the Biodiversity Impact Assessment and Critical Habitat Assessment, the Project will not affect any critical habitats, therefore 'Net Gain' requirements per IFC PS6 are not applicable for the Project. This assessment identifies the residual impacts on natural habitat (rangelands) and priority biodiversity features (27 species), as well as discusses the NNL requirements pertaining to these biodiversity values.

A Biodiversity Action Plan must be developed for the Project to mitigate residual impacts on natural habitat and PBFs and achieve no net loss of these biodiversity values. The BAP must document all related objectives, management measures, monitoring requirements, implementation arrangements, roles and responsibilities. The BAP should also be developed in consultation with relevant stakeholders such as government entities, external experts, conservation organisations, and affected communities. An initial Framework BAP has been developed for the Project, which should be developed into a full BAP prior to the end of construction.

No Net Loss of Natural Habitat (Rangelands)

Residual impact on natural habitats, after all embedded measures and additional mitigations are implemented, is assessed as moderate (as shown in *Section 7.7.5.5*), due to the extent of permanent, unavoidable loss of 52.81 ha of natural rangeland habitat. Per IFC PS6 paragraph 15, “in areas of natural habitat, mitigation measures will be designed to achieve no net loss”. No net loss (NNL) is defined as “the point at which project-related impacts on biodiversity are balanced by measures taken to avoid and minimize the project’s impacts, to undertake on-site restoration and finally to offset significant residual impacts, if any, on an appropriate geographic scale (e.g., local, landscape-level, national, regional). To achieve no net loss of natural habitats in accordance with IFC PS6 requirements, compensation/offsets (such as off-site restoration) are recommended to address residual impacts of natural habitat areas affected by permanent loss.

Biodiversity offsets are typically required in certain situations to compensate for residual impacts to ecosystems and biodiversity, and only once all other forms of mitigation have been considered. Offsets are therefore normally only considered as the last resort option in the mitigation hierarchy. The trigger for offsets is linked to the significance of residual negative impacts of development on biodiversity: where residual impacts are of high enough relative significance, offsets to compensate for biodiversity loss should be explored. Biodiversity offsets for the Project must be developed in accordance with best international practice, including the Biodiversity Offset Design Handbook (BBOP, 2012)[57].

An Offset Feasibility Study and Biodiversity Offset Management Plan (BOMP) must be developed to identify suitable offset options to achieve NNL outcomes for the Project, including ideally like-for-like offsets that involve restoration/enhancement of rangelands in the Project region with the same or similar habitat characteristics and species assemblages. Initial comments from IFC indicate that there are sections of abandoned roads belonging to the Oyu Tolgoi Mine that could be rehabilitated to support the Project’s no net loss commitments. However, as of the time of writing, information is unavailable on the total area and location of roads that could potentially be rehabilitated; therefore, further consultation with Oyu Tolgoi Mine to be undertaken for the Offset Feasibility Study and BOMP is necessary to determine the scope and feasibility of this approach.

It should also be noted that rangeland rehabilitation as a like-for-like offset may not be able to compensate for the entirety of residual impacts on natural habitat, given traditional nomadic practices, livestock overgrazing, and increasing infrastructure development in the region, as well as experiences from nearby projects (e.g. the Oyu Tolgoi Mine’s challenges with rangeland rehabilitation as documented in its monitoring reports). Therefore, the Offset Feasibility Study and BOMP should clearly document all possible offsetting approaches, constraints, and selected options based on demonstrable, quantified targets and feasibility analysis.

There may be key opportunities for the Project to assist with financing or supporting existing conservation projects and programmes that are already well-rooted in the region and focusing on rangeland rehabilitation and conservation of species of conservation significance, as a form of biodiversity offset mitigation. Some examples include the UNDP and Ministry of Environment

[57] BBOP (2012). “Guidance Notes to the Standard on Biodiversity Offsets.” Washington, D.C.: Business and Biodiversity Offsets Programme (BBOP). Online at: https://www.forest-trends.org/publications/standard on-biodiversity-offsets/

and Climate Change's Ensuring Sustainability and Resilience (ENSURE) of Green Landscapes in Mongolia project, Wildlife Conservation Society's (WCS) regional conservation projects (focused on steppe ecosystem protection and landscape connectivity enhancement for threatened species), Goviin Khulan community-based conservation initiatives in the southeastern Gobi desert to protect the Asiatic Wild Ass and other key Gobi species, etc. There are also opportunities to collaborate with the Oyu Tolgoi Mine project on existing initiatives, such as rangeland rehabilitation through native species planting, wildlife monitoring, contribution to the Gobi seed bank, etc., in conjunction with their partners (e.g. NGOs such as the WCS).

No net loss commitments, strategy, and preliminarily identified actions for natural habitats is provided in the Framework BAP, which should be used to inform the development of a full BAP along with a Biodiversity Offset Feasibility Study and Biodiversity Offset Management Plan (BOMP).

No Net Loss of Priority Biodiversity Features

Significance of residual impacts on PBF species are expected to be Negligible to Minor, taking into account additional mitigation measures recommended. The No Net Loss assessment for each category of PBFs (grouped by taxa and similar impacts from Project) is presented in *Table 7-65*.

TABLE 7-65: NO NET LOSS ASSESSMENT FOR PRIORITY BIODIVERSITY FEATURES

PBF	Significance of Residual Impact	No Net Loss Assessment
Flora - *Amygdalus mongolica*	*Amygdalus mongolica* is considered a medium sensitivity species due to its legal protection status. Impact on this species is primarily related to vegetation clearance, land preparation, and construction activities, with the magnitude of impact considered small as only a small proportion of its global population will be affected. Therefore, the impact significance is minor, and the significance of residual impact after considering additional mitigations (including the development and implementation of a Priority Plant Conservation Plan) is considered negligible, assuming proper implementation of all mitigations.	No net loss for this PBF flora species will be achieved through the development and implementation of the Priority Plant Conservation Plan (PPCP) by qualified flora experts with regional experience, which is detailed in *Section 7.7.5.3*. This Plan will support quantification of Project impacts on this species through the conduct of pre-construction surveys, which will record the total number of individuals of *A. mongolica* present in areas with planned construction works and Project facilities. These surveys should inform the presence of *A. mongolica* and the Project's micro-siting strategy to revise the layout and locations of infrastructure to prioritise avoidance of this species, in line with the mitigation hierarchy. Where avoidance is possible and individuals will be retained on-site, this will be managed through clear demarcation of exclusion buffers, access restrictions, and monitoring for survival rate throughout the construction phase. If monitoring or ecological supervision identifies any sign that avoidance controls are not working as intended, corrective actions to be developed as part of the PPCP will be implemented. Where individuals cannot be retained, they will be translocated to a suitable nearby habitat and monitored for long-term survival. Where translocation is not possible or retained/translocated individuals do not survive, corrective actions and additional conservation measures (e.g. compensatory planting) will be required to maintain no net loss. Any additional flora species of conservation significance identified during pre-construction surveys that meet the criteria as a PBF under EBRD ESR6 will also be managed using this no net loss approach.
Volant Species	The main Project interaction pathway for volant species (birds and bats) is collision with WTGs and OHL infrastructure during the operation phase. Significance of residual impact, after all embedded and additional mitigations are fully implemented (including BBAMP, PCFM, SDOD Protocol, and installation of BFDs), is assessed to be minor for high sensitivity species and negligible for low and medium sensitivity species.	The No Net Loss approach for PBF volant species (including 56 birds and 1 bat) focuses on the residual risks that may remain after implementation of recommended mitigations, mainly in relation to collision risk with operating wind turbines and OHL infrastructure. Results of the CRM and PBR-based fatality thresholds (as summarised in *Section 7.7.2*) will be used, in conjunction with PCFM results, to inform operational mitigations, adaptive management measures and SDOD protocol activation. Given that CRM results and PBR analysis already shows exceedance of species-specific fatality thresholds for Saker Falcon (*Falco cherrug*), Cinereous Vulture (*Aegypius monachus*), and Upland Buzzard (*Buteo hemilasius*), compensation/offsets will be required to achieve no net loss for these PBFs. Initial comments provided by IFC, EBRD and ADB indicate that, given the typical high costs of implementing SDOD, additional conservation/compensation actions in the form of retrofitting existing nearby overhead transmission lines that durable, effective BFDs should be carried to offset potential mortality exceedances. Given the CRM results show very low level of WTG collisions, retrofitting existing powerlines may represent a more cost-effective

PBF	Significance of Residual Impact	No Net Loss Assessment
		for small numbers of fatalities, compared to avoidance of collisions through costly SDOD activation. Overall, confirmation of the final PBR-based fatality thresholds, PCFM programme, SDOD protocol, and compensation measures should be prepared as part of the BBAMP and BOMP. The selected suite of actions will define measurable objectives, responsibilities, timing and sequencing of actions, budget and monitoring requirements, and will be agreed with relevant authorities, specialists and lenders, as applicable. This no net loss approach should be reviewed and updated as applicable based on monitoring results, incident records, specialist recommendations, lender requirements, or any change in Project design or operation that may affect these species.
Non-volant Mammals	Impacts on PBF land mammals, including the Asiatic Wild Ass (*Equus hemionus*), Goitered Gazelle (*Gazella subgutturosa*), Mongolian Gazelle (*Procapra gutturosa*), and Argali (*Ovis ammon*), are mainly associated with loss of natural habitat, temporary disturbance during construction, injury/mortality from vehicle collision, and displacement due to barrier creation. Significance of residual impacts after all embedded and additional mitigation and monitoring measures are expected to be negligible.	No net loss for these PBF species will be carried out through monitoring, operational adaptive management and additional conservation or compensation actions where residual impacts remain. Monitoring surveys targeting these species should be conducted before the start of construction and at the beginning of the operation phase to compare the results and assess the level of impact on these species' abundance and distribution arising from barrier creation. If monitoring shows significant displacement of PBF species due to barrier effects, adaptive management should be implemented, which may require additional conservation or compensation actions.

7.8 SUMMARY OF ENVIRONMENTAL IMPACTS

Following a scoping exercise, this Chapter was focus on the interaction between Project activities and various resources/receptors that could result in significant impacts. *Table 7-66* and *Table 7-67* below presents the outcomes of the comprehensive assessment of identified impacts as a result of the various phases of the proposed Project and summarise the impacts.

TABLE 7-66: SUMMARY OF ENVIRONMENTAL IMPACTS

Aspect	Significance of Impact	Significance of Residual Impact
Impact on Air Quality		

• Construction Phase
  • Fugitive Dust Emissions
  • Vehicular Exhaust Emissions
	Negligible to Moderate	Minor

	Negligible	Negligible
Impact on Climate Change (Refer to specific climate hazards in *Section 7.2*)		
Impact on Noise		

• Construction Phase
  • Typical Construction Noise
  • Construction Traffic Noise
	Minor	Negligible

• Operation Phase
  • Wind Turbine, BESS and Substation Noise
  • Operational Traffic Noise
	Negligible	Negligible

Impact on Soil		
• Construction Phase • Potential Impact to Soil	Minor	Minor
Impact on Water Resources		

• Construction Phase
  • Potential Impact due to Water Resources Competition
  • Potential Impact on Water Quality
	Negligible	Negligible

	Moderate	Negligible
• Operation Phase • Potential Impact due to Water Resource Competition and on Water Quality from Operation Activities	Negligible	Negligible

TABLE 7-67: SUMMARY OF BIODIVERSITY IMPACTS

Impact	Receptor	Significance of Impact	Significance of Residual Impact
Construction Phase			
Direct Loss of Terrestrial Habitat	Habitat	Moderate	Moderate
	Species	Minor	Negligible
Indirect Disturbance to or Displacement of Fauna	Species	Minor	Negligible
Direct Impacts from Barrier Creation	Species	Minor	Negligible
Indirect Degradation of Habitat	Habitats and Species	Negligible to Minor	Negligible
Direct Mortality from Vehicle Collision, Hunting and Poaching	Species	Minor	Negligible
Operation Phase			
Direct Mortality from Collision with Wind Turbines	High Sensitivity Volant Species	Moderate	Minor
	Low and Medium Sensitivity Volant Species	Negligible to Minor	Negligible
Direct Mortality from Collision/ Electrocution from OHL	High Sensitivity Volant Species	Moderate	Minor
	Low and Medium Sensitivity Volant Species	Negligible to Minor	Negligible
Direct Displacement from Barriers	Species	Minor	Negligible

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ERM-Hong Kong, Limited
2507 One Harbourfront
18 Tak Fung Street
Hong Kong
T: +852 2271 3000
F: +852 3015 8052

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