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Biodiversity Management Plan

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Khorzem Solar 100MW | Uzbekistan

voltalia

Record of Issue

Company	Client Contact	Version	Date Issued	Method of Delivery

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Acronyms and Abbreviations

2(VU:D)	Vulnerable, Declining
2(VU:R)	Vulnerable, naturally rare
2(VU:R)	Vulnerable, Rare
BIO	Biodiversity
BMP	Biodiversity Management Plan
CH	Critical Habitat
CR	Critically Endangered
DD	Data Deficient
EBRD	European Bank for Reconstruction and Development
EHS	Environmental, Health and Safety
EPC	Engineering, Procurement and Construction
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management System
GIIP	Good International Industry Practice
IAS	Invasive Alien Species
IASMP	Invasive Species Management Plan
IBA	Important Bird Area
ID	Identification code
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
KPI	Key Performance Indicator
LC	Least Concern
Lit.	Literature
LSA	Local Study Area
MP	Management Plan
MW	Megawatt
NEGU	JSC National Electric Grid of Uzbekistan
NGO	Non-governmental Organization
NT	Near Threatened
Obs.	Observed
OTL	Overhead Transmission Line
PBF	Priority Biodiversity Features
PPA	Power Purchase Agreement
PPP	Public-Private Partnership
PR	EBRD Performance Requirements
Project	Khorazm Solar Project
PS	IFC Performance Standards
PV	Photovoltaic
Ruz	Republic of Uzbekistan
SPPP	Solar Photovoltaic Power Plant
VU	Vulnerable
WBG	World Bank Group

1.0 INTRODUCTION

This document is the Biodiversity Management Plan (BMP) for the Khorazm Solar PV Project (the Project). This BMP sets out the requirements for the management of environmental, community and occupational health and safety particularly concerning biodiversity (BIO) management during the implementation of the Project.

The Project consists in the development of a 100 MW solar photovoltaic power plant covering an area of 177 hectares and associated 3.2 km overhead transmission line for connection to the existing Sarimay substation. The Project is located in the Tuprokkala district in the Khorazm region of Uzbekistan (Figure 1), 120km south-east of Urgench city, close to the border with Turkmenistan and near the Amu-Darya River. This project is being implemented as part of a Public-Private Partnership (PPP) between the Government of the Republic of Uzbekistan represented by the Ministry of Energy, and FE LLC Sarimay Solar, an entity created by Voltalia S.A. in Uzbekistan for the purpose of this Project.

This Plan has been developed according to the Uzbek regulatory framework, International Finance Corporation (IFC) Performance Standards (PSs), EBRD Performance Requirements (PRs) and World Bank Group (WBG) General Environmental, Health and Safety (EHS) Guidelines.

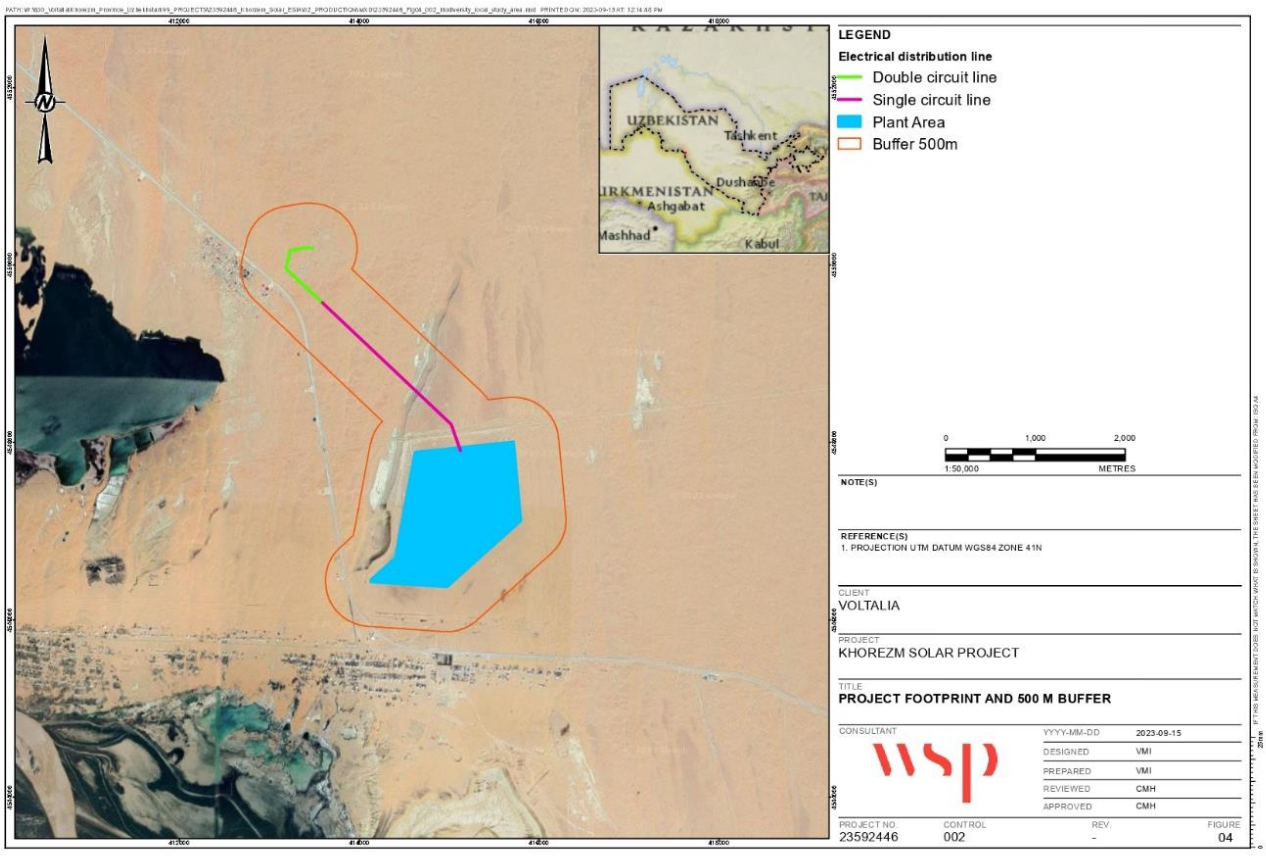


Figure 1: Local Study Area (designed as a 500 m buffer around the Project Site and associated facilities) and Project Footprint.

1.1 Purpose and Scope

The main objective of this document is to develop and implement policies, plans and procedures to integrate biodiversity aspects within the overall project management framework throughout the Project lifecycle.

This BMP applies to both construction and operation phase and provides guidelines to the Engineering Procurement and Construction (EPC) contractor to address biodiversity aspects according to the standards mentioned above (Uzbek regulatory framework, IFC PSs, EBRD PRs and WBG General EHS Guidelines).

The Purpose of this Plan is to define, in relation to BIO aspects of the Project:

- Project standards during the construction and operation phase;
- responsibilities, commitments, operating procedures and instructions for the implementation of this MP;
- the mitigation measures applicable to the Project; and
- guidelines for the monitoring activities and their performance management.

This MP applies to normal operating conditions during the construction and operation activities and does not specifically address any emergency situation. Emergencies are addressed in the Emergency Preparedness and Response Plan (EPRP).

The overall objective of this MP is to identify the adequate mitigation and monitoring measures in order to:

- adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize and restore impacts to the environment;
- develop and implement policies, plans and procedures to integrate environmental and social aspects within the overall project management framework throughout its lifecycle;
- establish a monitoring program to assess the effects of residual impacts on the environment;
- report the results of the periodic audits and provide for corrective actions, if necessary, in order to reach the planned objectives.

Achieving these objectives requires that the mitigation hierarchy is exercised to ensure Project-related impacts are managed through taking appropriate avoidance, minimization and restoration measures before biodiversity offsets are considered to compensate for significant residual impacts.

The overall goal shall be to ensure that:

- Impacts on fauna and flora species as a result of construction and O&M activities are minimised;
- No Net Loss and preferably a Net Gain for Natural Habitats, whenever possible;
- Ecological processes are maintained and are not disrupted.

Since no species triggering Critical Habitat (CH) were identified and no CH is expected to be present in the LSA, Net Gain for CH has not been considered for this Project.

Changes in the Project description, including location of temporary facilities are expected to come in due course; it is therefore recommended that this plan is systematically reviewed during construction

phase, before the starting of operation and whenever a considerable change in the Project occurs, in order to encompass any information relevant to biodiversity matters.

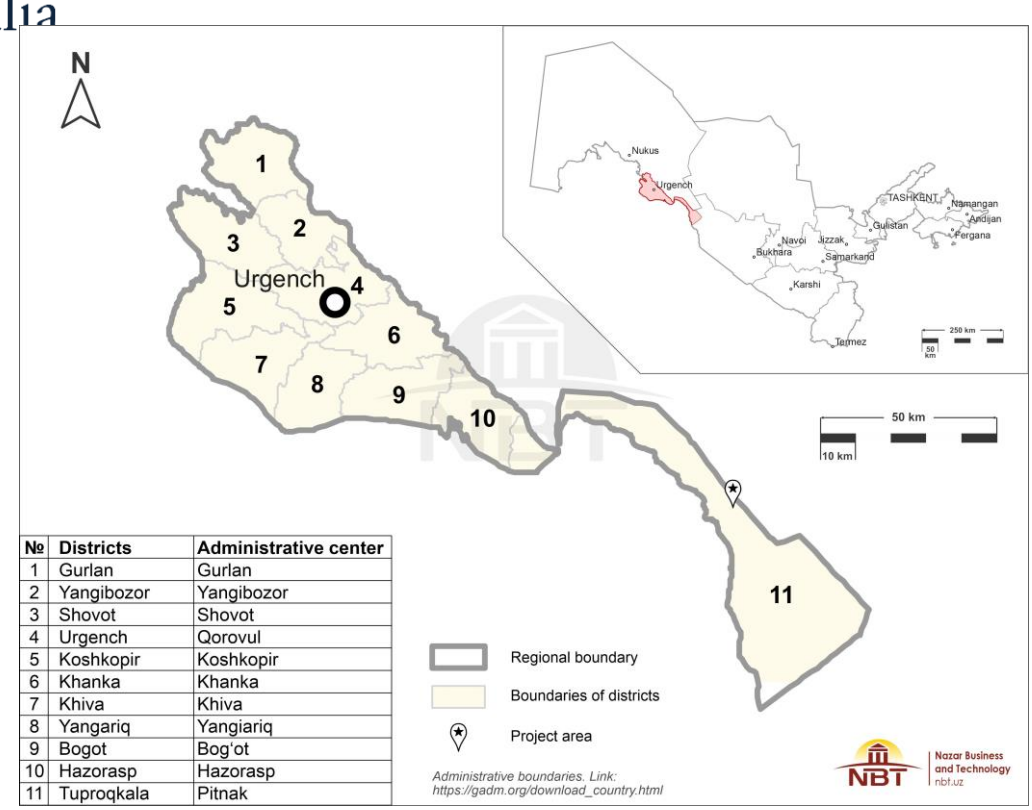
1.2 Project Overview

The Khorazm Solar PV Project (the Project) consists in the development of a 100 MW solar photovoltaic power plant, and associated 3.2 km overhead transmission line, in the Tuprokkala district in the Khorazm region of Uzbekistan. This project is being implemented as part of a Public-Private Partnership (PPP) between the Government of the Republic of Uzbekistan represented by the Ministry of Energy, and FE LLC Sarimay Solar, an entity created in Uzbekistan by Voltalia S.A. for the purpose of this Project.

The Ministry of Energy of the Republic of Uzbekistan, working as the Project Proponent, performed a bidding process in 2021 for the selection of the Project Developer, after which, Voltalia S.A. was selected. Voltalia is operating in Uzbekistan through the investor company FE LLC Sarimay Solar. Voltalia is a company incorporated and operating under the laws of France and an international energy producer which specializes in renewable energy solutions and produces and sells electricity from wind, solar, hydraulic and biomass energies. Voltalia is also a service provider and supports renewable energy customers in all phases, from design to operation and maintenance, of their projects. Its service offerings include project development, project financing, engineering services, procurement and construction.

The development and design of the final technical solution and selection of components will be completed by the successful Engineering, Procurement and Construction (EPC) bidder who will develop the project under a design, build, finance, operate, maintain and transfer model.

The Khorazm Solar PV Project covers approximately 177 ha which will be utilized entirely for the construction and installation of the solar photovoltaic power plant. The PV plant area stands at a height ranging between 158 m asl and 185 m asl on a gently sloping surface from North to South and from North-West to South-East. The Project will be located 120 km south-east of Urgench city, in the Khorazm Province (Tuprokkala District) close to the border with Turkmenistan and near the Amu-Darya River (Figure 2).



№	Districts	Administrative center
1	Gurlan	Gurlan
2	Yangibozor	Yangibozor
3	Shovot	Shovot
4	Urgench	Qorovul
5	Koshkopir	Koshkopir
6	Khanka	Khanka
7	Khiva	Khiva
8	Yangariq	Yangiariq
9	Bogot	Bog'ot
10	Hazorasp	Hazorasp
11	Tuproqkala	Pitnak

Figure 2: Project Region. Source: NBT, 2023.

The project area is located in the Kyzylkum desert within a trans-zonal sandy-alluvial surface which was formed by the former riverbed of the Amu-Darya river. The Amu-Darya river is one of the biggest rivers in Central Asia and its current riverbed is at a distance of 1.67 km south-west from the Project area. The closer lake is a filling lake which is at a distance of 2.4 km north-west of the Project. The Project site is characterized by landscapes of ridge-cellular, cellular and hummocky eolian sands and small remnant hills with white scythes, *Calligonum* and saltwort-sagebrush vegetation. The vegetation includes native plant communities typical for natural sandy and stony habitats of the desert Kyzylkum, highly adapted to extreme conditions, presenting small or no leaves.

The closest protected area is the Khorazm National Natural Park, established in 2019 for the conservation of the natural vegetation and wildlife associated with the Amu-Darya river delta. The National Park is located at 1.6 km from the Project area beyond the settlement of Sarimay. At 6 km from the Project site there is also the Gorelde KBA and IBA which hosts around 160 bird species (29% of the avifauna of Central Asia).

In close proximity to the Project area, there is the A-380 highway (at a distance of 120 meters from the south-west corner of the footprint at the closest point) which has a high daily load of vehicles and flanks the Project site from the south to north-west. Along the A-380 road, there is a gas pipeline with a gas distribution station at a distance of 400 to 600 meters from the Project area which, together with this road, contributes to the atmospheric pollution.

In the Project area, at 180-200 meters on the north side, a centralized main water pipeline can be found (Figure 3). This is the Sarimay/Amudarya-Zeravshan water supply pipeline and belongs to Navoi Mining and Metallurgical Combinate (NMMC).

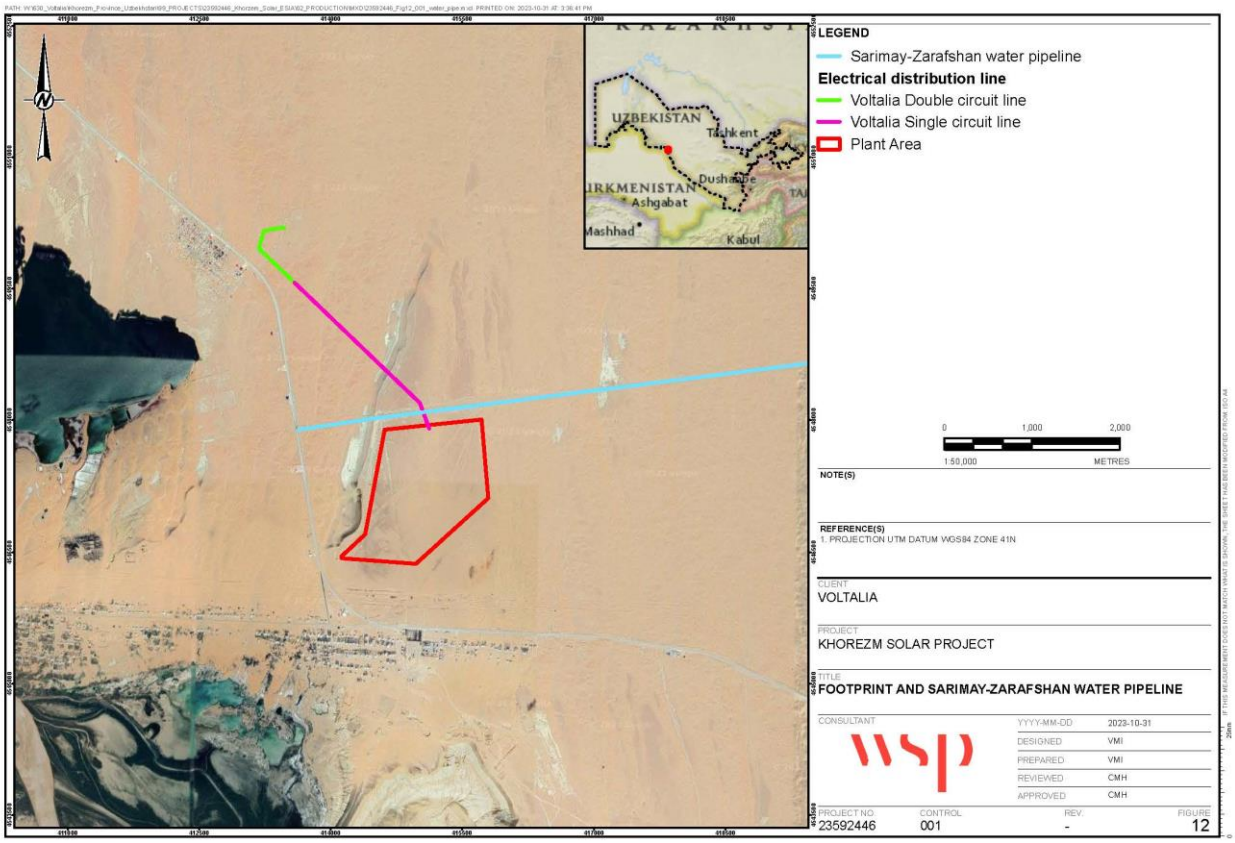


Figure 3: Project footprint and an existing water pipeline running north of the site.

The Sarimay Switching Station (SS) can be found at 3 km north-east of the Project site. The projected OTL will run parallel to the Project site at about 130 from the PV plant and will reach a distance of 30 m in the closest point near the Sarimay power station (Figure 4). The PV plant under construction will be connected to existing OTL with the designed power transmission line that will cover a total length of 3.3 km.

In the proximity of the Project area, there are six existing high-voltage transmission lines, shown in Figure 4 below, including the transmission line connecting the Sarimay Switching Station to the Zarafshan Substation. The latter transmission line has a 72 m height and a capacity of 220/110 kV. The new transmission line for the Project will be built along the abovementioned transmission line and will run parallel to it throughout its entire trajectory. The existing transmission lines are found running south and west to the project footprint and are shown in the map below. It should be noted that a further seven transmission lines are planned, within a 5 km from the Project footprint, and are expected to be built between the years 2024-2030. Additional information on the future developments can be found in Chapter 9 of this ESIA (Cumulative Impact Assessment).

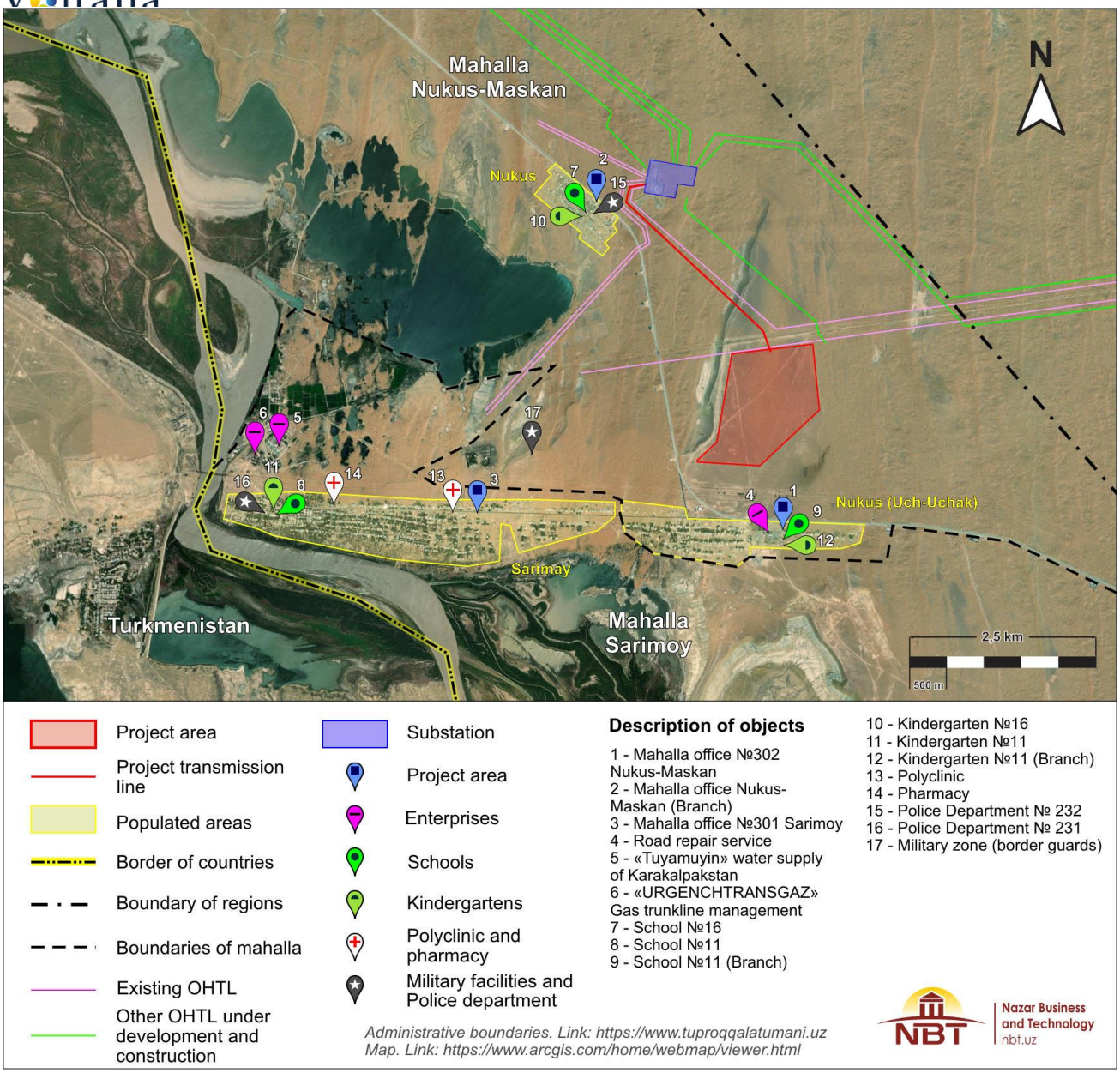


Figure 4: Project footprint (red) and surroundings. Source: NBT, 2023.

The two nearest settlements are the two villages of Sarimay and Nukus (Figure 5). The nearest residential buildings of the Sarimay village are located at 730 m from the Project site south of the A-380 motorway, while Nukus village is located north-west at a distance of 300 m. Between the Nukus village and the Project site runs the A-380 road, which increases the perceived distance.

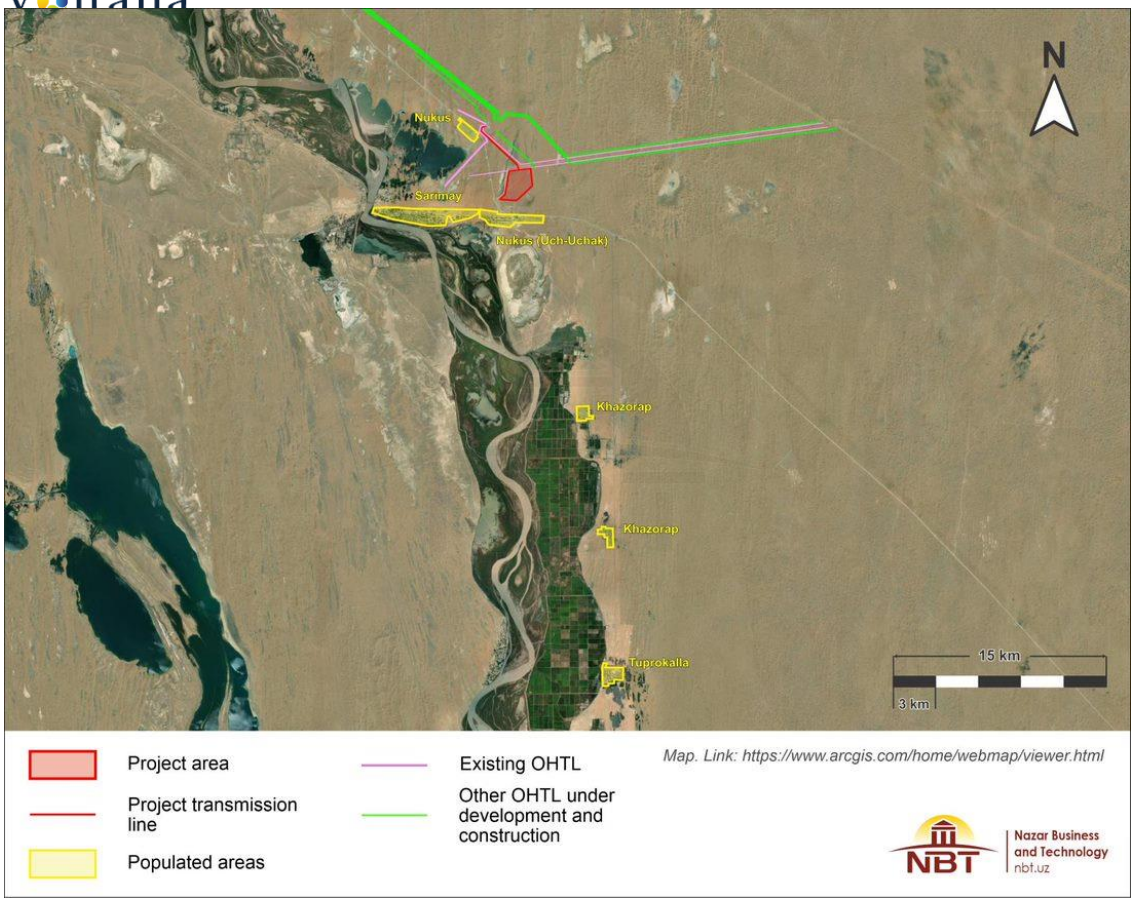


Figure 5: Project Footprint and nearest settlements. Source: NBT.

The Khorazm region of the Republic of Uzbekistan is home to several historical and archaeological monuments associated with the Khorazm civilization. The cultural heritage sites closest to the project area are the ancient mound complex "Uch - Uchok" which is located at 4.7 km and the ancient Caravan-serai – "Tosh-kala" at 7.46 km.

The estimated total workforce, for a solar PV plant of this size, required during the peak construction period is estimated to be between 200-250 workers, including technicians and low-skilled personnel. The workforce during operation is limited and expected to be around 20 and will include skilled technicians, security guards, and support staff. Information on distribution by skills and employment of workers is still currently missing due to the early stage of the Project. Any necessary integration will be carried out at a later stage of the Project, if required.

The Project, to the extent possible, will supply its workforce from local communities (i.e. communities within the municipalities where the Project is located) since multiple tasks such as cable laying, security, cleaning, etc. would allow employment of local workforce. In order to achieve it, contractors will be contractually required to maximise use of local workforce in the Project. Local workforce will be sourced in the surrounding areas to the extent the skills and qualifications needed are available, and otherwise in other regions of Uzbekistan.

Project works are planned to be conducted in one shift per day consisting of eight hours which could be developed during daytime or nighttime in the hot summer period. If needed, additional overtime could be planned to address technical requirements during the construction stage. In compliance with local law, the additional overtime could be a maximum of four hours and it will be remunerated at 1.5 times the normal rate.

Initial activities, including site preparation, will entail the following activities, which can occur simultaneously in different areas:

- Site works preparation and accommodation;
- Implementation of site security;
- Site works supervision;
- Unloading/loading equipment;
- Fencing of the Project site;
- Mobilization of vehicles, workers and equipment, materials transportation;
- Vegetation clearing and land stripping;
- Earthworks (excavations, landfill, surface levelling/grading);
- Adaptation of existing roads and implementation of temporary construction roads;
- Installation of lifting cranes and warehouses for storage of delivered power equipment and building materials;
- Excavation of trenches for the laying of cables;
- Construction of the Project drainage system;
- Construction of the water supply network and hydraulic infrastructure;
- Construction/Installation of the panel foundations;
- Construction of electrical substation and its foundations;
- Construction of support facilities (Administrative and household building, warehouse, gatehouse);
- Construction of temporary housing (container-type constructions trailers, campsites) for builders and maintenance services;
- Construction of lighting system (road, solar power plant);
- Concrete pouring under the foundation of buildings and structures;
- Installation of supporting structures;
- Installation of fasteners for solar modules installation;
- Installation of solar modules and inverters.
- Installation of electrical infrastructure and power supply;
- Construction/Installation of the transmission line towers foundations;
- Installation of the solar panels and electric equipment;
- Installation of the transmission line towers and facilities;
- Performance tests
- Building of sewage septic tank and firefighting water tank;
- Site clean-up and demobilization activities;

At the time of writing this report, full information on construction was not available; further integrations will be made during the EPC stage.

There is an extensive network of roads available in the area where the Project will be implemented, including asphalt roads with a transition to unpaved roads in good conditions and with an average width of 4.5 m. Delivery of external cargo and equipment and access to the site will employ such existing roads, mainly the existing A-380 highway. Some of the existing roads will be upgraded for the use of the Project.

The operation of the proposed solar PV plant will last for 25 years and during this period modules will need to be cleaned periodically depending on soiling and sand/silt accumulation. During the operational phase, a preventative maintenance program will be established for maintenance of the inverters, mounting structures, surge arresters, cables and PV junction boxes, meteorological station, security, fencing and gates, ditches and drainage culverts as well as all sub-station components including services and septic tank.

Scheduled regular maintenance to ensure proper functioning of the Khorazm Solar PV Project will be carried out by JSC National Electric Grid of Uzbekistan (NEGU) and will be implemented in compliance to the national legislative requirements stipulated in by-laws or technical standards for operation and maintenance of electrical and power generation systems. Maintenance activities could include line inspection, PV panels cleaning, tower painting, future upgrading, etc. NEGU will be responsible for vegetation growth control below the line if necessary and will control future land use close to the line. Vegetation control will be carried out favouring the use of manual removal or mechanized cutting and herbicides are banned.

Maintenance works will include visual inspections, routine annual maintenance works and overhauls (detailed examination and elimination of eventual faults). Visual inspection would be conducted twice a year and may be followed by certain actions in individual sections and/or on towers, such as replacement of insulators, bridges, strengthening of tension ropes, repair/replacement of tower lattices, etc. Four-wheel drive vehicles and small trucks would be used for that purpose. Overhauls may be done once in three to five years and would physical inspection of each tower and removal of all registered faults and electrical equipment (short circuits, ground faults, ground wire damages, etc.). These may require use of tracks and heavy tractors.

On the other hand, the OTL will be designed for continued operability (24 hours per day, 7 days per week) depending on the regime and parameters of the national and regional power transmission grid. From the beginning of the operations, the transmission line will work without the continuous presence of personnel.

Maintenance of the OTL would require access by a range of vehicles of varying size. These vehicles would use the public road system and those access tracks which are retained for permanent use following completion of construction. Operational traffic would be very light and no significant traffic related effects are predicted on any part of the public road system.

During operations, the use of heavy machinery is expected to be sporadic, in the case of maintenance activities that might be necessary. In that case, noise and vibrations is considered to be negligible. A more in-depth assessment will be possible when further information on the vehicles to be used during this stage is provided.

However, solar facilities can cause noise pollution due to the presence of noise-generating equipment, mainly the inverters. The conversion of direct current (DC) to alternating-current (AC) in order to distribute the electricity to the grid, generally produces considerable noise, which is similar to a tonal

humming-like sound. In addition, movements in other mechanical components in the inverter and transformer, like coil vibrations and high-speed cooling fans, contribute to the body and level of noise.

It is expected the inverters to be silent during the night, when no power is being produced, however during the day, the noise could reach intolerable levels for a person nearby, in case no mitigation measures are applied. The location of inverters will be considered to minimize noise pollution and mitigations measures will be applied when necessary.

Key Environment and Social (E&S) issues associated with solar power projects include loss of habitat, avian collision risks against the transmission line, impacts on neighboring communities including visual impacts, glare, noise and dust generation, as well as impacts related to increased water consumption, soil erosion, vibrations, waste generation and sewage generation.

The ESIA process initiated with the completion of the desktop review of technical documentation provided by Voltalia, including, among other:

- Scoping Report[1];
- Preliminary Infrastructure Assessment[2];
- Preliminary SPPP and grid connection documentation[3];
- Preliminary layout[4];
- Geology and seismic studies[5,6];
- Land access documentation and letters[7,8,9,10,11].

Eventually, EPC bidding documentation was also received and integrated by August 2023. For a full list of documents received, please refer to APPENDIX 1.1 “Document register”.

WSP then proceeded to develop baseline biodiversity (spring and autumn 2023) field studies throughout 2023, and an additional community consultation and engagement session in June 2023. During the development of the physical studies, a potential plume of contamination was identified at the southeastern corner of the selected site, leading to a readjustment of the proposed Solar Photovoltaic Power Plant (SPPP) site, from a 233 hectare to 177-hectare area. A Environmental Impact Assessments (EIA) compliant with local legislation was then produced to obtain the required local environmental permit. Following this, further integrations were carried out (critical habitat assessment, cumulative impact assessment, climate change risk assessment, among others), to produce the document at hand, which consists in the ESIA Report for the project, developed to meet lenders requirements.

[1] Technical, Environmental and Social Consultant Khorazm Environmental & Social Scoping Report. Dated March 2022.

[2] Technical, Environmental and Social Consultant Khorazm PV Site Infrastructure Assessment Report. Dated November 2021.

[3] Voltalia, Khorazm Project – PV Plant Technical Description.

[4] Voltalia, Khorazm Project – General Implantation Plan Layout. Dated October 2022 and last updated in June 2023.

[5] Technical, Environmental and Social Consultant Khorazm Geotechnical Investigations Report. Dated April 2021.

[6] Technical, Environmental and Social Consultant Khorazm Seismic Conditions Report. Dated October 2021.

[7] Power Purchase Agreement (PPA), April 2023.

[8] Khokimiyat of Khorazm region of the Republic of Uzbekistan – Site access authorization letter (April 2023).

[9] Letter from Uztransgaz to the Ministry of Energy of the Republic of Uzbekistan (Tashkent, July 2021).

[10] Letter from the Ministry of Water Resources of the Republic of Uzbekistan to the Ministry of Energy of the Republic of Uzbekistan (Tashkent, July 2021).

[11] Letter from the Ministry of Development of Informational Technologies and Communications of the Republic of Uzbekistan to the Ministry of Energy of the Republic of Uzbekistan (Tashkent, July 2021).

2.0 REFERENCE & LEGAL REQUIREMENTS

This section includes policies, standards, and requirements of reference for this Plan that are applicable for, but not limited to, construction, operation, and decommissioning phases of the Project.

Project standards are described in the Project ESIA (see section 02) and are listed below:

- National legislative requirements and all permits, licenses, and approvals;
- IFC Performance Standards;
- EBRD Performance Requirements;
- World Bank Group EHS Guidelines;
- Other good international industry practices (GIIP);
- International conventions and protocols Uzbekistan is a party to; and
- Voltalia's policies, related practices, and procedures.

The Project is expected to achieve whichever is more stringent amongst these. The relevant international standards shall be also directly applicable in the absence of applicable Uzbek standards.

2.1 National Requirements

Uzbekistan has enacted the following natural resources and environmental management laws:

- The law "On Nature Protection" (1992, amended in 2021);
- Land Code of the RUz (1998);
- Law "On Protection of Flora" (1997, amended in 2016);
- Law "On Protection and Use of the Wildlife" (2016);
- the Law "On State Environmental Expertise" (2020);
- The Red Data Book of Uzbekistan (2021);
- BR&N No 2.01.08-96 – Noise protection;

2.2 International Standards

The Project is required to meet requirements of international lending financing institutions, specifically:

i) The International Finance Corporation (IFC) Performance Standards (PS) 2012 and relevant Guidance Notes, in particular:

   a. IFC PS6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources;

   b. IFC Guidance Notes 6 – Biodiversity Conservation and Sustainable Management of Living Natural Resources (2019);

ii) EBRD Performance Requirements (PR) (2019): and relevant guidance Notes, in particular:

   a. EBRD PR 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

iii) World Bank Group Environment, Health and Safety (EHS) Guidelines (General and Industry Sector):

   a. General EHS Guidelines (April 2007) which cover four areas of GIIP: Environmental; Occupational health & safety (OHS); Community health & safety (CHS); Construction and decommissioning;

iv) EHS Guidelines for Electric Power Transmission and Distribution (April 2007);

v) International conventions and agreements for the protection and conservation of the environment including:

   a. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

   b. Vienna Convention for the Protection of the Ozone Layer and The Montreal Protocol on Substances that Deplete the Ozone Layer

   c. Stockholm Convention on Persistent Organic Pollutants;

   d. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);

   e. Convention on Biological Diversity (CBD);

   f. Convention on the Conservation of Migratory Species;

   g. World Heritage Convention;

   h. Kyoto Protocol;

   i. Ramsar Convention on Wetlands of International Importance Especially as Wildlife Habitat;

   j. United Nations Convention to Combat Desertification (UNCCD);

   k. United Nations Framework Convention on Climate Change (UNFCCC);

   l. International Labour Organization (ILO) Conventions;

vi) Good International Industry Practice (GIIP).

3.0 OVERVIEW OF BIODIVERSITY BASELINE CONDITIONS

This chapter presents an overview of the baseline conditions, including the results of field studies conducted during the EIA and ESIA phase in 2023. Specifically, the document includes baseline information regarding the following components:

- Legally protected and internationally recognized areas,
- Natural and modified habitats;
- Flora Species;
- Fauna Species (reptile, bird and mammal species); and
- Invasive alien species.

The methodology and results of the field studies, as well as the overall baseline results and Critical Habitat Assessment are presented in detail within the biodiversity Baseline Report (Chapter 6B - ESIA Report).

3.1 Study Area

For the assessment of the biodiversity components, two types of study areas were identified in the baseline studies present in Section 6B of the ESIA for the Khorazm Solar PV Project. A wider Regional Study Area (RSA) was identified comprehending a terrestrial RSA and a freshwater RSA, based on bio-geographic characteristics (described in chapter 6.3.1 "Landscape overview" in Section 6B of the ESIA) within a 20 km buffer from the Project Area:

- the terrestrial RSA consists of two terrestrial ecoregions, the first is the "Central Asian Riparian Woodlands (818)" ecoregion that includes the Project Area and the "Central Asian Southern Desert (819)" ecoregion, less than 3 km away from the Project Area;
- the freshwater RSA also comprises two ecoregions, the "630 – Middle Amu Darya" freshwater ecoregion that includes the Project Area and the "629 - Aral Sea Drainages" freshwater ecoregion, less than 3 km away from the Project Area.

While a Local Study Area (LSA) was identified for more focused information regarding the detailed field surveys.

The biodiversity Local Study Area (LSA) is included in the wider RSA and was identified to include all Project components (solar power plant construction site of 177 hectares and 3,2 km of transmission line), including associated facilities, both permanent and temporary, and the area beyond which no detectable effects on biodiversity are expected. Since there are no clear physical boundaries, the LSA (illustrated in Figure 6 below), was designed as a 500 m buffer, around the Project Area and around the related associated facilities. This buffer is considered as the limits beyond which no detectable effects on biodiversity are expected.

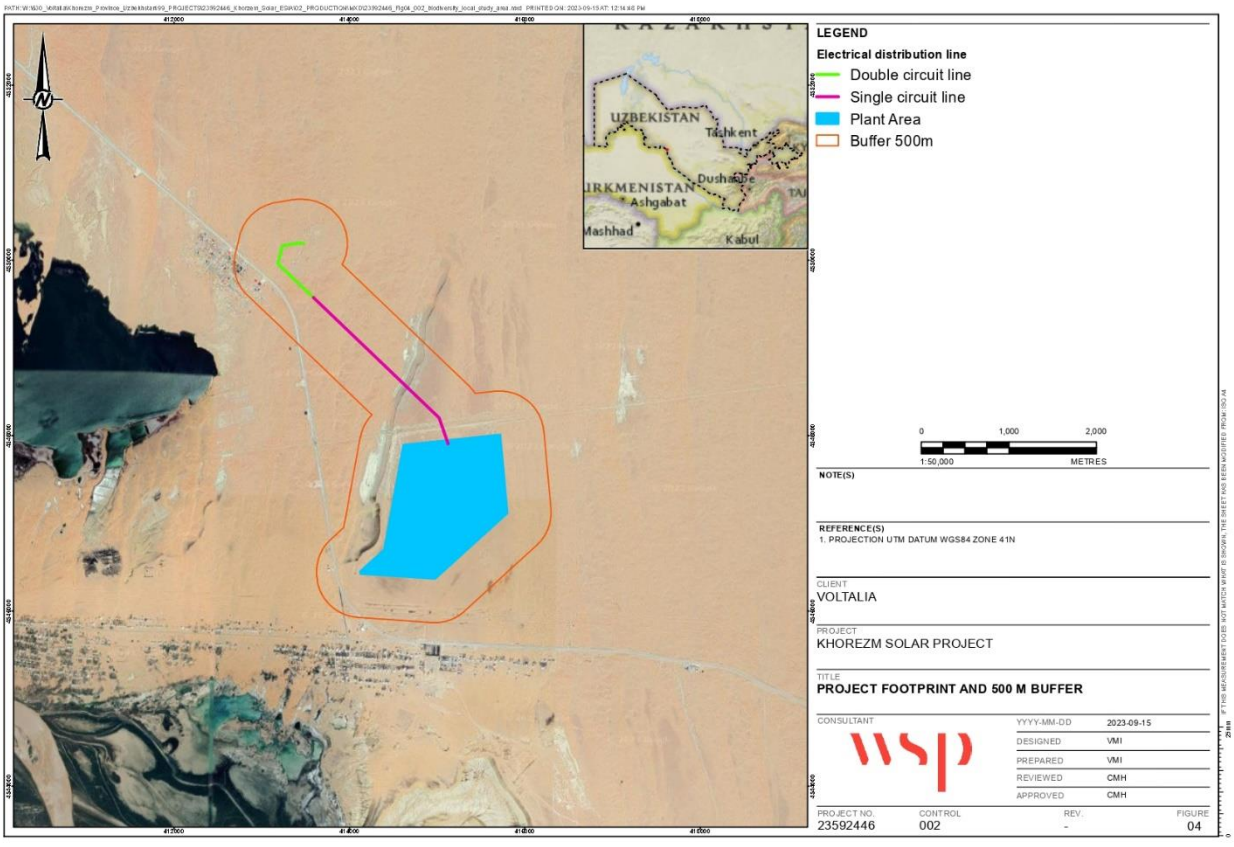


Figure 6: Local Study Area and Project Footprint.

3.2 Legally protected and internationally recognized areas

The LSA is not located within the boundaries of a legally protected area. The nearest protected areas are the Khorazm National Nature Park and the Gorelde KBA and IBA (1,6 km and 7 km south from the Project footprint).

Khorazm National Nature Park

The Khorazm National Park is one of the 41 protected areas in Uzbekistan and has an extension of 21,687.5 hectares.

The park was created in December 2019 by the Cabinet of Ministers of the Republic of Uzbekistan, for the purpose of protecting natural forest resources in the Amu Darya delta, restoring them, preserving desert ecosystems in the Khorazm region, and further developing ecotourism in the region. Given its very recent history, there are no long-term studies of this territory and information on the presence and distribution of fauna species in these areas is not available.

Gorelde KBA and IBA

Gorelde is internationally recognized as a Key Biodiversity Area (KBA) and Important Bird Area (IBA). The area important for biodiversity covers the Amu Darya valley and adjoining sites to the west and have and extension of nearly 23,4 ha (KBA) and 23,4 ha (IBA). In the valley there are meadows and flood lands on alluvial soils, and extensive saltmarshes (Lavrov, 1984).

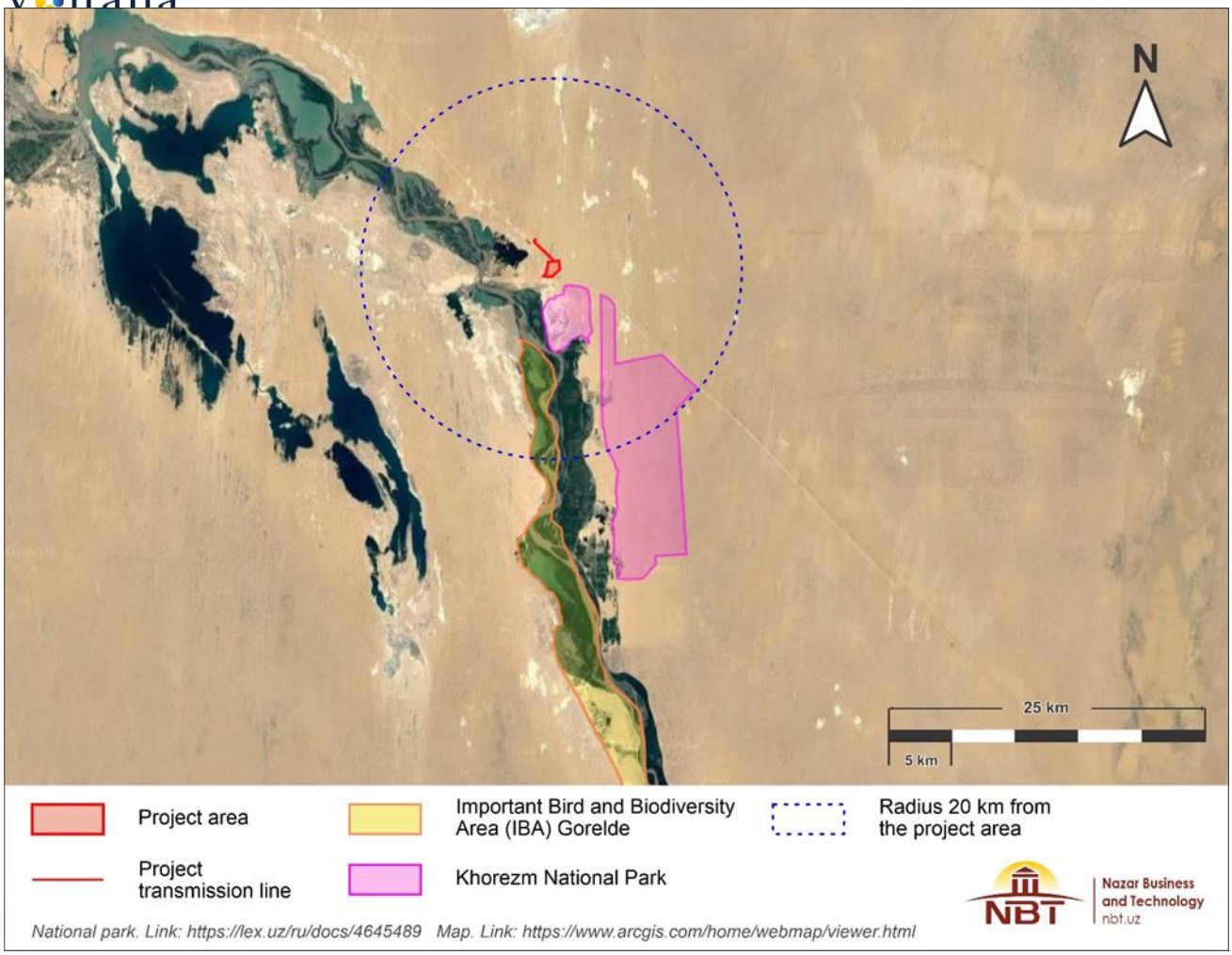


Figure 7: Protected areas and Internationally Recognized Areas situated in a buffer of 20 km from the Project Footprint.

3.3 Natural Habitats and Modified habitats

The Project LSA is located at an average height of 170 m above the sea level within the "Central Asian Southern Desert (819)" Ecoregion and in the subzone of the Southern Desert of the Kyzylkum Province. The site itself is a flat gravel-sandy uplift, gradually descending to east and turning into a sandy plain. The north-western boundary of the LSA breaks off with a rocky chink 30-40 m high to hilly-cellular sands.

The vegetation is represented by desert flora, ephemera and ephemeroids, typical for natural sandy and stony habitats of the desert Kyzylkum. Here the vegetation is very adapted to extreme conditions, presenting small or no leaves. The LSA is mainly characterized by herbaceous and shrubby formations.

The great majority of the habitats present in the LSA are characterized by natural habitats, among which the most represented is the sandy-stony upland. Some of these natural habitats are also subject to anthropic pressures, partially from grazing and mainly for the passage of vehicles and frequentation to reach the power lines already present in the area.

Natural habitats identified within the LSA are characterized by vegetation and described as:

- Cliff: a sandy-stony cliff (40-50 m high) is present between the upland and adjacent sandy desert. This habitat is characterized by sparse saltworts (*Oreosalsola arbusculiformis* (*Salsola arbusculiformis*), *Ceratocarpus arenarius*, *Halimocnemis macrantha*, *Turania sogdiana* (*Salsola sogdiana*)) between the upland and adjacent sandy desert.

- Sandy-stony upland: in the northern part of the LSA, there is a relict sandy-stony upland characterized by slightly inclined, almost flat terrain. This habitat is represented by desert sedge-sagebrush (*Artemisia diffusa, A.turanica, Carex physodes*) and desert sedge-saltwort-sagebrush communities (*Artemisia diffusa, A.turanica, Oreosalsola arbusculiformis* (*Salsola arbusculiformis*), *Carex physodes*) on sandy-stony grey-brown desert soils, occasionally with solitary black saxaul individuals (*Haloxylon ammodendron)*. In the northern part of the SPPP site, there are small plots of psammophilous desert sedge-saltwort-sagebrush-*Calligonum* communities (*Calligonum sp., Xylosalsola arbuscula, Artemisia diffusa, Carex physodes*) with solitary white saxaul (*Haloxylon persicum*) and sand acacia (*Ammodendron conollyi*) on shallow blown sands.
- Sandy desert: This habitat is characterized by fixed hilly sands covered on shallow blown sands on relict sandy-stony upland with psammophilous shrubland typical for western Kyzylkum. The vegetation consists mainly of Psammophilous desert sedge-saltwort-sagebrush-*Calligonum* community with solitary white saxaul (*Calligonum sp., Xylosalsola arbuscula, Artemisia diffusa, Haloxylon persicum, Carex physodes*).

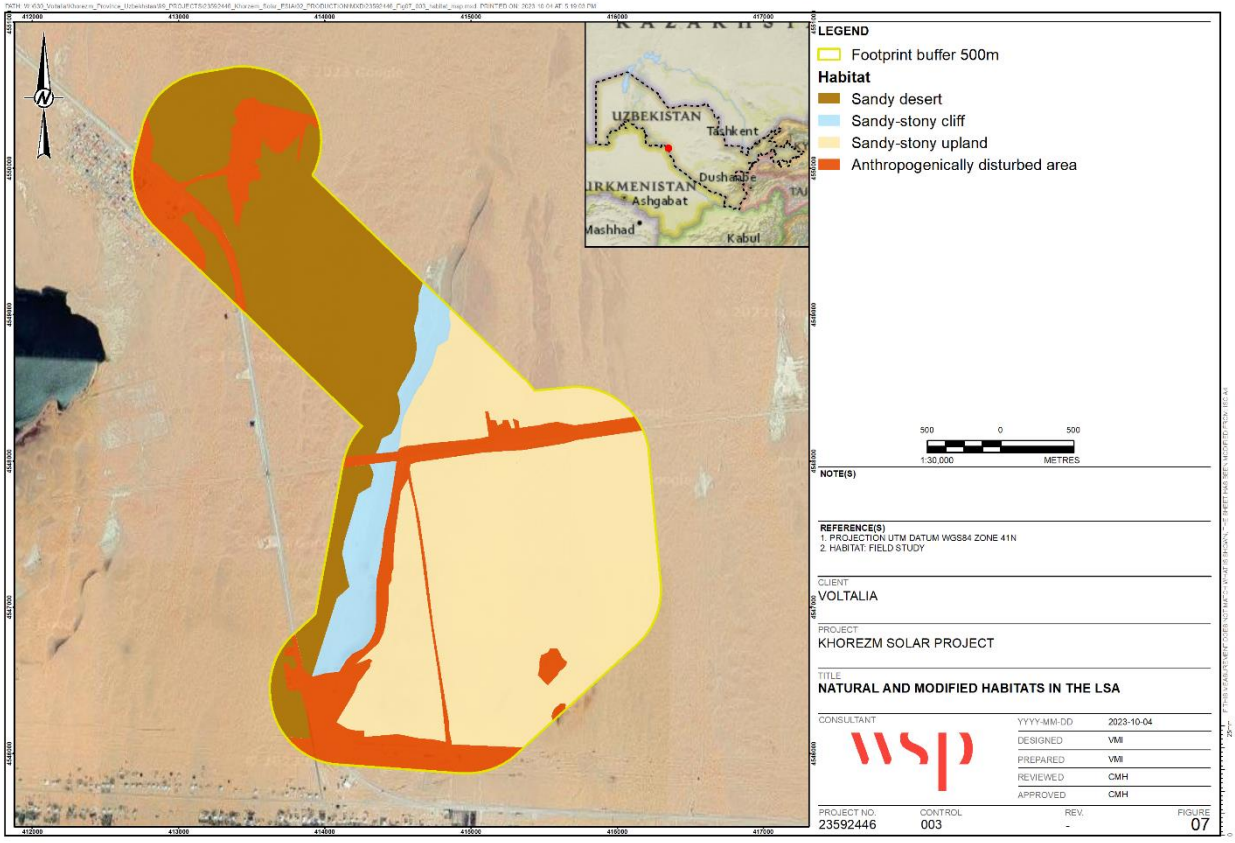


Figure 8: Habitat map

3.4 Flora Species

The two main flora formations in the LSA are the desert sedge-saltwort-sagebrush communities (*Artemisia diffusa, A.turanica, Oreosalsola arbusculiformis (Salsola arbusculiformis), Carex physodes)* and psammophilous desert sedge-saltwort-sagebrush-Calligonum communities with solitary white saxaul (*Calligonum sp., Xylosalsola arbuscula, Artemisia diffusa, Haloxylon persicum, Carex physodes*).

No threatened species red-listed at global or national level, alien species or endemism were found in the Project LSA.

The complete list of flora species found during the field studies in the Project LSA is present in the Appendix 6B.1 of the biodiversity baseline of the Khorazm Solar PV Project ESIA Document.

3.5 Fauna Species

The following subchapters present the most salient information regarding the fauna component obtained during the fieldwork and studies for the preparation of the ESIA baseline (Section 6B).

3.5.1 Reptiles

Among the species directly observed or by traces and footprints during the fieldwork campaigns conducted for the preparation of the ESIA, there are the following threatened species:

- the Central Asian Tortoise (*Agrionemys horsfieldii),* classified as Vulnerable "VU" according to the Global IUCN Red List and VU according to the Red Book of Uzbekistan;
- the Desert Monitor (*Varanus griseus*) Vulnerable "VU" according to the Red Book of Uzbekistan; and
- the Desert Sand Boa (*Eryx miliaris*) classified as Near Threatened "NT" according to the Red Book of Uzbekistan.

The LSA also intersects the area of distribution of the Central Asian Cobra (*Naja oxiana)*, a reptile widespread in arid habitats and classified as Near Threatened (NT) according to the Global IUCN Red List.

3.5.2 Birds

In the LSA or in its vicinity, 7 nesting species were observed during the field studies performed for the preparation of the ESIA: Crested Lark (*Galerida cristata*, LC), Desert Wheatear (*Oenanthe deserti*, LC*)*, Asian Desert Warbler (*Curruca nana*, LC), Blue-cheeked Bee-eater (*Merops persicus*, LC), Ruddy Shelduck (*Tadorna ferruginea*, LC), Brown-necked Raven (*Corvus ruficollis*, LC), Golden Eagle (*Aquila chrysaetos*, LC).

Among the 41 bird species observed during the field work, two species are present in the Global IUCN Red List: *Aquila nipalensis* (EN) and *Circus macrourus* (NT). Four species are included in the Red Book of Uzbekistan as Vulnerable (VU): the Osprey (*Pandion haliaetus)* the White-tailed eagle (*Haliaeetus albicilla*), the Steppe eagle (*Aquila nipalensis*) and the Golden eagle (*Aquila chrysaetos*). Two golden eagle's nests were found on the existing power line in the Project LSA. In one nest, three fledglings were noted.

Between the bird's species potentially present in the LSA there are the Sociable Lapwing (*Vanellus gregarius*), a species categorized as Critically Endangered (CR) according to the Global IUCN Red List but that does not use the territory in which the LSA lies as breeding site. Moreover, eight birds species categorized as Vulnerable (VU), according to the Global IUCN Red List, are potentially present in the LSA: the Lesser White-fronted Goose (*Anser erythropus*), the Eastern Imperial Eagle (*Aquila heliaca*), the Common Pochard (*Aythya ferina*), the Asian Houbara (*Chlamydotis macqueenii),* the Greater Spotted Eagle (*Clanga clanga*), the Yellow-eyed Pigeon (*Columba eversmanni*), the Great Bustard (*Otis tarda*) and the European Turtle-dove (*Streptopelia turtur*). No endemic species are present in the Project LSA. No endemic bird species were found in the LSA.

3.5.3 Mammals

During the fieldwork studies performed for the preparation of the ESIA, the presence of 8 species was confirmed based on signs of presence or direct observations, of which most remarkable is the Marbled Polecat (*Vormela peregusna*). The Marbled Polecat is listed as Vulnerable (VU), according to the Global

IUCN Red List and is included as Vulnerable in the Red Book of Uzbekistan. During the field studies data regarding the potential presence of a large wild cat, the Caracal, in the Khorazm National Park, which is in proximity to the LSA, were collected. This species is inserted in the Red Book of Uzbekistan as Critically Endangered (CR).

One mammal's species categorized as Vulnerable (VU) according to the Global IUCN Red List, is potentially present in the LSA: the Goitered Gazelle (*Gazella subgutturosa).* No endemic species are present in the LSA.

3.6 Invasive alien species (IAS)

No invasive alien species have been detected in the Project LSA during the three field studies campaigns (April, June, September), but it is assumed that some IAS may be introduced and spread during construction and operation activities. The IASMP, included as **Appendix A**, will be implemented and it will be updated in case of other IAS will be found in the Project LSA.

4.0 SUMMARY OF CRITICAL HABITAT AND PRIORITY BIODIVERSITY FEATURES

Critical Habitats and Priority Biodiversity Features have been assessed in the biological component baseline – Section 6B of the ESIA for the Khorazm Solar PV Project.

4.1 Critical Habitat

According to the Critical Habitat Assessment, no species triggering, or potentially triggering CH were identified based on Criterion 1 and Criterion 2. Moreover, no Critical Habitats are expected to be present in the Project LSA according to Criterion 3, 4 and 5.

4.2 Priority Biodiversity Features

No Priority Biodiversity Features are expected to be present in the LSA, according to the *Threatened Habitats* Criterion. Differently, 7 Priority Biodiversity Features and 24 Potential Priority Biodiversity Features are expected to be present in the LSA, according to the *Vulnerable Species* Criterion.

Table 1: Priority Biodiversity Features - Vulnerable (VU) species

Taxon	Family	Species name	Common name	Global IUCN Status	National Red List Status	Lit./Obs.
Birds	Anatidae	*Anser erythropus*	Lesser White-fronted Goose	VU	-	Lit.
Birds	Accipitridae	*Aquila chrysaetos*	Golden eagle	LC	2(VU:R)	Obs.(2)
Birds	Accipitridae	*Aquila heliaca*	Eastern Imperial Eagle	VU	-	Lit.
Birds	Accipitridae	*Aquila nipalensis*	Steppe Eagle	EN	2(VU:D)	Obs.(2)
Birds	Anatidae	*Aythya ferina*	Common Pochard	VU	-	Lit.
Birds	Anatidae	*Aythya nyroca*	Ferruginous Duck	NT	2(VU:D)	Lit.

Taxon	Family	Species name	Common name	Global IUCN Status	National Red List Status	Lit./Obs.
Birds	Accipitridae	*Circaetus gallicus*	Short-toed Snake-eagle	LC	2(VU:D)	Lit.
Birds	Otididae	*Chlamydotis macqueenii*	Asian Houbara	VU	2(VU:D)	Lit.
Birds	Accipitridae	*Clanga clanga*	Greater Spotted Eagle	VU	2(VU:R)	Lit.
Birds	Columbidae	*Columba eversmanni*	Yellow-eyed Pidgeon	VU	-	Lit.
Birds	Ardeidae	*Egretta garzetta*	Little Egret	LC	2(VU:D)	Lit.
Birds	Falconidae	*Falco pelegrinoides*	Barbary Falcon	NE	2(VU:R)	Lit.
Birds	Falconidae	*Falco peregrinus*	Peregrine Falcon	LC	2(VU:R)	Lit.
Birds	Accipitridae	*Haliaeetus albicilla*	White-tailed eagle	LC	2(VU:R)	Obs.(2)
Birds	Accipitridae	*Hieraaetus pennatus*	Booted Eagle	LC	2(VU:D)	Lit.
Birds	Laridae	*Larus ichtyaetus*	Pallas's Gull	LC	2(VU:D)	Lit.
Birds	Scolopacidae	*Limosa limosa*	Black-tailed Godwit	NT	2(VU:D)	Lit.*
Birds	Accipitridae	*Neophron percnopterus*	Egyptian Vulture	EN	2(VU:D)	Lit.
Birds	Scolopacidae	*Numenius arquata*	Eurasian Curlew	NT	2(VU:D)	Lit.
Birds	Otididae	*Otis tarda*	Great Bustard	VU	-	Lit.
Birds	Pandionidae	*Pandion haliaetus*	Osprey	LC	2(VU:R)	Obs.(2)
Birds	Threskiornithidae	*Plegadis falcinellus*	Glossy Ibis	LC	2(VU:D)	Lit.*
Birds	Pteroclidae	*Pterocles alchata*	Pin-tailed Sandgrouse	LC	2(VU:D)	Lit.
Birds	Columbidae	*Streptopelia turtur*	European Turtle-dove	VU	2(VU:D)	Lit.
Mammals	Mustelidae	*Mustela eversmanni*	Steppe or Asiatic Polecat	LC	2(VU:D)	Lit.*
Mammals	Bovidae	*Gazella subgutturosa*	Goitered Gazelle	VU	-	Lit.
Mammals	Vespertilionidae	*Pipistrellus aladdin*	Turkestan Pipistrelle	DD	-	Lit.
Mammals	Mustelidae	*Vormela peregusna*	Marbled Polecat	VU	2(VU:D)	Obs.(1)(2)
Mammals	Canidae	*Vulpes corsac*	Corsac Fox	LC	2(VU:D)	Lit.

Taxon	Family	Species name	Common name	Global IUCN Status	National Red List Status	Lit./Obs.
Reptiles	Testudinidae	*Agrionemys horsfieldii*	Central Asian Tortoise	VU	2(VU)	Obs.(1)(2)
Reptiles	Varanidae	*Varanus griseus*	Desert Monitor	LC	2(VU:D)	Obs.(1)(2)

(1): observed during scoping field surveys in 2021.
(2): observed during ESIA baseline field studies in 2023.
* Data from literature and local consultant experience.

5.0 NO NET LOSS ASSESSMENT

In chapter 8.3 of the Impact Assessment - Section 8B of the ESIA for the Khorazm Solar PV Project, "No Net Loss" was assessed for Natural Habitats and Priority Biodiversity Features.

Direct impacts on NHs are mainly associated with loss in correspondence of the footprint of the Project and its secondary facilities. At the end of the construction phase restoration/rehabilitation activities will be conducted on all the areas directly impacted by temporary facilities such as the workers camp, storage areas and deposit areas, therefore the only direct impacts remaining will be those due to presence of permanent buildings/infrastructures. It is concluded that indirect impacts from the Project shall occur in a 500 m buffer and could potentially include changes in the habitat suitability and competition due, for example, to the potential introduction and spreading of alien species into disturbed habitats.

The expected net loss of Natural Habitats (NHs) is the 25% of the LSA (141,65 ha) and the NH that will undergo the most impact will be the sandy-stony upland habitat (refer to Table 2 for further details). Note the LSA definition includes areas that are unlikely t o experience any discernable impacts.

Literature shows that the shade offered by PV panels could determine a decrease in temperature while increasing soil moisture therefore leading to a positive effect on biodiversity (Bai et al., 2022; Graham et al., 2021; Hassanpour et al., 2018). However, the change could disadvantage the specialist species, such as arid tolerant species due to the novel microenvironments generated under the solar panels. Specific mitigation measures for the long-term management and restoration of the temporary facilities and PV panels have been identified to maximize the potential positive effects on biodiversity and ecosystem services and mitigate the negative impacts. These mitigation measures are further described in this MP.

To date, it is not possible to assess if the effects of the presence of the new Solar Power Plant on the natural habitats and biodiversity of the area could be negative or positive (e.g. partial loss of natural habitats, loss of suitable foraging habitat and potentially nesting habitat for PBF species, the modification of soil moisture and shading or increased plant diversity and increased plant biomass, etc). Therefore, to ensure No Net Loss, a series of field monitoring activities, according to Mitigation Measure BIO-27 (Table 5), will be implemented. The monitoring campaigns will help understand exactly which PBF species frequent the project area, whether they use the area for nesting, foraging, predation, or protection from predators.

The monitoring results will allow for the evaluation of whether additional conservation actions or offset measures are needed and they will be integrated, and therefore implemented, into the Biodiversity Management Plan.

Table 2: Potential Net Loss of Natural Habitats

Habitat type	Degrad. Level (d)	Total area in LSA (ha)	Net Loss (ha)	Total area in LSA (qu ha)	Net Loss (qu ha)	% of loss in LSA
Sandy-stony cliff	0,8	50,11	0,15	40,09	0,12	< 1
Sandy-stony upland	0,8	399,78	174,18	319,82	139,34	44
Sandy desert	0,8	251,15	2,73	200,92	2,18	1
Total (Natural Habitats)		***701,04***	***177,18***	***560,83***	***141,65***	***25***

6.0 SUMMARY OF POTENTIAL IMPACTS

This section summarizes the potential impacts of the Project during the construction, operation and decommissioning phases on biodiversity and ecosystem services.

6.1 Construction Phase

According to the ESIA assessment, potential impacts from Land Preparation and Construction activities include:

- Removal/degradation of soil and vegetation;
- Land occupation;
- Emission of gaseous pollutants;
- Emission of dust and particulate matter;
- Emission of noise and vibrations;
- Emission of light;
- Influx of population;
- Increase of road traffic;
- Introduction and spreading of invasive alien species.

The main impacts are expected to result from the removal and degradation of soil and vegetation during the construction activities and site preparation, and they will negatively affect the entire Project footprint and, potentially, although with lower intensity, the entire LSA.

Fauna species of conservation concern sensitive to the construction impacts will be the ones characterised by a low-mobility and/or the ones whose ecological requirements are strongly connected to the soil (eg., the Central Asian Tortoise and the Desert Sand Boa). Bird species are considered to be affected to a lesser degree by the construction phase due to the higher mobility and the fact that the LSA could be considered only as a potential feeding/hunting ground for these species and not a nesting site.

6.2 Operation Phase

According to the ESIA assessment, potential impacts from operational activities include:

- Existence of new buildings/infrastructures;
- Emission of gaseous pollutants;
- Emission of dust and particulate matter;
- Emission of noise and vibrations;
- Emission of light;
- Generation of glare;
- Increased Risk of collision and electrocution;Increase of road traffic.

Habitat loss will occur within the footprint of the facilities identified as permanent, while temporary facilities areas will be rehabilitated during operation. Flora and vegetation are expected to at least partially recover during the operation phase, due to rehabilitation of the temporary facilities, but also in the area where the PV panels are installed. Indeed, the particular edaphic conditions present under the PV panels and the grazing exclusion could potentially determine an increase in local species richness, diversity and biomass for the most common and generalist flora species compared to the surrounding sandy upland. However, the change could disadvantage the specialist species, such as arid and salt tolerant endemic species, due to the novel microenvironments generated under the solar panels.

Despite the possible positive effects for biodiversity determined by the variation in microclimate and physical conditions under photovoltaic panels within SPPPs observed in many cases, studies considered and reported also by IUCN Guidelines (Bennun *et al.*, 2021[12]), it must be considered that these positive effects depend on the implementation of a long-term management and restoration plan. Indeed, without an appropriate management and restoration plan, the topsoil removal and vegetation clearance which are necessary for the construction of the SPPs, will be unavoidably followed by a strong alteration of the local biotic communities and the probable arrival of exotic/invasive alien species, which could take advantage of the novel disturbed microhabitats (Graham *et al.*, 2021[13]). For these reason, detailed management and monitoring measures have been planned in the following chapters.

Fauna disturbance (e.g. noise, artificial light) connected to the Operation Phase is expected to be minimal compared to construction and fauna species are expected to habituate to the disturbance deriving from operation and maintenance activities. For some fauna species the presence of a fenced area occupied by permanent facilities and PV panels will create a loss of potential habitats, while for others (especially small size mammal, birds and reptiles) the area could still be considered as a suitable habitat, and in some cases the fence and PV panels could even offer protection from predators. It should be noted that the fences shall be built allowing for a 20 cm gap from the surface every 100 m.

Injury or mortality during operation could occur for birds as a result of collisions or electrocution with the OTL. Soaring birds, larger bird species and species with low manoeuvrability, such as Golden eagle (*Aquila chrysaetos*), the Great bustard (*Otis tarda),* the Osprey (*Pandion haliaetus*), the Eastern Imperial Eagle (*Aquila 27eliacal),* the Asian Houbara (*Chlamydotis macqueenii*), the Steppe eagle (*Aquila*

[12] 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.

[13] Graham M., Ates S., Melathopoulos A., Moldenke A., DeBano S., Best L. and Higgins C. (2021). Partial shading by solar panels delays bloom, increases floral abundance during the late-season for pollinators in a dryland, agrivoltaic ecosystem. Scientific Reports. 11. 7452. 10.1038/s41598-021-86756-4

nipalensis), the White-tailed eagle (*Haliaeetus albicilla)* and the Dalmatian Pelican (*Pelecanus crispsus)* are particularly vulnerable to this impact albeit not observed on this site.

Specific mitigation and monitoring measures for the long-term management and restoration of the temporary facilities, SPPP and OTL are identified in the following chapters to maximize the potential positive effects on biodiversity and ecosystem services and mitigate the negative impacts.

6.3 Decommissioning Phase

At the end of the Power Purchase Agreement (PPA), which will occur after 25 years of operation, it will be decided whether the SPPP functioning will be continued, or the Project decommissioned between the parties forming the PPP. Thus, the Project shall not be decommissioned for at least 25 years.

In general, it is expected that during decommissioning, indirect negative impacts deriving from increase in vehicular traffic, emission of noise and vibration and introduction and spreading of alien species will be similar to those of the Construction Phase. However, positive impacts deriving from the re-establishment of natural vegetation and the restoration of the disturbed areas will allow to reclaim most of the areas with an expected overall positive effect on biodiversity compared to the Operation Phase. Impacts during decommissioning are expected to be temporary and the magnitude of the impact will depend on how much of the infrastructure is removed. The general focus of the decommissioning and closure phase is to rehabilitate the disturbed lands to create stable, non-polluting and self-sustaining ecosystem capable of being incorporated into the future landscapes, which will be consistent with activities in the general surrounding area. However, considering that Decommissioning and Closure will not happen for many years, the future land use of the area is not known, and no detailed information is available at this stage, it is not possible to discuss in the details the effects of this Phase on the biodiversity component at this point. This will therefore be assessed at a later stage.

7.0 Roles and Responsibilities

Voltalia is responsible for ensuring that the measures set out in this Plan are implemented in full and this will be achieved by verifying the compliance of the EPC contractor and subcontractors, and well as the O&M Contractors and subcontractors.

General roles and responsibilities for the implementation of this Plan are provided in the table below. The roles and responsibilities for the implementation of this management plan will be revised according to the changes in the organisational structure of the Client.

Table 3: Roles and responsibilities

Role	Responsibilities
Voltalia SPV	
Project Director	▪ Ensure the Voltalia's HSES Policy and HSES Management System Requirements are in line with EBRD performance requirements, and IFC Performance standards, and ESAP requirements and are communicated and implemented effectively and consistently to the Project's relevant stakeholders; ▪ Ensure the HR policy includes a code of conduct, provisions regarding forced labour and illegal employment, and must explicitly require that all construction staff and workers receive a written contracts with the HR policy prior to starting work and in its own language; ▪ Allow sufficient time and adequate resources for the implementation of this Plans requirements; ▪ Foster HSES leadership culture within the Project; and

Role	Responsibilities
	▪ Assign an ESAP owner conversant with EBRD Performance Requirements and Uzbek legislation.
Health & Safety Site Supervisor	▪ Supervise workers within their area of supervision, take corrective action when HSES issues are noted and report these issues to the Site Management Team; ▪ Participate in internal audits and investigation of incidents to determine root cause and corrective actions; ▪ Supervise close out H&S incident reports and record, monitor and follow up close out of action items in the Action Tracking System; ▪ Liaise with Site Mnagers on relevant H&S issues and organize H&S meetings; ▪ Perform regular site and work front visits and inspections and monitor High Risk Activities; ▪ Develop, review, and approve risk assessments, RAMS and PTW´s. Ensure liaison with other relevant HSES Site Management Team members in this process to collect their feedback concerning their respective fields of actuation; ▪ Liaise with the Lenders on Project E&S performance, to seek alignment between their expectations; ▪ Review and approve site access HSE documentation; ▪ Overseeing, managing, and allocating adequate resources for the implementation of the HSES Management System.
E&S advisor	▪ Oversee this Plan; ▪ Ensure that all the environmental authorizations and permits have been obtained in a timely manner; ▪ Monitor close out of environmental action items in the Action Tracking System; ▪ Review the Environmental management documents; ▪ Ensure all corrective/preventive actions related to environmental risks and incidents are implemented; ▪ Liaise with Site Managers on relevant Environmental issues and plan environmental performance monitoring meetings; ▪ Supervise and manage the work of the Environmental specialists; ▪ Review Environmental incident reports; ▪ Perform regular site and work front visits and inspections and monitor high environmental risk activities and the commencement of activities in new areas or areas with significant environmental sensitivities; ▪ Ensure implementation of the Project's Management Plans in accordance with environmental permit requirements and ESIA requirements if different; ▪ Ensure the social components of the Project are compliant with this Plan, permit requirements, local legislation, and Lenders' requirements; ▪ Ensure that stakeholder engagement during construction is in line with Lender's requirements and national regulations. ▪ Supervise the work of the Community Liaison Officer and ensure the correct implementation of the stakeholder engagement plan and grievance mechanism; ▪ Ensure the implementation of the community health and safety management measures; ▪ In coordination with HR Coordinator, verify that all social measures from LMP are implemented on site;

Role	Responsibilities
	▪ Report to the Lenders on (i) Implementation status of the ESAP and of the Register of commitments, with success/fail indicators (see ESAP action 1.4) and (ii) the Environmental and social performance of the project activities, and (iii) the management of non-compliances and corrective actions; and Final approval of this Plan and subcontractors plans/procedures prior to their implementation.
Voltalia - Site Manager	▪ Day to day supervision of the site; ▪ Supervision of Project execution timeline and its disclosure to the Site Management Team; ▪ Ensure compliance of requirements by Contractor at the different phases of the Project (pre-qualification reports, kick off meetings, periodic performance evaluations...); ▪ Supervise dissemination of the updated version of this Plan to all Site workers, including the EPC Contractor and Subcontractors; ▪ Supervision of this Plan's requirements implementation through regular site monitoring visits and EPC Contractor and Subcontractors documentation/reports review; ▪ Supervision of adoption and implementation of disciplinary actions upon failure to comply with requirements; ▪ Supervision that all workers have proper training to implement the requirements of this Plan; ▪ Participation and supervision in the worksite Risk Management process (risk assessment, RAMS, PTW, interface management, definition of control measures, and change management); and ▪ Ensure contractors and service providers compliance with EBRD 2019 PRs and IFC 2012 PSs by including them in the list of applicable E&S requirements to be complied with. Require them, in a legally binding manner, to cascade the requirement down their subcontractors chain.
HSE Coordinator	▪ Implementation of the HSE Policies, Sustainability principles, procedures and best practices, transversely to Voltalia region; ▪ Keeping up-to-date with any changes in safety regulations and standards; ▪ Monitor and ensure that the Projects' E&S objectives are achieved; ▪ Ensure the Projects' E&S requirements and this Plan are communicated to, and implemented by the Projects' personnel, including the Site Management Team and Contractors; ▪ Prepare a register of all E&S commitments from the permitted EIA, ESIA and ESAP actions;
EPC Contractor - Site Management Team	
Project Manager	▪ Overall delivery of the Project and HSES performance, and assurance of compliance with budget, schedule, project policies, plans and procedures; ▪ Ensure that the necessary resources, authority, information, are provided to enable the execution of Project's HSES management activities and HSES procedures; ▪ Ensure that HSES management issues are included in periodic reports to be to be sent to Site Management Team, and also in reports prepared by Site Management Team to be sent to the Project Owner;

Role	Responsibilities
	▪ Submit periodic reports to the Project Owner. ▪ Cooperate with Project Owner to obtain necessary permits and/or legal documents for the Project, if necessary. Hold a dedicated register of these permits and authorizations, indicating their scope and validity date if any.; ▪ Supervision of the proper implementation of this Plan by the Site Management Team and subcontractors plans/procedures prior to their implementation through regular meetings and review of reports; ▪ Designating specific personnel on site or at the administrative level for the implementation of the E&S Management System; ▪ Present monitoring data to Voltalia's Corporate Level and to the Lender; ▪ Liaise with the Project Owner, corporate level HSES team, for implementation of this Plan; and ▪ Follow-up on any grievances and non-Conformities, non-compliance or deviation from the requirements of this Plan.
Site Manager	▪ Ensure that all the activities of the Project are carried out in accordance with this Plan and implement control measures and procedures that have been issued by Site HSES Management Team and the Project Owner as per the HSES Management Plan ▪ Ensure that the international E&S requirements applicable to the Project are included - as conditions - in contracts with Subcontractors and suppliers; ▪ Instruct and/or train workers on the requirements of this Plan; ▪ Ensure that Personal Protective Equipment is always available on site and is used whenever required; ▪ Deliver all the documents required for contractors' validation as per the requirements of this Plan and the Voltalia HSES Management Plan; ▪ Provide to Voltalia's Health and Safety Site Supervisor, before the start of any hazardous work, the Environmental Risk Assessment and Method Statement – RAMS; ▪ Identify the need for specialized Subcontractors to carry out specific tasks on site in compliance with this Plan provisions; ▪ Coordinate with Voltalia's HSE Manager, organize and participate in the auditing activities organization, maintain a program of audits and inspections at the Construction Site; ▪ Ensure that the raised non-conformities based of this Plan are addressed and resolved as quickly as possible; ▪ Ensure the planning, preparation and provision of the trainings in order to enable the full implementation of the Plan; ▪ Check the E&S performance of all Subcontractors in relation to this Plan implementation; ▪ Verify the compliance with the contractual arrangements and with the Project standards and requirements; ▪ Provide the monitoring reports to Voltalia's Site Management Team through the monthly report; ▪ Liaise with Voltalia's HSE Manager for proposing and discussing – where necessary – potential changes and integrations of the monitoring activities of this Plan; ▪ Report and resolve the non-conformities raised;

Role	Responsibilities
	▪ Notify and report to the Site Manager any Near Misses, hazardous conditions and incidents during construction activities; ▪ Perform the Contractor Management process (pre-qualification reports, kick off meetings, periodic performance evaluations...); and ▪ Ensure that all plant machinery and equipment are suitable for the use allocated to them and maintained in good working order, and record related maintenance activities.
HSES Manager	▪ Organizing and delivering the implementation of all the Health, Safety and Environment obligations, also for subcontractors, as per the EPC contract, the ESAP, the Environmental Permit and the Uzbek Environmental, Social, Health and Safety legislation; ▪ Be conversant with EBRD PRs, IFC PSs and the Uzbek E&S legislation; ▪ Oversee performance and ensure compliance of the Project with requirements of this Plan through regular meetings with the E&S Site Management Team and review of E&S reports; ▪ Ensure that sufficient and qualified resources are allocated on an ongoing basis to achieve effective implementation of actions, measures and monitoring activities; ▪ Ensure ESMS is in-line with the Project ESMS; ▪ Collecting, organizing and reviewing monitoring data and performance monitoring reports provided by the HSE specialist(s) and providing summary results of such reports to the Project Manager; ▪ Bringing Non-Conformities immediately to the attention of the Project Manager and ensuring that action/measures and monitoring activities are carried out timely and adequately according to this Plan requirements; ▪ Programming inspections and audit activities to monitor the correct implementation of this Plan and of HSE specialist(s) tasks; ▪ Monitor the compliance of the activities by Site Team, and subcontractors, with the time schedule and conducting regular inspections and audits of the traffic management activities to identify any non-conformances; ▪ Addressing Non-Conformities through the definition of Preventive/Corrective actions proposing to the Project Manager, if necessary, amendments and/or updates to this Plan and issuing Plan revisions; ▪ Search for continuous improvement through audits and monitoring of the HSE KPIs and internal processes; ▪ Advise and support the Project Manager and Site Manager on matters related to HSES; ▪ Develop HSES training and induction schedules and content and deliver the training and induction material such as site induction and toolbox talks; and ▪ Review and approve H&S Management documents delivered by the Health & Safety Site Supervisor.
Health & Safety Site Supervisor	▪ Communicate and instruct workers in proper work practices and update instructions as needed, make records of this instruction; ▪ Supervise workers within their area, take corrective action when HSES issues are noted and report these issues to the Site Management Team; ▪ Participate in internal audits and investigation of incidents to determine root cause and corrective actions;

Role	Responsibilities
	▪ Develop and update the Project specific H&S management documents; ▪ Communicate the Health and Safety (H&S) requirements to Project personnel including Site Manager; ▪ Develop, review, investigate and close out H&S incident reports and record, monitor and follow up close out of action items in the Action Tracking System. ▪ Contact point for reporting H&S Near Misses, hazardous conditions, and incidents onsite and takes care of reporting to the Project Manager and the HSE Manager; ▪ Liaise with Site Managers on relevant H&S issues and organize H&S meetings; ▪ Deliver the H&S component of training and induction such as site induction and toolbox talks; ▪ Perform regular site and work front visits and inspections and monitor High Risk Activities; ▪ Develop, review, and approve risk assessments, RAMS and PTW´s. Ensure liaison with other relevant HSES Site Management Team members in this process to collect their feedback concerning their respective fields of actuation; and ▪ Review and approve site access HSE documentation.
E&S Specialist	▪ Obtain all E&S authorizations and permits in a timely manner; ▪ Record and follow up close out of E&S action items in the Action Tracking System; ▪ Develop and update E&S management documents; ▪ Report and investigate all E&S risks and incidents to the HSES Manager and Site Manager, and ensure all corrective/preventive actions related to environmental management are implemented; ▪ Liaise with Site Managers on relevant Environmental issues and plan environmental performance monitoring meetings; ▪ Develop Environmental incident reports; ▪ Communicate the E&S requirements to Project personnel and perform necessary training; ▪ Ensure that stakeholder engagement during construction is in line with Lender's requirements and national regulations. ▪ In coordination with the HSE site supervisor, ensure the implementation of the community health and safety management measures; ▪ Address external grievances through the Community Grievance Mechanism and ensure corrective action as per the mechanism; ▪ Provide regular feedback in the form of progress report(s) (as needed) to the local authorities, specifically as it relates to local employment and economic development investment; ▪ Communicate the Biodiversity requirements to project personnel including Site Manager and Contractors; ▪ Ensure development and implementation of the Project's Biodiversity Management Plan in accordance with environmental permit requirements and ESIA requirements if different; ▪ Carry out the required biodiversity monitoring; ▪ Carry out the preventive or corrective biodiversity measures as required including fauna relocation, habitat, and flora mapping.

Role	Responsibilities
	▪ Oversee and implement this Plan.
HR Coordinator	▪ Conduct due diligence to assess and manage labour-related risks associated with the project; ▪ Ensure compliance with the Project Labor Management Plan through audits, also for subcontractors; ▪ Coordinate with the E&S Specialist and relevant governmental authorities to ensure legal compliance of subcontractors work conditions; ▪ Conduct and analyse the workforce surveys as a monitoring tool; ▪ Oversee that the recruitment processes are fair and transparent; ▪ Ensure that workers are provided with clear and accurate information about their terms of employment, including wages, working hours, and benefits; ▪ Oversee the implementation of policies to prevent discrimination in the workplace based on gender, ethnicity, nationality, or other factors, and to prevent and address child labour and forced labour; ▪ Ensure that workers are paid fair wages in accordance with applicable laws and industry standards; ▪ Monitor and enforce compliance with working hour limits to prevent excessive overtime; ▪ Address internal grievances through the Community Grievance Mechanism and ensure corrective action as per the mechanism; ▪ Ensure that workers have adequate rest periods and time off; ▪ Oversee the communication and implementation of grievance mechanisms; ▪ Build the capacity of Subcontractors to ensure effective labour management; ▪ Collaborate with relevant stakeholders to promote positive impacts on local communities; ▪ Put in place monthly random HR audits of its direct sub-contractors to verify the absence of illegal or non-compliant forms of employment. The results of audits shall be reported to Voltalia through quarterly E&S reports during construction; and ▪ Ensure that all the staff employed on the construction site through his subcontractors chain is formally employed and declared, as required by the Uzbek legislation. Undertake during construction monthly random audits throughout his sub-contractors chain to verify compliance of the employment conditions with the provisions of the Uzbek labour legislation, EBRD PR2/IFC PS2 and the present ESAP. The results of these audits must be provided in the monthly E&S reports to Voltalia.
All workers	
All construction site workers	▪ Comply with all HSE requirements; ▪ Understand their responsibilities and implement the requirements of this Plan; ▪ Participate in site induction training and other relevant HSES related training if required; ▪ Report on any activities which demonstrate deviations from – or non-compliance with – this Plan requirements; and ▪ Report any incidents, unsafe situation, or issues to their supervisors and stop work on the grounds of danger to life or the environment and report this immediately to the Site Manager.

8.0 MITIGATION MEASURES/ACTIONS

8.1 Construction

The following table details the environmental management and mitigation measures/actions identified for BIO management activities during construction phase. For each measure/action identified, the table shows:

- **Item:** the identification code of the mitigation measure/actions (ID);
- **Measure/Actions:** description of the mitigation measure/actions;
- **Source document:** is the reference to one or more applicable standard (i.e. National Regulation and Permits, EU Regulations/Directives, IFC PS/Guidelines, or other GIIP);
- **Timeline and frequency:** frequency/timing of the measure/action;
- **KPI (Key Performance Indicator):** quantitative compliance indicator or qualitative acceptance criteria to be used to confirm the actual effectiveness of the mitigation measure/actions;
- **Target:** final qualitative or quantitative objective to comply with;
- **Responsibility:** resource responsible for implementing the measures/actions;
- **Status:** progress of the measures/actions.

The "mitigation hierarchy" (avoidance, minimization, rehabilitation/restoration, offset) is applied to allow for an adequate selection of measures that will limit negative impacts to the environment as far as possible.

This process is intended as an adaptive management system, so that the mitigation and management approach will be adapted based on any new findings which could arise from the monitoring program described in the following section.

In the case that non-conformities or unexpected residual impacts due to the Project are identified on site during the monitoring activities, the biodiversity specialists will evaluate the situation and, if needed, propose changes and integrations to the mitigation and monitoring activities included in the present BMP. The proposed changes will be evaluated and approved by EHS&S Manager and by the Site Manager who will also ensure that action/measures and monitoring activities are carried out timely and adequately.

Table 4: Mitigation measures/actions for construction phase

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
BIO-01	**Avoidance: avoid the unnecessary removal or degradation of soil and vegetation.** ▪ Unnecessary soil excavations and vegetation clearance will be avoided whenever possible.	IFC PS6 ESIA Section 8B	Prior and during construction phase	Records of the relocation activity and the discharging of the	Final placement of project facilities. Final placement of relocated shrubs in a suitable	Voltalia Site Manager HSES Manager Health &	To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	▪ The use of fire, pesticides, herbicides, or similar substances will be strictly prohibited. ▪ Avoid unnecessary and uncontrolled levelling, diggings, and excavations whenever possible. ▪ Attentive planning and supervision of the activities to prevent unnecessary intentional or accidental removal and deterioration of soil and vegetation. ▪ The relocation of *Haloxylon spp* with the site shall be carried out following local requirements and the permission for such relocation shall be requested to the National Ecological Committee.			permit requirements to be maintained.	environment.	Safety Site Supervisor E&S specialist	
BIO-02	**Minimization: Minimize the project footprint and footprint creep.** ▪ Minimize the footprint of individual facilities whenever possible; ▪ Organize the construction site areas and the storage areas of material and work vehicles in such a way as to optimize the spatial footprint and reduce as much as possible the footprint on the ground; ▪ Utilize the existing modified habitat for placement of temporary facilities.	IFC PS6 ESIA Section 8B	Prior and during construction	Record of project alternative analyses.	Final placement of project facilities. No signs of footprint creep outside planned construction areas.	EPC Contractor Site Manager	On going
BIO-03	**Minimization: Fauna site recognition before groundwork** To minimize fauna mortality, an experienced herpetologist will perform a site recognition and survey within the footprint area, to identify and relocate fauna species prior the initiation of the	IFC PS6 ESIA Section 8B	Prior earth works and site preparation (vegetation clearing) - not earlier than 7 days before.	Number of completed pre-construction fauna surveys perform	Fauna pre-construction survey performed in all areas to be developed.	Voltalia Site Manager Health & Safety Site	To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	site preparation in the areas to be cleared (not earlier than 7 days before). ▪ This survey will focus on fauna species with limited mobility (e.g., reptiles, in particular the Central Asian tortoises and Desert Sand Boa) as well as the presence of nests and subway dens. The Desert Monitor does not need special measures, since it will leave the site on its own. ▪ Reptiles will be caught and moved to a suitable receptor site, at a minimum distance of at least 50 m from the Project footprint during the construction phase. ▪ Collection and relocation of hibernating reptiles should be avoided whenever possible. ▪ If any individual reptiles are found, the relocation shall be carried out according to the local legislation and the permit for such relocation shall be made to the Ministry of Ecology of Uzbekistan according to local requirements.			ed and locations. Number of reptile individuals found and relocated.		Supervisor E&S specialist	
BIO-04	**Minimization: Breeding season site recognition.** This action is only relevant when vegetation clearance activities cannot be avoided during the breeding season, which is from April to June, with a peak from May to June. ▪ The site recognition for nesting birds will be undertaken within 48 hours before vegetation	IFC PS6 ESIA Section 8B	Prior site preparation during breeding season (April-June) – 48 hours before vegetation clearing	Number of completed pre-construction fauna surveys performed and locations. Number of nests	Fauna pre-construction survey performed in all areas to be developed.	EPC Contractor HSES Manager Health & Safety Site Supervisor	To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	clearance by a qualified ecologist. ▪ If breeding birds are discovered, then works will be postponed in that area until the breeding cycle is complete (this may take up to three weeks). ▪ A species-specific buffer zone (minimum 25 m) will be set up around the nest site following consultation with a qualified ecologist.			detected. Presence of species-specific buffer zones.		E&S specialist	
BIO-05	**Minimization: Wildlife Management** ▪ During construction phase, the perimeter of the construction site will be fenced to prevent the entry of wildlife. Moreover, the fences won't present any hole or gaps. ▪ The use of rodenticides to control small mammals will be banned to avoid indirect impacts to predators (*e.g.* Marbled Polecat (*Vormela peregusna)* or raptors). ▪ The use of herbicides is banned. ▪ All conduits, excavations, pits, etc. will be checked daily for trapped and/or injured wildlife by personnel of the EHS Team. ▪ Installation of slopes or other escape measures for small animals at trenches that will need to be left open for a considerable time (i.e. more than 6 months). ▪ Any fauna species encountered will not be interfered with or disturbed until it moves on by itself or is moved by a specialist or	IFC PS6 ESIA Section 8B	Prior and during construction phase	Register of alive animal's observations or carcasses within the pv site. Records of the integrity of the fences and absence of hole or gaps. Register of weekly checks of the fences by EHS personnel.	Full implementation of measure within and around Project construction sites.	EPC Contractor Site Manager HSES Manager Health & Safety Site Supervisor E&S specialist	To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	a trained HSES employee. This includes the cessation of operations in the area where the animal was found, if required, until the animal has moved on or will be moved. ▪ Prevent the accumulation of stagnant water and organic waste within the construction site and on the roads, that could attract wildlife, especially amphibians. ▪ Feeding of wildlife or stray cats and dogs will be prohibited on-site. Fauna carcasses, if found, will be removed and organic waste will be carefully managed and disposed to avoid the attraction of wildlife or stray cats and dogs.						
BIO-06	**Restoration: Restoration of temporary facilities.** ▪ All the areas occupied by temporary facilities (workers camp, storage areas and deposit areas, etc) will be restored through the demolition of structures, removal of materials, recovery of compacted sandy soil and planting of native flora species. Planting native flora species will be carried out to enhance local species and sand fixation. ▪ The aim of the mitigation measure is to ensure that the material to carry out planting of local flora species is available once the structures are decommissioned. Therefore, salvaging of	IFC PS6 ESIA Section 8B	At completion of the construction phase, for temporary facilities.	Percentage of areas presenting successful vegetation restoration.	Full Implementation of a stable vegetative cover.	EPC Contractor Site Manager HSES Manager Health & Safety Site Supervisor E&S specialist	To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	native flora species can result from two actions or a combination of them: **1.** salvaging of plants individuals (shrubs and slower-growing species that are more difficult to restore or species that are not found in nurseries) present in the Project footprint during pre-construction survey and storage of the individuals in a dedicated open-air area of approximately 300 m^2 and caring for them until the temporary facilities areas are recovered. *Haloxylon* species relocation will follow indications present in the mitigation measure BIO-01. **2.** The second measure will be the obtaining of autochthonous plants from dedicated nurseries available in Uzbekistan. ▪ The aim of restoration shall be to produce a stable vegetative cover to minimize erosion, dust deposition and spreading of invasive alien species. ▪ Trampling and offroad driving will be prevented as						

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	much as possible in the rehabilitating area and between the panels. ▪ Further measures shall be taken to assure sand fixation around the OHL towers, such as phytomelioration, or mechanical dune stabilization through the use of reed mats.						
BIO-07	**Minimization: Minimize the overall emissions of pollutants and dust.** *Minimize the overall emissions of pollutants and dust in air by mean of a set of mitigation measures that are included in the specific Air Quality Management Plan prepared for the Project's Construction phase.*						To be implemented.
BIO-08	**Minimization: Minimize noise emissions from facilities and vehicles.** *Minimize the overall emissions of noise by mean of a set of mitigation measures that are included in the specific Noise Management Plan prepared for the Project's Construction phase.*						To be implemented.
BIO-09	**Minimization: Reduce light emissions.** ▪ The lighting shall be planned in order to ensure a level of light required for the safety of the workers and the safety of the equipment while minimizing the luminous level; ▪ Keep glare to a minimum by ensuring that the main beam angle of all lights directed towards any potential observer is not more than 70°. When lighting vertical structures, direct light downwards wherever possible. ▪ When selecting lighting, the next should be considered:	IFC PS6 ESIA Section 8B	During construction phase	Records of the lighting selected and installed.	Full implementation of all light emission management actions within and around project construction sites.	EPC Contractor Site Manager HSES Manager Health & Safety Site Supervisor E&S specialist	To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	• ensure that their placement minimizes stray light and glare. Prefer dark-sky compliant full-shielded (i.e., full cut-off) light fixtures that direct light downwards below the horizontal plane and result in no up-light; • the use of more warm-white light sources shall be implemented, as proposed by many organizations (The Dark and Quiet Skies consortium, the International Union for Conservation of Nature and United Nations Office for Outer Space Affairs). • Prefer light sources with a wavelength comprised between 500 and 700nm. The optimal light sources are the ones higher than 560nm; • Lumens (amount of light produced) shall be preferred rather than watts (amount of energy used) when selecting lighting. Low glare lighting fixtures shall be preferred to reduce excessive brightness and diffuse light. Low glare options will also require less energy; ▪ Night activities will be reduced to a minimum. ▪ Using non reflective surface treatments for project facilities. Reduce building contrast levels by using finishes with low						

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	reflectance levels and colours that match natural landscapes. Using non reflective surface treatments for project facilities. Reduce building contrast levels by using finishes with low reflectance levels and colours that match natural landscapes.						
BIO-10	**Minimization: Employees and subcontractors' awareness raising and training.** ▪ Awareness among employees and contractor working on site about the protected species/habitats potentially present in the area will be developed, to ensure constant monitoring and promote actions to be taken if wildlife is encountered. ▪ HSES personnel must be trained to safely catch and manage specimen that would be found in the Project area during construction activities and for its safe removal and relocation in a suitable environment. ▪ Illegal hunting and animal caught for traditional medicine or food purposed will be forbidden. Contractors, sub-contractors, and their staff must be informed that employees who would intentionally kill or extract reptiles and other fauna specimen from the Project site will be excluded from the Project without prior notice.	IFC PS6 ESIA Section 8B	During construction phase	Records of the trainings carried out to the employees and contractors.	Increased awareness on biodiversity protection.	EPC Contractor HSES Manager Health & Safety Site Supervisor	To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	▪ Include in the workers code of conduct workers awareness raising about the presence of reptiles of conservation interest (tortoises and snakes) in the Project area. ▪ By partnering with agencies responsible for law control, the Contractor could strengthen law enforcement against illicit wildlife trade.						
BIO-11	**Minimization: Minimize road kills within the pv site.** ▪ To minimize the risk of wildlife investment, all drivers accessing the site will be briefed and trained about the speed restrictions. ▪ Signs and labels showing the maximum speed allowed will be affixed at the site entrances and on the Project footprint roads. Animal crossing sings will be installed in the access road and internal roads. ▪ If necessary, installation of speed bumps and noise stripes on straight sections of the access and internal roads shall be implemented. ▪ If any fauna species are injured during the operational activities, a Fauna Handling and Rescue Procedure must be activated, and the species taken to a vet for treatment. ▪ To reduce the likelihood that scavenging species will be struck by vehicles, roadkill will be removed or relocated and shall be	IFC PS6 ESIA Section 8B	During construction phase	Records of the training carried out to the employees and contractors. Presence of maximum speed signs and animal crossing signs. Register of the fauna species encountered or injured and relocated. Effectiveness of vehicular traffic mitigation measures. No signs of	Full implementation of measure within and around Project construction sites.	EPC Contractor Site Manager HSES Manager Health & Safety Site Supervisor	To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	reported as an environmental event. Moreover, all fauna deaths and real animal sightings in the project site will be reported. ▪ Project traffic routing will be reduced in areas of particular interest for autochthonous fauna species such as animal crossings wherever possible and especially during sensitive periods (nesting, reproduction). ▪ Trucks and moving vehicles will travel only on predefined paths. ▪ No vehicles and trucks will leave the predefined road for shortening the travel time or because of roads interruption without proper authorization. Entrance of unauthorized vehicles shall be forbidden.			vehicles footprint creep outside planned areas.			
BIO-12	**Minimization: Alien species management.** Since the project area presents water scarcity, putting in place prevention measures that make use of water, such as washing truck wheels, is discouraged. In the case IAS are detected, a reduction or an elimination of the impacts of established species by eradication, containment, exclusion, or population reduction by physical or biological control, according to the Invasive Alien Species Management Plan (IASMP) (**Appendix A** of this BMP) shall be applied.	IFC PS6 ESIA Section 8B	During construction phase	Records of the inspections carried out. Register of IAS encountered and eradicated.	Implementation of the Invasive Alien Species Management Plan (IASMP)	EPC Contractor HSES Manager Health & Safety Site Supervisor E&S specialist	To be implemented.

8.2 Operation

The table below details the environmental management and mitigation measures/actions identified for BIO management activities during operation phase. For each measure/action identified, the table shows:

- **Item:** the identification code of the mitigation measure/actions (ID);
- **Measure/Actions:** description of the mitigation measure/actions;
- **Source document:** is the reference to one or more applicable standard (i.e. National Regulation and Permits, EU Regulations/Directives, IFC PS/Guidelines, or other GIIP);
- **Timeline and frequency:** frequency/timing of the measure/action;
- **KPI (Key Performance Indicator):** quantitative compliance indicator or qualitative acceptance criteria to be used to confirm the actual effectiveness of the mitigation measure/actions;
- **Target:** final qualitative or quantitative objective to comply with;
- **Responsibility:** resource responsible for implementing the measures/actions;
- **Status:** progress of the measures/actions.

The aim of the "mitigation hierarchy" (avoidance, minimization, rehabilitation/restoration, offset) is to select the most appropriate measures to limit as far as possible negative impacts to the environment.

This process is intended as an adaptive management system, so that the mitigation and management approach will be adapted based on any new findings which could arise from the monitoring program described in the following section.

In case during monitoring non-conformities or unexpected residual impacts due to the Project are identified on site, the Biodiversity Specialist, will evaluate the situation and, if needed, **propose changes and integrations to the mitigation and monitoring activities** included in the present BMP.

The proposed changes will be evaluated by the designated and adequately trained EHS&S specialist and approved by the Voltalia EHS&S Manager or Chief Sustainability and Environmental Officer.

Table 5: Mitigation measures/actions for operation phase

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
BIO-13	**Minimization: Wildlife Management** ▪ The use of rodenticides to control small mammals will be banned to avoid indirect impacts to predators (*e.g.* Marbled Polecat (*Vormela peregusna)* or raptors). ▪ The use of herbicides in the Project area to control vegetation in the Project area and under the solar panels is banned. ▪ Any fauna species encountered and found during operation should be left on-site. ▪ Prevent the accumulation of stagnant water and organic waste within the construction site and on the roads, that could attract wildlife, especially amphibians. ▪ Feeding of wildlife or stray cats and dogs will be prohibited on-site. Fauna carcasses, if found, will be removed and organic waste will be carefully managed and disposed in order to avoid attraction of wildlife or stray cats and dogs.	IFC PS6 ESIA Section 8B	During operation phase	Register of alive animal's observations or carcasses. Records of the implementation of good practices for vegetation control.	Full implementation of measures within and around Project construction sites.	EPC Contractor Site Manager HSES Manager Health & Safety Site Supervisor E&S specialist	To be implemented.
BIO-14	**Minimization: Habitat fragmentation reduction.** Fencing around the SPPP will present a 30x30 cm passage every 100m. The frames of the gaps created will be strengthened with a metal reinforcement in order to avoid larger animals to damage it. These gaps will ensure ecological continuity and allow species of conservation concern and with low mobility (in particular the Central Asian Tortoise, *Agrionemys horsfieldii*) to move in and out of the project site, thus maintaining connectivity with populations located in areas outside of the project.	IFC PS6 ESIA Section 8B	During operation phase	Records of the presence of gaps in the fences in the right positions. Checks of records during EHSS Audit visits.	Full implementation of the measure to ensure ecological continuity.	EPC Contractor Site Manager HSES Manager E&S specialist	To be implemented.
BIO-15	**Minimization: Employees and subcontractors' awareness raising and training.** ▪ Awareness among employees and contractor working on site about the protected species/habitats potentially present in the area will be developed, to ensure constant monitoring and promote actions to be taken if wildlife is encountered. ▪ HSES personnel must be trained to safely catch and manage specimen that would be found in the Project area during operational activities and for its safe removal and relocation in a suitable environment. Provide for the intervention of a biodiversity expert in case of need. ▪ Particular attention will be paid during the maintenance of solar panels so as not to disturb or injure the fauna present in the project area, particularly the reptiles of conservation interest. ▪ Illegal hunting and animal caught for traditional medicine or food purposed will be forbidden. Contractors, sub-contractors, and their staff must be informed that employees who would intentionally kill or extract reptiles and other fauna specimen from the Project site will be excluded from the Project without prior notice. ▪ An incentive will be provided for workers to report specimen to the HSES personnel on-site. Include in the workers code of conduct workers awareness raising about the presence of reptiles of conservation interest (tortoises and snakes) in the Project area. ▪ By partnering with agencies responsible for law control, the Contractor could strengthen law enforcement against illicit wildlife trade.	IFC PS6 ESIA Section 8B	During operation phase	Records of the training carried out to the employees and contractors. Record of the implementation of the wildlife rules.	Increased awareness on biodiversity protection.	EPC Contractor HSES Manager Health & Safety Site Supervisor	To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
BIO-16	**Restoration: Assessment of habitat fragmentation and loss.** The installation of the SPPP will likely result in the loss of natural habitats, loss of suitable habitat for PBF species, fragmentation of habitat due to the fencing and the modification of soil moisture and shading. Although the impacts can be qualitatively anticipated, to date it is not possible to reliably quantify how these factors will interact over time to determine a net loss of natural habitat and PBF, as the presence of the SPPP can lead both to positive or negative impacts for PBF species and their natural habitats. Therefore, a field monitoring campaign will be conducted to assess the changes over time of the site conditions and in particular the evolution of the natural habitat and the abundance of PBF species. The field monitoring campaign will help to enrich the knowledge of the flora and fauna species present in the Project LSA and how they interact with the natural habitats occupied by the Project Footprint. The monitoring will include: ▪ a **pre-construction** survey in spring for flora species using plots to assess flora distribution and abundance; ▪ a **pre-construction** surveys for fauna species, in spring to evaluate the abundance of PBF species population and their interaction with the Project footprint; ▪ surveys **after 3 years** from the Solar Power Plant installation for both flora and fauna (PBF) species (using the same methodology as for pre-construction); ▪ surveys **after 5 years** from the Solar Power Plant installation for both flora and fauna (PBF) species (using the same methodology as for pre-construction). *The results of monitoring activities and additional studies will allow to understand whether additional conservation actions or offset measures are needed and how to implement them.* **Flora field monitoring** The objective of the monitoring is to verify whether there will be impacts on vegetation/habitats, from time zero (pre-construction) to the operation of the project (after 3 years and after 5 years). The study is also aimed at assessing how habitats and floristic composition will evolve under solar panels and in the absence of grazing due to the presence of fences. Therefore, two types of quadrants to be monitored will be identified in the project area: i) those under the solar panels; and ii) those inside the fences but not under the solar panels and therefore not subjected to the effects due to the presence of the panels. Each **vegetation quadrant** will be 4x4 m and the corners will be marked using poles hammered into the ground so that they would be easy to be recognised in the following monitoring campaigns. A total of 12 permanent quadrants inside the project area, of which 8 under the solar panels and 4 inside the fences but not under the solar panels will be marked. Also 4 control quadrants will be collocated in the area outside the fences but adjacent to the project area and with the same habitat as the one present in the project area. Whenever possible, the 4x4 quadrants' locations will be the same of the quadrants used during the ESIA baseline studies (coordinates are available in chapter 6.2.2.1 Flora field surveys). The following data will be collected: ▪ Location coordinates: longitude and latitude in decimal degrees and WGS 84 datum; ▪ unique identifier for plot, surveyors, date; ▪ total vegetation cover (%), vegetation cover (%) for each stratum (i.e., herbaceous stratum, short shrubs stratum, tall shrubs stratum); ▪ vegetation species for each stratum; ▪ threat/disturbance present (example: soil compaction, soil erosion, dust deposition, offroad driving) ▪ disturbance level (very high, high, medium, low, none);	IFC PS6 ESIA Section 8B	Pre-construction (spring and winter) During operation phase year 3 of operation (spring and winter) year 5 of operation (spring and winter)	Register of the number and locations (coordinates) of the fauna and flora survey plots and record of all the data to be collected. Record of the flora and fauna species surveyed during the three field-monitoring campaigns. Records of measure to be kept and reported by the Biodiversity Specialist(s).	Assessment of the habitat positive or negative changes and fauna species frequentation to conclude on the habitat loss or gain.	Site Manager HSES Manager Health & Safety Site Supervisor E&S specialist	To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	▪ any other information considered useful (example: any particular fauna activities); ▪ photographic documentation: perpendicular photo of the plot, landscape photos of the vegetation in the four cardinal directions (N, E, S, W). Close-up pictures showing the soil surface characteristics and the amount of ground surface covered by vegetation and litter. In addition, a walkover survey through the PV panel areas will be completed each year to identify any areas of lower vegetation cover, any damages to the quadrants or other potential issues to be remediated. The above proposed methodology shall be subject to review based on new project information such as the selection of the final layout. **Fauna field monitoring** PBF fauna species monitoring shall comprehend both vantage point and line transects. The location of the **Vantage point** will be the same used during baseline studies (Coordinates (WGS 84 – DD (Decimal degrees): Long 61.983110, Lat 41.079410) and will be same for the entire period of monitoring (from the pre-construction survey, after 3 years and after 5 years from SPP installation). Monitoring campaign (spring) should include 3 days of work and observations will cover the period from dawn to the onset of heat and during the evening - after the decline of the daytime heat until sunset (depending on weather conditions). Recorded species will be registered with the relevant information: ▪ Species and number of individuals; ▪ Presence of nests and burrows, geo-localization and distances from the Project footprint; ▪ Time spent over the site or at the site; ▪ Flight altitude; ▪ Distance from the ViewPoint; ▪ Flight direction; ▪ Behaviour (foraging, predation, interaction with other species, etc.). **Line transects** will be positioned as follows: ▪ four transects one along every north, west, south-oblique and east borders of the SPPP; ▪ two transects under the OTL line. Every transects will be 500 m length and be the same for the entire period of monitoring (from the pre-construction survey, after 3 years and after 5 years from SPP installation). For every transect following data will be collected: ▪ Geo-localization; ▪ Date and time; ▪ Species observed and number of individuals; ▪ Observing distance (in/out of 0-100 m band from the transect line) ▪ Biological activity (flying, feeding, sheltering, breeding, etc.) ▪ Presence/Number of nests: geolocalization and distance from the Solar Power Plant and the OTL line; ▪ Presence/number of fatalities: geolocalization and distance from the Solar Power Plant and the OTL line.						
BIO-17	**Minimization: Minimize the overall emissions of pollutants and dust.** *Due to the nature of the Project, relevant pollutants and dust emissions are not expected to occur during the operation phase. Should the Lenders deem a Air Quality Management Plan is required for the Project, the mitigation measures included shall be considered sufficient to mitigate potential disturbances to biodiversity (if any).*						To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
BIO-18	**Minimization: Minimize noise emissions from inverters, facilities and vehicles.** *Due to the nature of the Project, relevant noise disturbances are not expected to occur during the operation phase. Should the Lenders deem a Noise Management Plan is required for the Project, the mitigation measures included shall be considered sufficient to mitigate potential disturbances to biodiversity (if any).*						To be implemented.
BIO-19	**Minimization: Reduce light emissions.** ▪ The lighting shall be planned in order to ensure a level of light required for the safety of the workers and the safety of the equipment while minimizing the luminous level; ▪ Keep glare to a minimum by ensuring that the main beam angle of all lights directed towards any potential observer is not more than 70°. When lighting vertica structures, direct light downwards wherever possible. ▪ When selecting lighting, the next should be considered: • ensure that their placement minimizes stray light and glare. Prefer dark-sky compliant full-shielded (i.e., full cut-off) light fixtures that direct light downwards below the horizontal plane and result in no up-light; • the use of more warm-white light sources shall be implemented, as proposed by many organizations (The Dark and Quiet Skies consortium, the International Union for Conservation of Nature and United Nations Office for Outer Space Affairs). • Prefer light sources with a wavelength comprised between 500 and 700nm. The optimal light sources are the ones higher than 560nm; • Lumens (amount of light produced) shall be preferred rather than watts (amount of energy used) when selecting lighting. Low glare lighting fixtures shall be preferred to reduce excessive brightness and diffuse light. Low glare options will also require less energy; ▪ Night activities will be reduced to a minimum. ▪ Using non reflective surface treatments for project facilities. Reduce building contrast levels by using finishes with low reflectance levels and colours that match natural landscapes. Using non reflective surface treatments for project facilities. Reduce building contrast levels by using finishes with low reflectance levels and colours that match natural landscapes.	IFC PS6 ESIA Section 8B	During construction phase	Records of the lighting selected and installed.	Full implementation of all light emission management actions within and around project construction sites.	EPC Contractor Site Manager HSES Manager Health & Safety Site Supervisor E&S specialist	To be implemented.
BIO-20	**Minimization: Reduce collision risk.** Line markers and bird flight diverters will be installed to minimize the collision risk towards power cables, making them more visible to birds. The choice of markers shall consider the next criteria for higher effectiveness: ▪ Install bird diverters on the TL's grounding wires that are not subject to the risk of frost and breakage. Prefer metallic 3D (coil shape) bird diverters, rather than plastic 2D bird diverters. ▪ markers should be as large as possible, and increase the visible thickness of the line by at least 20 cm, for a length of at least 10-20 cm; ▪ nocturnally visible devices (phosphorescence, ultraviolet radiation and other means) shall be installed; ▪ Diverters can be installed in different electric cable or just a single electric cable, as long as the entire power line is visible to birds in flight. Moreover, as much as technically feasible, the routes of neighbouring power lines shall be combined to the planned power lines to create a single obstacle and make them more visible.	IFC PS6 ESIA Section 8B IUCN Guideline *Wildlife and power lines*	During operation phase	Records of the line markers and bird-friendly glasses intalled. Records of the selected OTL line design.	Implementation of IUCN Guidelines. Full implementation of bird's deterrents within the OTL line and Project's buildings.	EPC Contractor Site Manager HSES Manager Health & Safety Site Supervisor	To be implemented.

Item	Mitigation Measures/Actions	Source document	Timeline and frequency	KPI	Target	Resp.	Status
	▪ The new OTL line must be designed of similar size and parallel to the existing transmission line (which runs from the SPPP to the Sarimay power station) and must be as close as technically feasible to it. ▪ The towers of the new OTL must be staggered from those of the existing one, such that each tower is aligned with the mid-span of the neighbouring line. In this way the lines become more visible.						
BIO-21	**Minimization: Reduce electrocution risk.** As much as technically feasible, to minimize the risk of electrocution: ▪ the supports of the OTL will be equipped with modern anti-landing protection device; ▪ the dead-end structure will be protected by shielding protection devices and insulating devices. Moreover, to minimize the risk of electrocution generated by cables and devices present in the SPPP, suitable cable boxes, or armouring etc. will be installed.	IFC PS6 ESIA Section 8B IUCN Guideline *Wildlife and power lines*	During operation phase	Records of the supports to reduce electrocution risk installed.	Full disposal of anti-landing devices and insulation devices.	EPC Contractor Site Manager HSES Manager	To be implemented.
BIO-22	**Minimization: Minimize road kills.** ▪ To minimize the risk of wildlife investment, all drivers accessing the site will be briefed and trained about the speed restrictions. ▪ Signs and labels showing the maximum speed allowed will be affixed at the site entrances and on the Project footprint roads. Animal crossing sings will be installed in the access road and internal roads. ▪ If necessary, installation of speed bumps and noise stripes on straight sections of the access and internal roads shall be implemented. ▪ If any fauna species are injured during the operational activities, a Fauna Handling and Rescue Procedure must be activated, and the species taken to a vet for treatment. ▪ To reduce the likelihood that scavenging species will be struck by vehicles, roadkill will be removed or relocated and shall be reported as an environmental event. Moreover, all fauna deaths and real animal sightings in the project site will be reported. ▪ Project traffic routing will be reduced especially during sensitive periods (nesting, reproduction). ▪ Trucks and moving vehicles will travel only on predefined paths. ▪ No vehicles and trucks will leave the predefined road for shortening the travel time or because of roads interruption without proper authorization. Entrance of unauthorized vehicles shall be forbidden.	IFC PS6 ESIA Section 8B	During operation phase	Records of the training carried out to the employees and contractors. Presence of maximum speed signs and animal crossing signs. Records of the fauna species encountered and relocated. No signs of vehicles footprint creep outside planned areas.	Full implementation of measure within and around Project sites.	EPC Contractor Site Manager HSES Manager Health & Safety Site Supervisor E&S specialist	To be implemented.

9.0 MONITORING ACTIVITIES

The following tables details the monitoring actions identified for BIO management activities during the construction (Table 6) and operation phases (Table 7). The aim of the monitoring actions is to verify whether the residual impacts are under control and the mitigation measures/actions have been effective.

For each monitoring measure/action identified, the table shows:

- Item: the identification code of the monitoring activity (ID);
- Monitoring Activity: description of the monitoring activity;
- Source document: the reference to one or more applicable standard or limit value (i.e. National Regulation and Permits, EU Regulations/Directives, IFC PS/Guidelines, or other GIIP);
- Timeline and frequency: frequency/timing of the monitoring activity;
- KPI (Key performance indicator): regulatory limit value or qualitative acceptance criteria to comply with;
- Responsibility: resource responsible for implementing the monitoring activity;
- Status: progress of the measures/actions.

The monitoring actions, which serve to evaluate the effectiveness of the mitigation measures, may be changed and integrated following the processing of the results collected during the three field monitoring seasons included in mitigation measure BIO-27 (to be performed during pre-construction, after 3 years and again after 5 years).

The proposed changes will be evaluated by the designated and adequately trained biodiversity and EHS&S specialist and approved by the Voltalia EHS&S Manager or Chief Sustainability and Environmental Officer.

Table 6: Monitoring actions for construction phase

Item	Monitoring Actions	Source doc.	Timeline and frequency	KPI	Responsibilities	Status
MA-01	**Footprint creep and other inadverted impacts.** Inadvertent impacts on natural habitats present around the construction site will be monitored monthly in order to be able to put in place corrective actions in a timely manner whenever needed (eventual driving outside designated areas, signs of dust accumulation, presence of waste or hazardous substances spill, etc.).	IFC PS6 ESIA Section 8B	During the entire construction phase. Monitor once a month.	No inadvertent impacts on natural habitats during construction	Health & Safety Site Supervisor	To be implemented.

Item	Monitoring Actions	Source doc.	Timeline and frequency	KPI	Responsibilities	Status
MA-02	**Wildlife management.** ▪ Wildlife roadkills and observations of live animals or carcasses along the access road or at the construction site will be recorded. ▪ Presence of protected reptile species (*Agrionemys horsfieldii, Varanus griseus, Eryx miliaris*), protected bird species (e.g., *Pandion haliaetus, Aquila chrysaetos, Otis tarda, Aquila heliaca, Clamydotis macqueenii,* see Table 8 of the ESIA baseline for further species) and protected terrestrial mammal species (*Vormela peregusna*) in and around the LSA will be also recorded when possible with photographic documentation and reported to the EHSS Supervisor on site. Additional mitigation measures to discourage wildlife presence on site and avoid roadkill and illegal poaching will be taken if needed.	IFC PS6 ESIA Section 8B	During the entire construction phase. Reports of incidents/ observations to be presented every 3 months.	No accidents involving wildlife or the observation of carcasses. Register of wildlife observations from employees/ contractors.	E&S specialist	To be implemented.
MA-03	**Invasive Species.** ▪ Presence and spreading of invasive flora species within and around the construction site will be monitored at least twice a year during the vegetative season by an expert botanist. ▪ Invasive species, where identified, will be dealt with in accordance with the Invasive Species Management Plan (**Appendix A**).	IFC PS6 ESIA Section 8B Invasive Alien Species Management Plan (IASMP)	During the construction phase and, in particular, during flowering period (June/July). Monitor twice a year.	No spreading of Invasive Alien Species within the Project LSA.	E&S specialist	To be implemented.

Table 7: Monitoring actions for operation phase

Item	Monitoring Actions	Source doc.	Timeline and frequency	KPI	Responsibilities	Status
MA-04	**Haloxylon spp. individuals' relocation effectiveness** The effectiveness of the relocation of the Haloxylon spp. individuals will be monitored according to the local requirements, together with the vegetative status of the individuals.	Local legislation	First weeks after completion. Yearly, during flowering period (March/April): during first 3 years of operation and in and in year 5 and 8.	Plants in good vegetative health Successful relocation	Health & Safety Site Supervisor E&S specialist	To be implemented.
MA-05	**Habitat Rehabilitation/Restoration for temporary facilities** The effectiveness of the restoration activities for temporary facilities will be monitored in the first weeks after completion. Subsequently, a walkover survey of the entire temporary facilities will be completed each year to identify any areas of lower vegetation cover or other potential issues to be remediated.	IFC PS6 ESIA Section 8B	First weeks after completion. Yearly, during flowering period (March/April): during first 3 years of operation and in and in year 5 and 8. If KPIs are not met within 3 years from construction, remedial actions of the planned restoration activities will be implemented. The implementation of remedial actions will be planned after an	All temporary facilities fully restored with species consistent with natural salt-steppe habitat and vegetation cover >25%	E&S specialist	To be implemented.

Item	Monitoring Actions	Source doc.	Timeline and frequency	KPI	Responsibilities	Status
			analysis of the possible critical issues that have emerged. After implementation of these remedial actions, monitoring activities will continue until the KPIs are met.			
MA-06	**Invasive species** ▪ Presence and spreading of invasive flora species in the LSA will be monitored by an expert botanist, especially in the areas located under the photovoltaic panels and the OTL. ▪ Invasive species, where identified, will be dealt with in accordance with the Invasive Species Management Plan (**Appendix A**).	IFC PS6 ESIA Section 8B Invasive Alien Species Management Plan (IASMP)	Twice a year, during flowering period (June/July): during first 3 years of operation and in year 5 and 8. If KPIs are not met within 3 years from construction, monitoring will continue until the KPIs are met.	No spreading of Invasive Alien Species within the Project footprint.	Health & Safety Site Supervisor E&S specialist	To be implemented.
MA-07	**Fauna Species of Conservation Concern – Reptiles and mammals.** ▪ The results of the pre-works checks and report of sightings of reptile and mammal species, including incidents causing fauna injuries or death will be carefully evaluated to assess the effectiveness of mitigation measures.	IFC PS6 ESIA Section 8B	Yearly, during spring/summer period (May/September): during the first 3 years of operation and	Presence of species of conservation	Health & Safety Site Supervisor E&S specialist	To be implemented.

Item	Monitoring Actions	Source doc.	Timeline and frequency	KPI	Responsibilities	Status
	▪ For reptile species (*Agrionemys horsfieldii, Varanus griseus, Eryx miliaris*) conduct standardized sampling survey using 10 transects of approximately 300-500 m performed within the Project Site. The transects will redistributed in all sections of the SPP. Surveys should be performed during tortoise and other reptiles' activity periods, in spring during the central part of the day (between 10:00 h and 14:00 h) or in the summer season during the morning or afternoon (between 09:00 h and 10:00 h and between 16:00h and 18:00 h). Surveyors should record all living tortoises or other reptiles, carcasses, scats, verified burrows (with scats or tortoises inside), and otherwise suitable/potential burrows. ▪ Marbled Polecat (*Vormela peregusna)* and other mammals, walkover surveys will be conducted to identify the burrows using 1x1 km grid squares and line transects.		in year 5 and 8 of operation. If KPIs are not met within 3 years from construction, monitoring will continue until the KPIs are met.	concern[14] .		
MA-08	**Fauna Species of Conservation Concern – Birds.** Breeding birds: Before any maintenance operation, to be carried out within the Project site in the period between mid-March and June, breeding bird surveys should be completed. Should any active nests be identified, these shall be recorded and marked on field maps, and such maintenance activity in the applicable facility/equipment/location shall be postponed until the end of the breeding season. Soaring / migrating Birds: Carcass surveys will be completed under the OTL between September and October for autumn migration	IFC PS6 ESIA Section 8B	For breeding birds: 2 surveys during breeding period (mid-March and June) for the first 3 years. For soaring/migrating birds: twice per month between	Presence of species of conservation concern[14] .	Health & Safety Site Supervisor E&S specialist	To be implemented.

[14] Species of conservation concern (SCC) refers to a plant or animal species that is identified as facing a heightened risk of endangerment or extinction. These species are given special attention and conservation efforts due to their threatened status.

Item	Monitoring Actions	Source doc.	Timeline and frequency	KPI	Responsibilities	Status
	and between end of February and mid-March for spring migration. The route of the OTL will be walked twice per month to record PBF species fatalities.		September and October for autumn migration and between end of February and mid-March for spring migration. If KPIs are not met within 3 years from construction monitoring will continue until the KPIs are met.			
MA-09	**Wildlife management and awareness** Accidents involving wildlife or the observation of live animal or carcasses along the permanent access roads or in the areas occupied by permanent infrastructures will be recorded. Additional mitigation measures to discourage wildlife presence on site and avoid roadkill will be taken if needed.	IFC PS6 ESIA Section 8B	During the entire operation phase. Reports of incidents/observations to be presented every 3 months.	No accidents involving wildlife or the observation of carcasses. Register of wildlife observations from employees/ contractors.	Health & Safety Site Supervisor E&S specialist	To be implemented.

10.0 Additional Conservation Actions and offsetting

Once the field monitoring campaigns under Mitigation Measure BIO-27 (Table 5) will be completed and the actual loss, if any, of natural habitats and suitable foraging and nesting habitats for PBF species will be assessed, it will be clear whether additional conservation actions are needed, and will be applied as a first resort. Should **additional conservation actions** be deemed necessary but prove not to be effective overtime after close monitoring, **offset measures** will therefore be taken.

Potential additional conservation actions and potential offset measures are detailed below. However, these shall be further refined and selected upon need and at the time of the habitat monitoring results assessment.

10.1 Potential Additional Conservation Actions

The following additional conservation actions could be implemented by involving local and regional NGOs committed to nature conservation. Additional conservation actions could include:

10.1.1 Awareness-raising campaign in villages/schools.

The campaign aims to raise local communities' awareness and contribute to young generations education on the sustainable use of biodiversity and its conservation. The awareness raising campaign will focus on:

i) the protected areas near the Project site;

ii) the importance of protecting the PBF fauna present within the LSA; and

iii) the importance of the ecosystem services offered by the natural habitat occurring in the LSA.

The awareness-raising campaign could include the following actions:

- Preparation of posters and brochures detailing information on the protected areas in the vicinity of the LSA (Khorazm National Nature Park and the Gorelde KBA and IBA) and on the threatened fauna species occurring in the LSA;
- Preparation of posters and brochures detailing information on the role of sand fixation as a method of erosion control and on the importance of the Natural Habitats providing such ecosystem service;
- Organization of public meetings with potentially impacted populations with the aim of achieving sensitization on environmental issues;
- Implementation of stewardship projects on PBFs occurring in the LSA, involving owners and users in conservation and promoting collaboration among owners, stewardship bodies and other public and private agents. Usually, stewardship bodies are non-for-profit organizations and stewardship is based on voluntary agreements;
- Reaching out to schools and education institutions to raise awareness about PBFs and propose above-mentioned stewardship programs on such PBFs;
- Increasing public awareness of the importance of the species for the regional biodiversity by providing information on the PBFs at commonly visited locations in collaboration with school and local/national NGO's.

10.1.2 Poaching control in the Gorelde IBA & KBA and Khorazm National Park protected area and, in the Project's, neighbouring areas.

Locally, the three reptile species of conservation interest are illegally hunted as a source of food or for use in traditional medicine. Additional measures for poaching control for these fauna species are therefore of high importance. The implementation of additional measures for poaching control will focus on the protection of the Central Asian Tortoise, the Desert Monitor and the Desert Sand Boa and they will be conducted in collaboration with local authorities and protected areas management bodies.

Additional measures for poaching control could include:

- Implementation of anti-poaching measures for the protection of the Central Asian Tortoise, the Desert Monitor and the Desert Sand Boa within the Project Site and its neighbouring areas, including nearest protected areas (Khorazm National Park and Gorelde IBA & KBA);
- Antipoaching measures are extended also to fauna species triggering PBF. The ban on hunting and or collection of animals and plants from the Project Site will be strictly enforced by Voltalia and this will avoid and minimize any operational related impacts on biodiversity features within the Project Site. All contractors and site staff will be reminded that this ban is also effective within areas outside of the Project Site.
- Breeding/nesting area of species of conservation concern will be fenced and access to the area will not be allowed during breeding/nesting season.

10.2 Potential Offsetting measures

Should the above-mentioned additional conservation actions not prove to be effective overtime, the following offset measures could be implemented:

Habitat restoration:

If within three years, the *Haloxylon* spp relocation prove to not be successful and the vegetation in the solar plant has not recovered to the 25% it would be necessary to evaluate potential rehabilitation measures. Habitat loss could be offset by restoring the same or similar habitat types in specifically selected suitable areas, by planting native and local adaptive flora species and protecting the areas from external disturbance factors or exploitations (e.g., grazing, and other human activities). Among the plant species that could be used to improve land and habitat quality, of major importance are the herbaceous desert ephemeral forms, which are extremely important to the sand fixation and soil protection processes. The Contractor should implement this offset measure by selecting areas outside of the Project footprint, to avoid wildlife attraction within the Project Site.

The selected areas shall be maintained, and a monitoring plan should be implemented in order to: keep track of the restoration activities, evaluate their effectiveness, and include a maintenance plan as well. The monitoring plan should include the quality control of the soil, the quality control of mixtures for hydroseeding, the periodic inspection of engrafted planted herbaceous plants and shrubs and the management of restored areas over time.

One of the possible selected sites of this offset measure could be identified within the borders of the "Gorelde" IBA and KBA, or within the "Khorazm" National Park.

Biodiversity enhancement by promotion of sustainable practices:

Optimal locations in which to implement sustainable practices nearby the Project site will be identified. Actions such as sustainable agricultural practices or waterbodies management measures could be implemented to improve and enhance local biodiversity features. Sustainable and best practices should be promoted in collaboration with local authorities, NGOs, and biodiversity organizations. A plan could be implemented to design and promote local sustainable economies in order to protect the selected local areas and its natural resources.

One of the feasible selected sites could be the Amu Darya River channel, flowing at a few kilometres of distance from the Project footprint, and characterized by the presence of riparian forests and vegetation, with associated floodplains and wetlands in the surrounding. The waterbody is a tributary of the Aral Sea and its commonly exploited by local communities for agricultural and industrial practices, mostly in unsustainable ways, thus identifying potential offset opportunities.

It should be noted that the "Gorelde" IBA and KBA are located along the Amu Darya River and could be identified as one of the targets of this offset measure.

11.0 TRAINING & AWARENESS

All employees including employees of Voltalia, EPC Contractor, and the selected sub-contractors will receive general workplace orientation, site-specific workplace orientation and comprehensive training that includes environmental and social awareness and compliance training to be aligned with Project ESIA and ESMS requirements. The training will be conducted at predefined intervals and during daily toolboxes.

Awareness among employees of Voltalia, EPC contractor, and the sub-contractors working on site will be developed for what concerns the protected/threatened species and habitats potentially present within the AoI. Training will be given to ensure that all the mitigation measures indicated in this Management Plan are applied during the construction, operation, and decommissioning phases of the Project for all involved parties.

All the workers will follow a general training concerning all the aspects regarding Biodiversity and the related prohibitions and best behaviours to be adopted (i.e., safe actions to be taken if wildlife is encountered, prohibition of feeding of wildlife or stray cats and dogs, removal of fauna carcasses, management of organic waste, avoidance of accumulation of stagnant water, cleanliness to be maintained within the Project site and in particular in all offices and workers' buildings, measures to be taken if rats or other pests are observed, the ban on hunting and the collection of animals and plants within the Project Site).

In addition, all drivers employed by Voltalia, EPC contractor, and sub-contractors will undertake a specific training regarding the issues related to the use of vehicles (i.e., speed limits to be respected, restriction of the vehicle movements to the existing roads, removal of fauna carcasses along the road, behaviour to be adopted if wildlife species are encountered along the road).

The EHS&S Manager will be the main responsible for these trainings.

12.0 INSPECTION & AUDIT AND REVIEW

The correct implementation of this Biodiversity Management Plan is verified through internal inspections and audits to be carried out according to the requirements included in section "Internal audit" of the "ESMS Manual" and in the "Audit and Non-Conformities Procedure".

The schedule, the frequency, the scope and objectives of the audit as well as the responsible internal auditors are indicated in the Audit Program that is developed and updated by Voltalia.

Internal auditing shall address:

- the correct implementation of this Management Plan;
- the correct development and implementation of Contractor's Plan;
- the correct and timely implementation of an auditing and review system by the Contractor;
- each of the points indicated in the tables in section 0 (mitigation measures/actions) and 0 (monitoring activities) of this Plan;
- the establishment of a stakeholder engagement process related to the aspects addressed by this Management Plan.

Evidence and results of the inspection and audit activities shall be included in the audit reports and in the "Non-Conformity and Preventive/Corrective actions" records.

Voltalia Management will review results of inspections and audits and the progress of the Preventive/Corrective actions and, if necessary, take additional appropriate actions according to the indications included in section 12.9.7 "Management Review" of the ESMS Manual.

Additional details related to both construction and the operation phase of the Project are expected to come in due course; it is therefore recommended that this Plan is subject to a systematic review process during the construction phase, the starting of operation (3-4 months before), and operation in order to encompass and consider any information relevant to the BIO matters.

During steady state operations, this Management Plan will be reviewed on an annual basis and any necessary revisions made to reflect the changing circumstances, operational needs or monitoring results. Revision of this Management Plan will be the responsibility of the EHS&S Manager, who is in charge of this Plan.

12.1 Reporting of the monitoring activities

Evidence and results of the monitoring activities (detailed in section0) must be described in detail in appropriate monitoring reports. These monitoring reports must include the following minimum information/data (where relevant):

- localization of the monitoring activities (geographical coordinates in WGS84 system and elevation);

- map of the surveyed area;
- timing of the data collection (start date and end date);
- description of the applied methodology;
- KPI (Key performance indicator): regulatory limit value or qualitative acceptance criteria to comply with;
- the responsibility for implementing the specific monitoring activities (including reference to this Management Plan and reference to the appointment of third parties eventually contracted to perform part of the activity, e.g. external laboratories and consultants);
- conclusions on compliance vs. KPI, and eventual observations;
- implications and recommendations in respect to adaptive management;
- quality control procedures applied to ensure consistency and reliability of the analyses or results.

12.2 Reporting of the auditing activities

Evidence of the implementation of the mitigation measures/actions (detailed in section 0), of the timely deployment of monitoring activities (detailed in section 0) and of related results are described in the audit reports. These audit reports must include the following minimum information/data:

- list of the items audited (detailed in sections 0 and 0);
- information whether the items have been implemented within the indicated timeline and frequency;
- achievement (or not) of the KPIs;
- description of non-compliances eventually identified.
    - detailed remedial action and follow-ups.

Finally, an annual Biodiversity Report will be prepared by Voltalia Biodiversity Specialist to summarize the results of the mitigation and monitoring activities performed during the calendar year and edits to be included in the next review of the BMP based on the adaptive management.

13.0 Bibliography

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