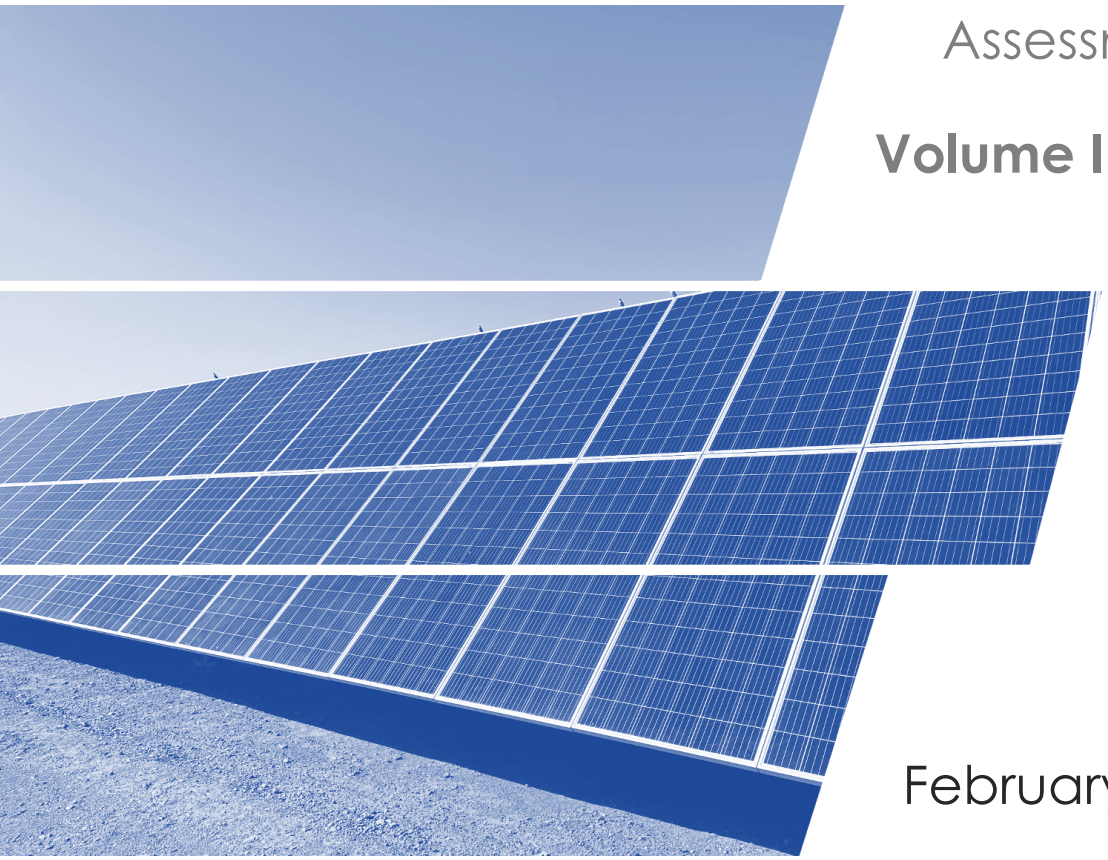
Tashkent Solar PV and BESS Project
Republic of Uzbekistan

Environmental and Social Impact Assessment (ESIA)

Volume II: Main Text



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LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
AC	Alternating Current
AEP	Annual Exceedance Probability
AIS	Air-Insulated Sub-Station
AoI	Area of Influence
AZE	Alliance for Zero Extinction Sites
BAP	Biodiversity Action Plan
BESS	Battery Energy Storage System
BMEP	Biodiversity Monitoring and Evaluation Plan
BMP	Biodiversity Management Plan
BMS	Battery Management System
BoM	Bill of Materials
CDM	Clean Development Mechanism
CEEC	China Energy Engineering Corporation
CESMP	Construction Environmental & Social Management Plan
CH	Critical Habitat
CHA	Critical Habitat Assessment
CLOs	Community Liaison Officers
COD	Commercial Operation Dates
CRU	Climatic Research Unit
DC	Direct Current
DEG	German Investment Corporation
DEM	Digital Elevation Model
DFIs	Development Finance Institutions
DoD	Depth of Discharge
EBA	Endemic Bird Areas
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EMS	Energy Management System
EPFIs	Equator Principles Financial Institution
EPFIs	Equator Principles Financial Institutions
ESG	Environmental and Social Governance
ESIA	Environmental and Social Impact Assessment
ESMS	Environmental and Social Management System
ETC	Early Transition Countries
FGD	Focus Group Discussions
GBV	Potential Gender-Based Violence
GCM	Global Climate Models
GHG	Greenhouse gas

ABBREVIATION	MEANING
GHI	Global Horizontal Irradiance
GIIP	Good International Industry Practice
HGVs	Heavy Goods Vehicles
HSSE	Health Safety Security and Environmental
HV	High-Voltage
HVAC	Heating, Ventilation and Air Conditioning
IBA	Important Bird Areas
IFIs	International Financial Institutions
IPs	Indigenous Peoples
IsDB	Islamic Development Bank
JSC the	Joint-Stock Company
KBA	Key Biodiversity Areas
KIIs	Key Informant Interviews
LALRP	Land Acquisition and Livelihood Restoration Plan
LCA	Landscape Character Assessment
LGA	Local Government Authorities
LILO	Loop-In-Loop-Out
LLA	Land Lease Agreement
MDAs	National Ministries, Departments, and Agencies
MEEPCC	Ministry of Ecology, Environmental Protection and Climate Change
MME	Multi-Model Ensemble
MPC	Maximum Permissible Concentrations
MV	Medium-Voltage
NCC	National Climate Contributions
NDC	Nationally Determined Contribution
NEGU	National Electric Grid of Uzbekistan
NFPA	National Fire Protection Association
NG	Net Gain
NGOs	Non-Governmental Organizations
NNL	Not Net Loss
NTS	Non-Technical Summary
O&M	Operation and Maintenance
OESMP	Operational Environmental & Social Management Plan
OTL	Overhead Transmission Line
PAC	Project-Affected Communities
PAs	Protected Areas
PBF	Priority Biodiversity Features
PCS	Power Conversion System
PGA	Peak Ground Acceleration
PICs	Project Information Centres

ABBREVIATION	MEANING
PPA	Power Purchase Agreement
PPP	Public-Private Partnership
PSs	IFC Performance Standards
PV	Photo-Voltaic
RCP	Representative Concentration Pathway
SACs	Special Areas of Conservation
SCADA	Supervisory Control and Data Acquisition
SCMP	Supply Chain Management Plan
SEA	Sexual Exploitation and Abuse
SEE	State Environmental Expertise
SEP	Stakeholder Engagement Plan
SoC	State of Charge
SPAs	Special Protection Areas
SSP	Shared Socioeconomic Pathway
STCs	Standard Testing Conditions
UNFCCC	United Nations Framework for the Convention on Climate Change
UPS	Uninterruptable Power System
VECs	Valued Environmental Components
VES	Vertical Electrical Sounding
VOCs	Volatile Organic Compounds
VP	Vantage Point
ZTV	Zone of Theoretical Visibility

1 INTRODUCTION

ACWA Power intends to undertake the development and operation of a 200 MW Photovoltaic (PV) Plant and 500 MWh Battery Energy Storage System (BESS), in partnership with the Ministry of Energy of the Republic of Uzbekistan, and with international financing from project lenders including Equator Principles Financial Institutions (EPFIs). This Report presents the Environmental and Social Impact Assessment for the Project, which has been undertaken in alignment with Environmental and Social (E&S) performance standards required by the Project's prospective lenders.

1.1 National Energy Context

Uzbekistan is amongst the fastest growing economies in the Central Asian region, with an increasing demand for energy. By 2018, the country's power consumption reached 50 million TWh, and the domestic demand for power has been projected to rise at an annual rate of 4%, due to continued population growth and industrial expansion. In 2019, the installed capacity of electricity generation in Uzbekistan totalled 63 TWh, with natural gas fired thermal power plants accounting for 85% of this production.

The steady uptrend in power consumption, declining yield of aged power plants and emergent climatic pressures have led to unprecedented power supply shortages, particularly within the regions of Tashkent, Andijan, Namangan, Ferghana, Samarkand, and Surkhandarya. In December 2022, severe grid congestion ensued from widespread spikes in electrical demand for domestic heating under extreme winter temperatures, culminating in a series of power blackouts across Tashkent Region. The emerging power crisis in Uzbekistan has prompted an urgent agenda for the development of the country's renewable energy base. This movement falls in line with the country's policy shift towards decarbonization and a greener economy.

In 2018, Uzbekistan ratified the Paris agreement, and in 2021 the country submitted its latest Nationally Determined Contribution (NDC) to global carbon footprint cutbacks. The NDC includes a commitment to reduce domestic greenhouse gas (GHG) emissions by 35% relative to its 2010 GHG output by 2030. In step with the power security emergency and efforts towards green transition, the Government of Uzbekistan introduced several sectoral strategies and laws to scale up the country's renewable power infrastructure. These instruments include the Strategy for the Transition of the Republic of Uzbekistan to the Green Economy for the Period (2019-2030), Law on the Use of Renewable Energy (2019), and the Transmission Network Development Plan to 2030. Amongst other objectives, the reforms

mandate a larger renewable contribution (25%) to Uzbekistan's energy mix, and upgrade of interconnection facilities for the integration of additional power sources, efficient and stable transmission, and international electricity trade.

To promote private sector inclusion and international collaboration in the country's pursuit of a carbon-neutral economy, the Government of Uzbekistan has also enhanced the policy landscape on these fronts, with the execution of the Law on Public-Private Partnership (PPP, 2019) and the Presidential Decree on Measures to Further Improve the Mechanisms of Attracting Foreign Direct Investment to the Economy of the Republic.

1.2 Project Rationale and Roadmap

The emergence of a dire energy crisis at the height of recent peak-demand periods has been met with urgent measures to augment the installed power capacity within Tashkent Region and the country at large. This agenda will largely involve the establishment of additional renewable energy sources, with a target of attaining a solar power capacity of 10,000 MW by 2030.

With regard to renewable energy production, Uzbekistan offers remarkable technical solar energy potential totalling 7,411 PJ, which is fourfold higher than the country's current electricity consumption level. In terms of local Photo-Voltaic (PV) power potential, recent solar resource assessments across the country have indicated a Global Horizontal Irradiance (GHI) value of 4.52 kWh per square metre, which equates to 2,000 hours of sunshine per year. This potential is attributable to the country's central geographic location, distance from large waterbodies, and predominantly anticyclonic conditions.

To leverage the country's solar resources in response to the current power crisis and climate agenda, the Government of Uzbekistan has passed a Presidential Decree on Measures to Increase the Effectiveness of Reforms Aimed at the Transition of the Republic of Uzbekistan to A "Green" Economy by 2030 (2022). In its commitment to include private sector machinery in the fast-paced development of the country's energy infrastructure, the Ministry of Energy of Uzbekistan has signed a USD 7.5 billion investment agreement with ACWA Power (hereinafter the Project Developer).

In furtherance of the master agreement, on 19 March 2023, the Joint-Stock Company (JSC) National Electric Grid of Uzbekistan (NEGU) entered into a Power Purchase Agreement (PPA) with ACWA Power (hereinafter Project Developer), for the fast-track development and operation of a 400-megawatt (MW) PV plant and a 500 megawatt hour (MWh) Battery Energy Storage System (BESS) in Tashkent Region. The agreement will be executed over a period of 25 years and 20 years from the Commercial Operation Dates (COD) for the PV

plant and BESS components respectively. Upon the completion of the agreement term, the project facilities will be handed over to the off-taker (NEGU) for subsequent operation and maintenance (O&M).

To this end, the project company, ACWA Power Riverside Solar LLC, was nationally registered on 23 March 2023. With the project planning in progress, The Project Developer is seeking international financing from Development Finance Institutions (DFIs) including the European Bank for Reconstruction and Development (EBRD), German Investment Corporation (DEG), Islamic Development Bank (IsDB) and Proparco/ French Development Agency (AFD) (hereinafter Project Lenders).

To ensure comprehensive planning and permitting, in keeping with applicable E&S appraisal criteria, the Project Developer has commissioned 5 Capitals (hereinafter the Consultant) to undertake a bankable Environmental and Social Impact Assessment (ESIA) and Land Acquisition and Livelihood Restoration Plan (LALRP) for the Project. The Consultant has engaged Juru and NBT as local sub-consultants in the delivery of the national EIA and support on certain elements of the bankable E&S impact assessment studies.

1.3 Requirements for E&S Assessment

The Project will involve the greenfield development of two major facilities for the generation and storage of electricity within two peri-urban districts in Tashkent Region. The Project Developer is seeking project finance from a number of International Financial Institutions (IFIs). The operations and activities of these FIs are guided by E&S policies that serve to mainstream the identification, assessment and management of the E&S risks associated with investment projects, in furtherance of the global initiative on sustainable development.

The commitment towards ensuring environmental and socioeconomic sustainability of development projects is enshrined in numerous international conventions and IFI performance benchmarks addressing topical developmental issues, such as biodiversity conservation, pollution control, climate change, preservation of cultural heritage, protection of human rights, public participation in decision-making, and access to information. This commitment is also founded on the principles of transparency, accountability and good governance, which underpin the mandates of the IFIs in relation to their partners, clients and stakeholders (including project-affected communities).

As set out in the broad-based international accords and industry guidelines, beyond the management of E&S risks, project-specific E&S risk appraisal processes are aimed at creating sustainable and equitable project benefits for potential beneficiaries, and pre-empting legal, financial and reputational risks associated with failure to meet relevant host country

regulatory requirements, project development objectives and IFI operational policies. An expansive discussion of the legal and administrative context for the Project's E&S appraisal is provided in Section 3 of this Report, with an elaboration on the Project's E&S risk categorization.

In consideration of the project development plan at the time of this assessment, the Project is subject to a dual E&S impact assessment framework prior to the start of operations, as outlined below:

- A phased national EIA study aimed at assessing potential E&S impacts and developing appropriate management measures in line with national laws and regulations. The outcomes of this appraisal are positive conclusions for each stage of the study, whereby interim E&S clearance is issued (i) in advance of the Project's construction phase, and (ii) final E&S clearance is issued prior to the Project's operational phase.
- A bankable ESIA study aimed at ensuring (i) statutory E&S compliance, (ii) delivery on ratified E&S convention commitments, and (iii) alignment with the mandates, policy objectives, national and sectoral strategies, and E&S requirements of the Project Lenders. Further to the ESIA, an ESDD will be undertaken by the lenders E&S advisor, the outcome of which is the development of an E&S Action Plan (ESAP), which will contain the E&S loan covenants for implementation during the Project's lifecycle.

The E&S impact assessment framework applicable to the Project requires the Project developer to commission national and bankable ESIA studies and furnish pertinent information, to enable informed appraisal in line with statutory and lender policy requirements.

1.4 Objectives of the ESIA

The objectives of this ESIA in relation to this project include the following:

- Provide an overview of the Project design, identification of sensitive receptors in the Project's area of influence and assessment of Project alternatives.
- Assessment of baseline conditions prior to the development of the Project through review of available data and conducting surveys;
- Assessment of the project's environmental and social impacts for the construction and operational phases;
- Review of compliance obligations, including applicable Uzbekistan regulations and international regulations and standards as well as international lender requirements;
- To engage with key stakeholders and project affected people to disclose Project information, study outcomes, gain lay knowledge about the local environmental and social context, seek feedback on proposal and to understand and map any resettlement requirements.

- Determination of applicable mitigation and management measures including monitoring requirements to be implemented in order to avoid or minimise potential impacts and maximise potential environmental and social gains;
- Consideration of alternatives that can be used for the project leading to reduced impacts and/or greater social and environmental gains.
- Prepare a framework from which the construction phase and operational phase respective environmental and social management systems and plans can be developed and implemented.

1.5 Structure of the ESIA

This ESIA is presented in the following format:

- **Volume 1**: Non-Technical Summary
- **Volume 2**: Main Text, Tables and Figures
- **Volume 3**: Framework for Environmental and Social Management
- **Volume 4**: Appendices

Volume 1 provides a Non-Technical Summary of the ESIA, including the main outcomes, and conclusions.

Volume 2 includes the assessment of impacts associated with the Project.

Volume 3 provides a framework for the development of the Construction and Commissioning and Operational Environmental and Social Management Systems (including associated system structures, documents and management plans) based on the findings from this ESIA. The intention is that this volume (alongside the full ESIA package and other E&S documents) will be issued to the EPC Contractor and O&M Company to develop and implement their project specific ESMS respectively; under the Project Company's E&S Policy.

2 PROJECT DESCRIPTION

The following sections elaborate on the facilities, activities and resources planned for the Project's construction and operational phases. This description is based on the best available information at the time of this assessment and serves to aid the identification of the Project's E&S aspects and potential impacts.

2.1 Key Project Information

Table 2-1 Key Project Information

PROJECT TITLE	Tashkent Solar PV and BESS Project
PROJECT DEVELOPER	ACWA Power
PROJECT COMPANY	ACWA Power Riverside Solar LLC
OFF TAKER	JSC National Electric Grid of Uzbekistan
EPC CONTRACTOR	China Energy Engineering Corporation (CEEC)
O&M COMPANY	NOMAC
ENVIRONMENTAL CONSULTANT	5 Capitals Environmental and Management Consulting (5 Capitals) PO Box 119899, Dubai, UAE Tel: +971 (0) 4 343 5955, Fax: +971 (0) 4 343 9366 www.5capitals.com
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POINT OF CONTACT	Ken Wade (Director), Ken.wade@5capitals.com

2.2 Project Location

The Project consists of two main components, namely the Photo-Voltaic (PV) power station and the Battery Energy Storage System (BESS). The PV plant and the BESS facility are situated 3.5 km apart, within Yuqorichirchik District and Parkent District respectively. Both districts are located within Tashkent Region. The overall project location lies about 20 km from Tashkent City.

The collector sub-station that will be located within the PV plant site will export generated power to an adjacent 220kV Overhead Transmission Line (OTL), which extends along the southern and eastern boundary of the PV plant site towards an existing sub-station situated

700 metres south of the BESS site. The collector sub-station will be connected to the grid by a Loop-In-Loop-Out (LILO) connection measuring a length of about 200 metres.

The locations of the planned PV plant and BESS facilities relative to those of the existing 220kV OTL and sub-station are shown in Figure 2-1 below.

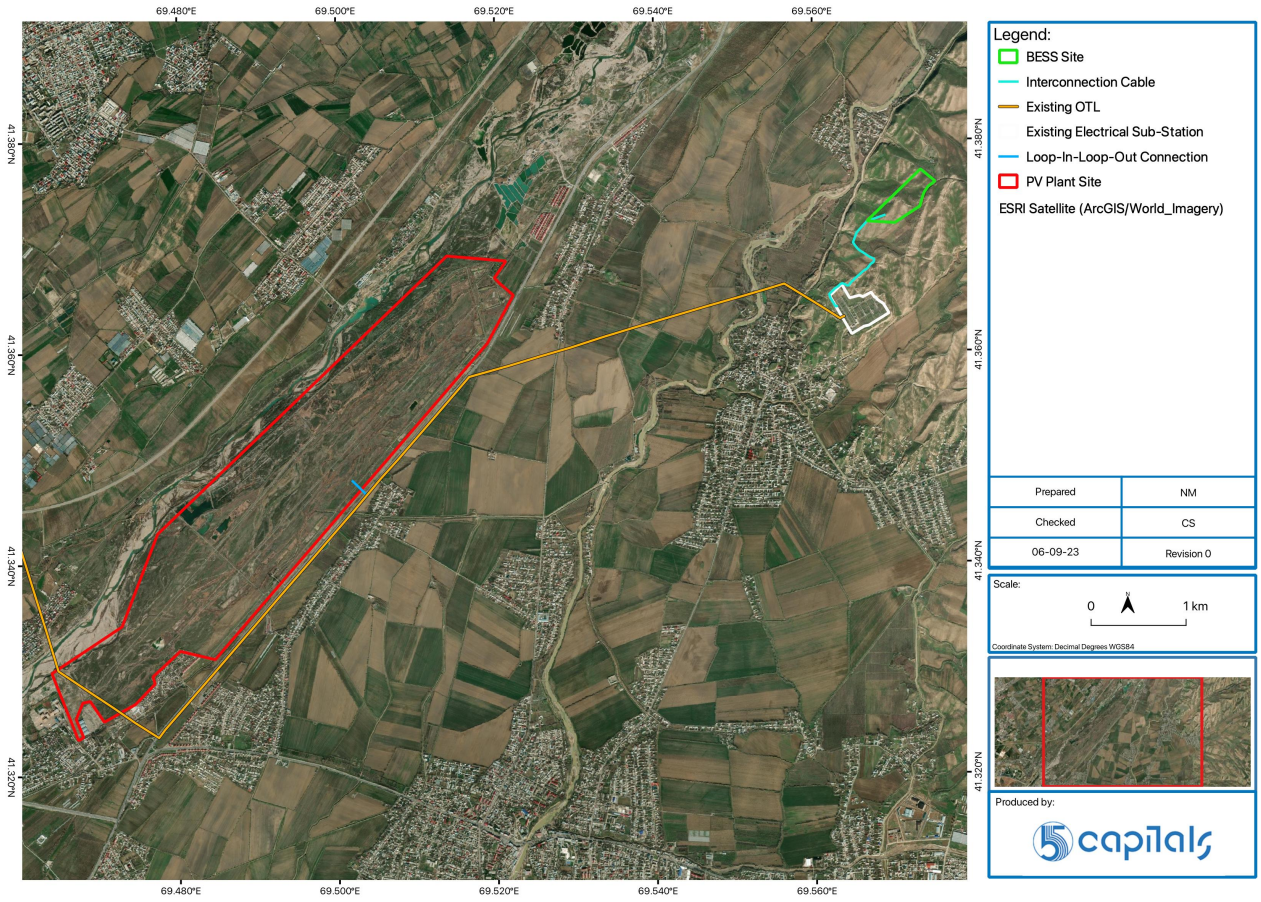


Figure 2-1 Location of the planned PV plant and BESS relative to existing OTL and sub-station

The GPS coordinates for the PV plant and BESS sites are provided in the table below.

LATITUDE	LONGITUDE
PV plant site	
41.325191°	69.470523°
41.330067°	69.464979°
41.365295°	69.522204°
41.369126°	69.514002°
BESS site	
41.366310°	69.563611°
41.365157°	69.562050°
41.363517°	69.569715°
41.361561°	69.564812°

2.3 Existing Land-Use and Land Acquisition

A total of two land parcels will be acquired for the development of the Project's temporary and permanent facilities. The hectarage of these plots is outlined in Table 2-2, and information on the tenure and current use of the land is presented subsequently.

Table 2-2 Overview of the land take for the project facilities

PROJECT SITE	SIZE (HA)
PV plant and collector sub-station	655
BESS facility	16

An additional area of land will be acquired on an easement basis, for the development of a 220 kV OTL and an underground interconnection cable, which measure a total length of 200 metres and 1.56 kilometres respectively.

2.3.1 PV plant and sub-station site

2.3.1.1 Land ownership

The plot of land designated for the development of the PV plant facilities, including the collector sub-station is under the ownership of the Joint Stock Company (JSC) Uzsuvtaminot, which is a utility company providing water supply and sewerage services within Tashkent Region.

2.3.1.2 Land use

CO-LOCATED WATER SUPPLY INFRASTRUCTURE

Sections of the land within the PV plant site are currently utilized for surface water treatment, groundwater recharge and the abstraction of groundwater, for potable water supply to service areas within Tashkent region. The site has been utilized for water supply since 1955.

On 28th April 2023, a joint meeting and site visit was held between the representatives from Project developer, Uzsuvtaminot and the hydrological survey team from Juru Limited. Subsequently, Uzsuvtaminot issued an inventory of the water supply facilities resident within the site, as well as regulatory source protection zones (buffers) for each category of operational facilities. Due to its sensitivity, exhaustive information on the utility assets was not disclosed for the purposes of the ESIA study. Nevertheless, ESIA-stage consultations with local engineers from Uzsuvtaminot indicated that the main resident facilities include the following:

- A concrete fence running along the northern, eastern and southern perimeter of the site. The entry gate and access road to the site is located along the eastern side of the site, which is located close to the 4R-12 highway.
- Administrative buildings, sanitary facilities and guard posts.
- A total of 63 groundwater wells, of which 48 are operational and 15 are on standby.
- One feeder canal channelling water from an upstream section Chrichik River.
- A total of 28 retention ponds, most of which are dilapidated and out of use.
- A number of water infiltration channels.
- Pumping stations and pipework.
- Auxiliary assets, including internal water distribution pipes and electrical cables.

The consultations further indicated that Uzsuvtaminot has arranged for severely degraded facilities (in disuse) and has sought the Project developer's assistance in the upgrade of a few existing facilities, and the establishment of several new infiltration ponds and channels. More information on these initiatives is provided in Section 2.6.3 of this Report.

As the original holder of land within the PV plant site, Uzsuvtaminot provided a non-objection statement (as part of the national EIA), to allow for limited acquisition of unused land for the development of the Project. Nevertheless, considering that Uzsuvtaminot will continue to utilize a significant fraction of land interspersed with the project facilities, a joint Site Management Plan will be established to ensure due coordination on the management of HSSE risks and impacts, initially during construction, and subsequently during operations.

Some of the compulsory avoidance and mitigation measures to prevent contamination impacts on water resources in and around the site, H&S accidents, as well as various form of property damage, over the course of the Project's construction and operation phases, include the following:

- Establishment of a Site Management Plan, which will (i) delimit land areas designated for the two different land usages (including internal access roads and walkways) and (ii) establish a basis for joint and respective roles and responsibilities, with regard to the management of HSSE risks and impacts (i.e., including contingencies, such as spills, fire outbreak and floods)).
- Demarcation of the water supply and power supply system footprints and their respective buffer zones/ setbacks (I.e., sanitary protection zone, grid security zones specified in relevant laws or prescribed by competent authorities on ad-hoc basis).
- Mandatory restriction of activities and facilities that pose potentially detrimental and/or catastrophic impacts on the existing water supply utility assets, operations and associated impacts on human health. Key proscribed activities include (but are not limited to):
    - The bulk on-site storage of hazardous materials (e.g., fuels).

- On-site maintenance of heavy machinery.
- Encroachment of sanitary buffers for water sources and waterworks.
- Earthworks within the riverine buffer of Chirchik River.
- Provision of site access to unauthorized entities.
- Littering and inappropriate disposal of waste, including open burning.
- Establishment of construction-enabling facilities (i.e., warehouses, laydown areas and EPC Contractor staff offices) within central or riparian locations on the site.
- Uncontrolled use and blockage of internal access roads for O&M activities by Uzsuvtaminot.

- Institution of common/ overarching management plans and procedures managing mutual health, safety risks, and security risks, as well emergency preparedness and response.
- Monitoring and auditing to rectify non-conformances pertaining to the management of HSSE risks and impacts.

The perimeter of the site is fenced on all fronts, except the western boundary, which is situated about 100 meters from Chirchik River. Access to the site is strictly prohibited, and security personnel are stationed across the area. No other land usages were observed within the site, and no private property is located in the area.





Figure 2-2 Uzsuvtaminot administrative offices (left) and pump station (right)within the PV plant site

NEARBY LAND-USES

The main land-uses noted within 500 meters of the site boundaries include commercial establishments located along the southern and south-western bounds, the 4R-12 highway east of the site, a cluster of aquacultural ponds located a distance away from the northern boundary, an underground gas pipeline north of the site, and an existing 200kV OTL running the southern and south-western boundaries.



Figure 2-3 Existing OTL within the PV plant site (left) and Chirchik River close to the site (right)

2.3.2 BESS site

2.3.2.1 Land ownership

Prior to the commencement of the Project, land within the BESS site was placed under the ownership of the Cultural Heritage Agency (CHA) of Uzbekistan, as part of a wider tract measuring a total area of 179 hectares. However, following the issue of the Presidential Resolution to provide for the Project, the Cultural Heritage Agency returned the undeveloped land to the land reserves of the Tashkent Regional Khokimiyat (administration), following the completion of a pre-construction archaeological survey to confirm the absence of any tangible cultural heritage resources within the area.

2.3.2.2 Land use

The site designated for the establishment of the BESS is undeveloped, and no farmland, built-up structures, utility assets or water sources are present within the area. Site visits and consultations with local authorities and community leadership indicated that the BESS site is occasionally utilized for herding, albeit to a limited extent as the area does not offer abundant pastures (as compared to the nearby expanse).





Figure 2-4 Pasture field within the BESS site (left) and the existing sub-station south-west of the area (right)

A large portion of the landscape surrounding the BESS site is utilized for grazing, and herds of cattle were encountered during field reconnaissance. A patchwork of actively farmed land extends across the middle section, western, eastern, and southern extremities of the surrounding area. Agricultural production sighted nearby the site includes the cultivation of wheat, apple trees and plum trees.





Figure 2-5 Fallow land and fruit tree orchards within areas surrounding the BESS site

2.4 Identification of E&S Impact Receptors

A preliminary identification of potential E&S receptors (i.e., Valued Environmental Components) located within 3 kilometres of the PV plant and BESS plot boundaries was carried out based on the examination of satellite imagery, early site visits, and progressive consultations with key stakeholders. The general Area of Influence (AoI) was set to 3 km considering the maximum AoI, which is expected for the majority of potential direct impacts associated with the main project facilities.

The land-uses and potential E&S receptors around the PV plant are shown in the figure below.

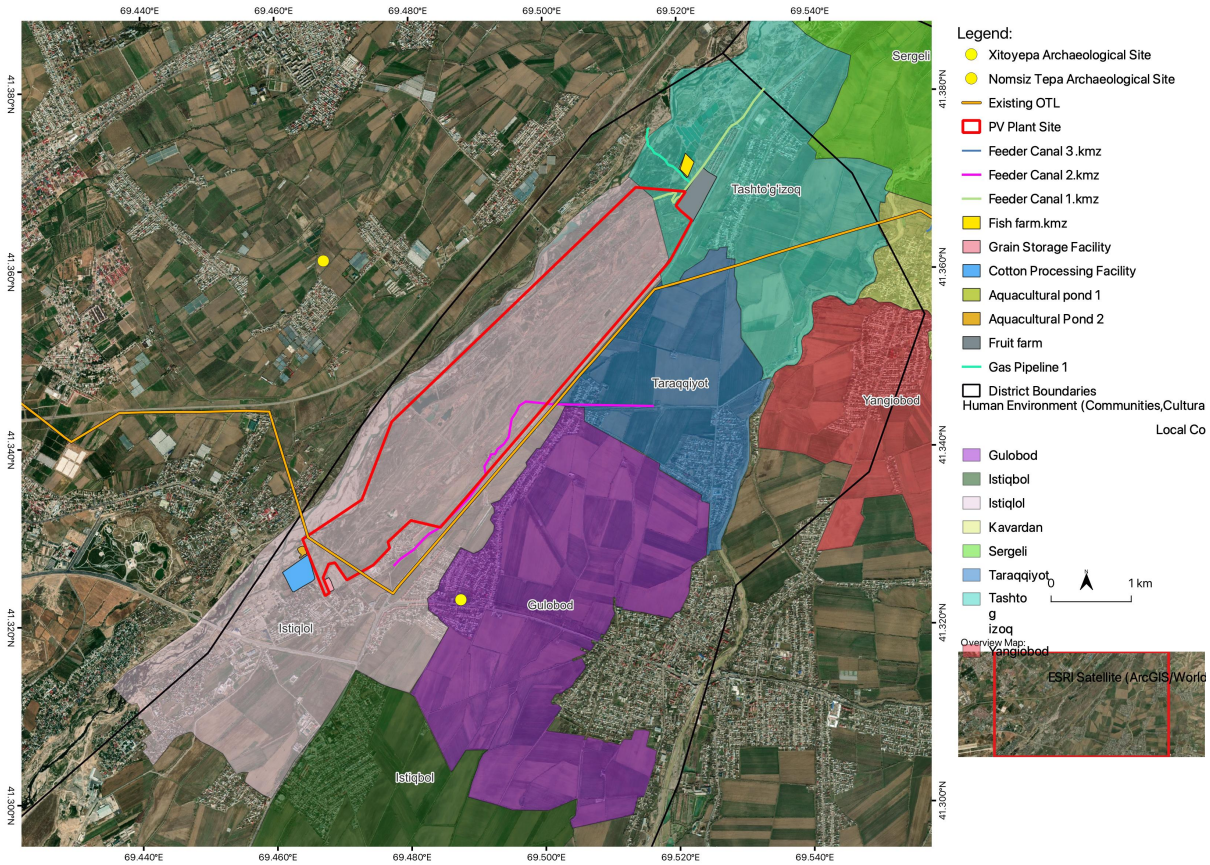


Figure 2-6 Overview of potential E&S impact receptors within 3 kilometres of the PV plant site

Table 2-3 below provides further information on the E&S receptors identified within the general AoI of the PV plant site, with respective summary descriptions and locations relative to the boundaries of the project footprints.

Table 2-3 Overview of potential E&S impact receptors within 3 kilometres of the PV plant plot boundaries

Receptor Type	Proximity to Project Sites	Description
Uzsuvtaminot water supply facilities	Within the project site	Boreholes, piping, pumping stations, infiltration channels and retention ponds, electrical cabling, administrative buildings and sanitary facilities operated by Uzsuvtaminot.
Chirchik River	100 metres west	Chirchik River channel located an average of 100 meters from the western site boundary.
Feeder canal 1	Within the project site	Feeder canal channelling water from an upstream section of Chirchik River.
Feeder canal 2	Within the project	Feeder canal channelling water from Karasu River,

Receptor Type	Proximity to Project Sites	Description
	site	which stems from an upstream section of Chirchik River.
Aquacultural pond	200 metres north	Cluster of fish farming ponds, with the nearest pond located north of site boundary.
Istiqlol residential community (with commercial complex)	Immediate south	Residential community adjoining the southern site boundary, with the nearest zone featuring a commercial complex.
Tashto'g'izoq residential community	Immediate north	Residential community adjoining the northern site boundary, with the nearest zone featuring a cluster of fish farms.
Taraqqiyot residential community	100 metres east	Residential community located east of the site boundary, including extensive farmland.
Gulobod residential community	300 metres east	Residential community located east of the site boundary, including extensive farmland.
Istiqbol residential community	1 kilometre south-east	Residential community located south-east of the site boundary, including extensive farmland.
Yangiobod residential community	2 kilometres east	Residential community located east of the site boundary, including extensive farmland.
Kavardan residential community	2.5 kilometres north-east	Residential community located north-east of the site boundary, including extensive farmland.
Sergeli residential community	1.7 kilometres north of the site	Residential community located north of the site boundary.
4R-12 highway	50 metres east	A paved road connecting the district to the main radial and outer ring roads of Tashkent City.
Gas pipeline 1	122 metres north	Yangiyor-Tashkent gas pipeline, with a length of 201 km, depth of 0.8m to 1.5m below ground level and a diameter 1220mm.
220kv OTL	Within the project site	An existing OTL intersecting the southern portion of the site and running along the western boundary of the site.
Xitoytepa cultural heritage site	0.9 kilometres east of the site	A cultural heritage exploration area east of the site.
Nomsiz Tepa cultural heritage site	2 kilometres west of the site.	A cultural heritage exploration area west of the site.
Fish farm	100 metres south-west of the site	An aquaculture recreational site under construction.
Fruit garden	Immediately north-east of the site	Strawberry farm

The land-uses and potential E&S receptors around the BESS are shown in the figure below.

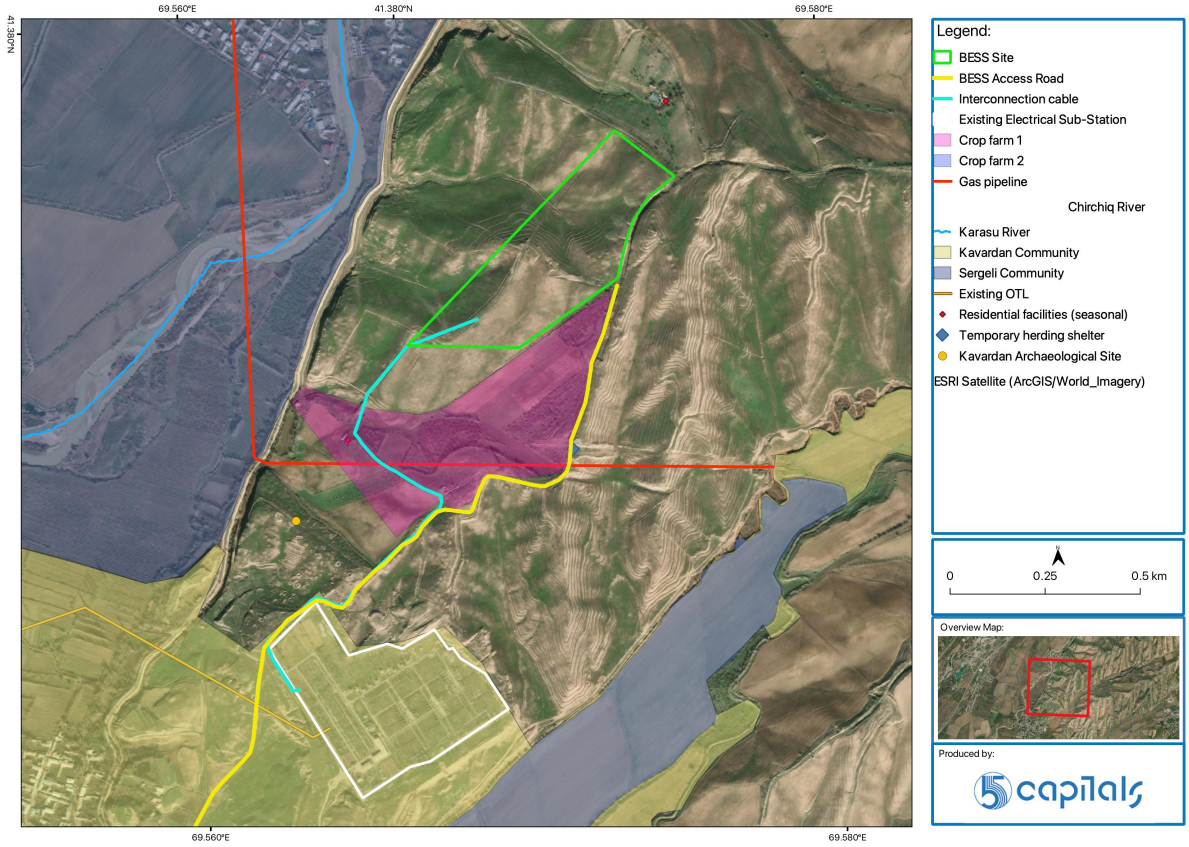


Figure 2-7 Overview of potential E&S impact receptors within 3 kilometres of the PV plant site

Table 2-3 below provides further information on the E&S receptors identified within the general AoI of the BESS site, with respective summary descriptions and locations relative to the boundaries of the project footprints.

Table 2-4 Overview of potential E&S impact receptors within 3 kilometres of the BESS plot boundaries

Receptor Type	Proximity to Project Sites	Description
Karasu River	362 metres west	Main canal stemming from Chirchik River.
Khandam Canal	245 metres west	Irrigation channel stemming from Karasu River.
Residential plot 1	140 metres north-east	Residential facility (to be confirmed) located north-east of the site.
Residential plot 2	264 metres south-west	Residential facility located south-west of the site.
Temporary herding shelter	5 metres east of the BESS access road	Private temporary shelter (shading) site for herder employed at the private farm located immediately west of (across) the road.
Tashto'g'izoq residential community	1.2 kilometres west	Residential community west of the site.
Yangiobod	2.1 kilometres south-	Residential community located south-west of the

Receptor Type	Proximity to Project Sites	Description
residential community	west	site boundary, including extensive farmland.
Kavardan residential community	885 metres to the south and east	Residential community located east and south of the site boundary, including extensive farmland.
Sergeli residential community	300 metres west	Residential community located west of the site boundary.
Qirg'izovul residential community	1.8 kilometres south-east	Residential community located south-east of the site boundary, including extensive farmland.
4R-12 highway	2.4 kilometres west	A paved road connecting the district to the main radial and outer ring roads of Tashkent City.
Gas pipeline 2	300 metres to the west and south	Syrdaryo-Tashgres gas pipeline, with a length 198 km, depth of 0.8m to 1.5m and diameter of 1020mm.
220kv OTL	1 kilometre south	An existing OTL connecting to the nearby sub-station.
Existing sub-station	600 metres south-west	An existing sub-station located south-west of the site.
Cemetery	990 metres south-west	A communal cemetery located south-west of the site.
Kavardan Cultural Heritage Site	540 metres south-west	A cultural heritage exploration area south-west of the site.

2.5 Land Acquisition Process

2.5.1 Power Purchase Agreement

On 19 March 2023, the National Electric Grid of Uzbekistan (NEGU) JSC executed a Power Purchase Agreement (PPA) with the Project Developer and Project Company. The agreement requires the Project Company to construct the PV power plant, BESS, and underground interconnection powerline. According to the PPA, following the construction of these facilities, the Project Company will be responsible for the operation and maintenance of the PV power plant and BESS facilities for power supply to the national grid over a period of 25 years.

2.5.2 Presidential Resolution

On 14 June 2023, the Presidential Resolution No. PQ-189 on Measures to Implement the Investment Project 'Construction of Solar Photovoltaic Power Plant And Electricity Storage System in Yurkochirchik District of Tashkent Region' was established (see Annex 1). The Resolution mandates the Ministry of Investment, Industry and Trade (MIIT) and the State Assets Management Agency (SAMA) to allocate land plots for the development of the PV power plant and BESS within Yukorichirchik and Parkent Districts in Tashkent Region.

2.5.3 Transfer of Land Rights

In furtherance of the Presidential Resolution for the implementation of the Project, the following two decrees were issued by the Mayor of Tashkent Region, to transfer the ownership of targeted land parcels from Uzsuvtaminot JSC to the Ministry of Energy:

- On 11 July 2023, the decree no.317-10-0-Q/23 was established to mandate an application by Uzsuvtaminot JSC for the return of 460 hectares of residual (unoccupied) land parcels within the 'Kibray Water Facility Plot' to state reserves, pursuant with Provisions 6 and 25 of the Law on Local State Municipality (see Annex 2).
- On 17 July 2023, the decree no.335-10-0-Q/23 was established to mandate the transfer of the targeted land parcels from government reserves to the Ministry of Energy for the development and operation of the PV power plant and LILO see Annex 2).
- In August 2023, two additional decrees were established to mandate the return of 15.9 hectares of the targeted, undeveloped land parcels under the ownership of Cultural Heritage Agency to state reserves, and the subsequent acquisition of these land parcels by the Ministry of Energy for the development and operation of the BESS and underground interconnection cable.

2.5.3.1 PV power plant site

The third-party tenure within the plot of land partially allocated to the development of the PV power plant will continue on the basis of an effective land allotment order. This tenure will apply to all areas required for the continued operation and maintenance of the utility assets belonging to Uzsuvtaminot.

The parcels of residual land designated for the operation and maintenance of the project facilities will be held on the basis of a LLA between the Ministry of Energy and the Project Company, for the duration of the Project's operational phase. In addition, a tripartite easement agreement involving the Ministry of Energy, Project Company and Uzsuvtaminot will be established for additional areas of land held by Uzsuvtaminot, where ad-hoc access may be required for occasional maintenance purposes during operations.

Following the issue of the Presidential Decree, Uzsuvtaminot played a lead role in the delineation of residual (unused) land parcels for reallocation to the Project. Consultations with Uzsuvtaminot confirmed that the Project's construction and operational footprint will not impact upon any operational water supply facilities within the plot. No aspect of the utility facilities, water supply services or labour will be curtailed by the Project. The consultations also indicated that another operational water extraction zone managed by the utility is situated about 300 metres west of the site, across Chirchik River, and no expansion plans were developed prior to the Project.

Further, early engagement with Uzsuvtaminot involved the demarcation of protective buffer zones for all resident water supply facilities, to avoid contingent contamination of soil and ambient water resources close to boreholes and accidental damage to utility assets, during construction. At the national EIA stage (preceding the bankable ESIA study), the Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC) also prescribed a riparian buffer of 60 metres for Chirchik River, which generally lies about 200 metres west of the project footprint. This buffer serves as both a sanitary setback to prevent sediment loading and the inflow of contaminated runoff, and leeway for any alluvial flood events and related erosion.

The transfer of remnant (unutilized) land parcels to the Ministry of Energy will not result in the diminution of water supply operations and workforce. In addition, the planned project facilities and activities will not sever access to operational utility assets and water resources.

2.5.3.2 BESS site

Land within the BESS site was previously held by the Cultural Heritage Agency, however, no developments were undertaken within the site. Following the issue of the Presidential Decree for the Project, the Agency commissioned an archaeological survey to ascertain the absence of any tangible heritage resources within the site prior to the handover of land. Consultations with the Agency established that no archaeological finds were noted in the survey, and that the project footprint does not fall within any protective buffers for designated cultural heritage sites or objects.

The Project Company will enter into an overarching LLA (i.e., pertaining to both PV plant and BESS sites) with the Ministry of Energy, for ownership of the BESS site, for the duration of the Project's operational term. The entire footprint of the underground interconnection cable linking the BESS to the nearby sub-station falls within the Right of Way (RoW) of an existing community road. An easement agreement will therefore be established between the Parkent District Road Department, the Project Company and two PAPs (i.e., one PAP whose farmland falls within the Right of Way of the existing access road, and CHA who owns the remainder of land within the road RoW and cable footprint.

2.6 Project Facilities

Project facilities planned for the Project's construction and operational phases can be split into several categories, based on their relation to the project and the financing agencies involved in the development of these facilities.

2.6.1 Main facilities

The main facilities refer to facilities planned as part of the project, which are of primary importance to the Project's operational objectives and funded by the Project Lenders.

These facilities comprise the solar (PV) power plant and the BESS. The PV plant components will serve the following main functions:

- Generation of solar power.
- Conditioning of the raw electrical output, for conformity with the operational standards of the recipient utility grid.
- Evacuation of power harnessed by the PV plant to the recipient utility grid.

The main functions of the BESS include:

- Storage of surplus power in the utility grid during periods of off-peak demand.
- Controlled discharge of stored power to the utility grid during periods of limited production and/or peak-demand.

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2.6.1.1 Solar power (PV) plant

The solar (PV) plant sited within Yuqorichirchik District will operate at a capacity of 200 MW, with a total estimated lifetime yield of 11,861,233 MWh. The PV plant components involved in the generation of electricity from solar radiation are described as follows.

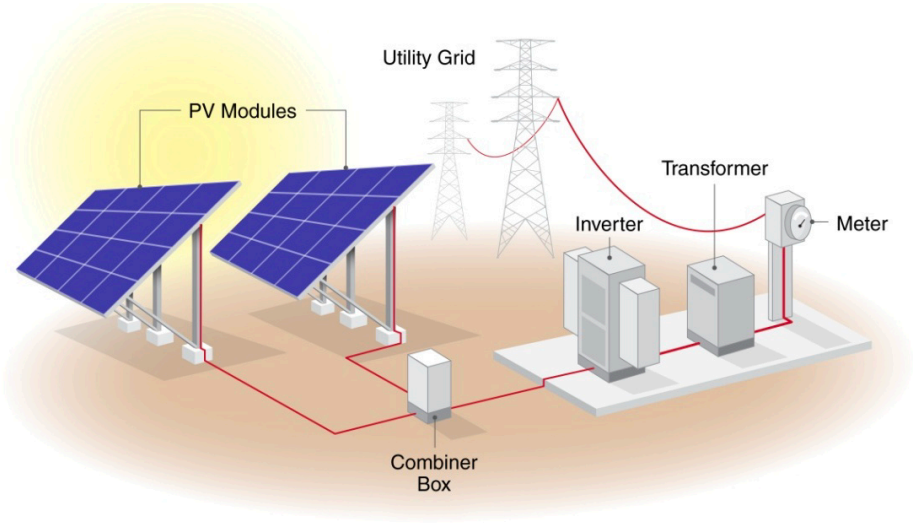


Figure 2-8 Illustration of the configuration of utility-scale PV power plants

2.6.1.2 Solar modules, panels and strings

Solar cells represent the smallest unit of the PV power generation equipment and are fabricated as part of solar modules. The cells consist of monocrystalline silicon, which generates electricity from solar radiation by means of the photoelectric effect. The electrical yield of the cells is conducted in form of a Direct Current (DC).

The power plant will employ solar modules manufactured by the Chinese-based manufacturer JA Solar (model numberJAM72D40 570/GB). Under Standard Testing Conditions (STCs), the modules offer a maximum power output of 570 Watts, with a corresponding voltage of 43 Volts. The modules utilize leading-edge PV technology to guarantee cost efficiency, relatively high yield and durability. Specifically, the model presents the following technological and economic advantages:

- Bifacal energy yield with power production on both sides (front and rear ends) of the solar panels (with a bifaciality factor of 80±10%). Single-axis sunlight trackers will be installed to continually adjust the positioning (angle) of the solar modules (and wider panels) relative to the direction of sunlight, for maximum irradiation throughout the daytime.
- Passivated Emitter and Rear Cell architecture with an in-cell passivation layer that boosts the electrical yield of solar modules by reducing charge recombination and enhancing light absorption (to achieve a module efficiency of 22.8%);
- N-type monocrystalline, 10M-sized wafers (182mm x 247mm) built into dual, heat-resistant glass, to achieve operational temperatures ranging between -40°C and 85°C, as well as a front-side and rear-side maximum static load capacities of 5400 Pa and 2400 Pa respectively.
- A low annual performance degradation rate of 0.4% over the first 30 operational years.

The solar modules will be assembled into solar panels, and the solar panels will be linked to form multiple strings, such that the designed output current is discharged from each string of solar modules.

The table below provides an overview of the number of solar modules, panels and strings constituting the solar array of the power plant.

Table 2-5 Total number of PV power generation components

PV Components	Total number
Solar modules	429,176
Solar strings	16,266

2.6.1.3 Solar trackers and mounting system

The solar panels will be mounted on active, single-axis solar trackers which will rest on piles driven four metres below ground level. The trackers will move the solar panels from East to West to maximize exposure of the modules to the changing direction of sunlight. Solar tracking is intended to raise the yield of the solar array by an estimated 27% to 30%.

2.6.1.4 Central combiner boxes

Direct current generated in solar cells and the broader modules will be collected by module cables, which will feed into the larger string cables (dedicated to each solar string of modules). The power produced in each solar string will be delivered to central combiner boxes for consolidation by the string DC cables. Each combiner box will combine a number of string DC cables into a single connection (main DC cable) leading to a dedicated central inverter. The solar array and hierarchy of power connections altogether constitute the DC circuit of the PV power plant.

In addition to combining the current discharged by numerous solar strings, the combiner boxes will house power regulation and circuit isolation devices. Specifically, string fuses built into the combiner boxes will provide protection of electrical equipment constituting the DC circuit in the event of faults and resultant overloads. In addition, disconnectors placed in the boxes will allow for the isolation of faulty components of the overall DC circuit for maintenance purposes.

2.6.1.5 Inverters

The first form of power conditioning is the transformation of the electric current generated by the solar module strings, for integration with the utility grid. Because the recipient utility grid operates with Alternating Current (AC) power loads, the power consolidated from the solar strings requires conversion from Direct Current (DC) to AC. A total of 192 central inverters will be installed for this purpose. The AC output of each inverter will be delivered to a dedicated series of step-up transformers.

2.6.1.6 Medium-voltage step-up transformers

The recipient utility grid consists of transmission and distribution power lines. To avoid power losses due to the heating effect of high-current (low-voltage) electricity, the transmission components of utility grids are designed to carry low-current (high-voltage) power loads. Therefore, the low-voltage output yielded by the solar array requires a staged voltage amplification (with a proportional reduction of the output current) before it is fed into the utility grid.

The AC power from the central inverters will be conducted towards dedicated Medium-Voltage (MV) step-up transformers, to generate a 33kV output. These transformers will operate at a capacity of 8.8 mVA each.

The following table provides an overview of the total number of central combiner boxes, inverters and MV step-up transformers for the consolidation and transformation of the DC power output from the solar array.

Table 2-6 Total number of PV power consolidation and conditioning components

PV COMPONENTS	TOTAL NUMBER
DC combiner boxes	960
Inverters	192
Medium-voltage step-up transformers (0.6/33 kV)	24

2.6.1.7 Collector sub-station

The consolidated and optimized power output from the solar array will be evacuated to the utility grid via the collector sub-station. Two 35 kV lines stemming from the MV step-up transformers will connect to the collector sub-station dedicated to the PV plant.

The Air-Insulated Sub-Station (AIS) will primarily include two High-Voltage (HV) step-up transformers, which will further raise the voltage of the solar power output to a level that is consistent with that of the recipient utility grid. This set of transformers will operate at a capacity of 120 mVA each.

Besides final voltage adjustment for integration with the grid and subsequent transmission, the sub-station will include a host of facilities to enable the monitoring, regulation, isolation and protection of the power generation equipment and circuits. These facilities include but are not limited to:

- Circuit breakers – Serve to interrupt faulty circuits and isolate defective elements, in the event of overload and maintenance work.
- Circuit switchers – A set of circuit breakers with the capacity to provide three-phase interruption, and protection of transformers, lines, cables and capacity banks against overloads including transient overloads.
- Relays – Automatic power monitoring devices capable of activating circuit breakers in the event of a circuit overload.
- Surge arrestors – Used to protect high-voltage equipment and conducting superstructures from power surges caused by lightning strikes, switching surges and other abnormal loads from faulty circuits.

- Meters – Tariff metering will be installed between the HV step-up transformers and the grid connection point, to measure and record the quantity of exported power on a continual basis.

Another key component of the collector sub-station is the Supervisory Control and Data Acquisition (SCADA) system. The main functions of the SCADA system include the following:

- Identifying and signalling issues within the solar power generation, conditioning and evacuation systems, to enable timely maintenance and minimum interruptions to the power yield and supply.
- Providing an electronic interface for remote control of the solar power generation, conditioning and evacuation system components, to enable (i) the optimization of power generation by adjusting the operational parameters of electrical equipment and circuits, and (ii) isolation of faulty circuits for maintenance.
- Collection and storage of real-time information regarding system performance and various key metrics to inform the power plant maintenance program and financial modelling for regular commercial assessments.
- Reducing Operation and Maintenance (O&M) costs and safety hazards by automating basic maintenance operations.

The SCADA system will generally comprise of (i) weather and circuit sensors, (ii) a satellite/Wi-Fi/optical fibre line communication network, (iii) the central processing hub (console), and (iv) the remote communication server. The various sensors will gauge operating conditions and generate signals for remote analysis, which will be transmitted to the master console via the dedicated network. A continual and centralized analysis and display of the system performance will be carried out on the master console. The communication server will host the software for operating signal transmission and remote feedback, as well as the database for logs related to various system performance metrics.

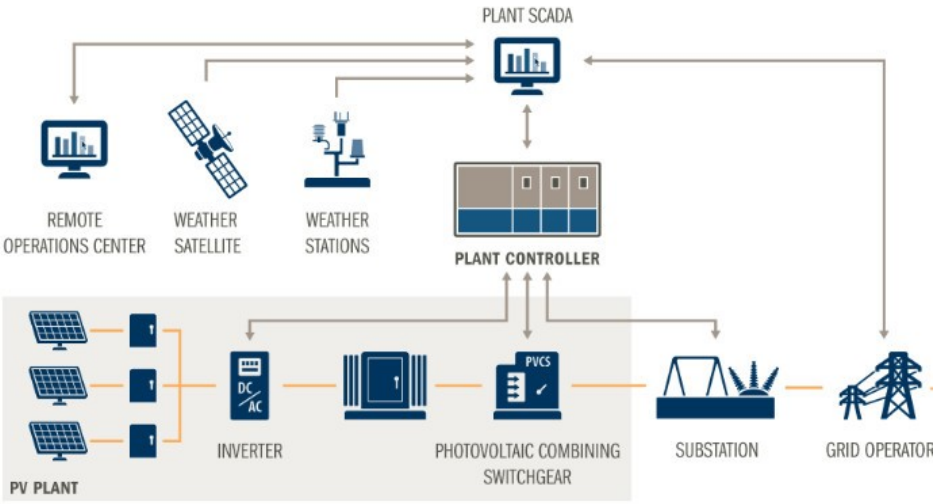


Figure 2-9 General schematic of a SCADA system for the PV plant

The following table provides a quantitative overview of the Project's evacuation facilities.

Table 2-7 Total number of PV power transmission components

PV COMPONENTS	TOTAL NUMBER
High-voltage step-up transformers	2
Metal-clad switch gear	1

2.6.1.8 Battery Energy Storage System

The Project will also involve the establishment of a 500 MWh AC-coupled Battery Energy Storage System (BESS). The BESS will operate on an independent basis (separately from the PV plant) and be developed close to the existing sub-station. The BESS facility will serve the following main functions:

- Storage of electrical energy from power sources feeding into the project-associated utility grid during off-peak grid time, and the dispatch of the operating reserves in the event of grid congestion (i.e., instances of power demand exceeding power supply).
- Stabilization of the frequency of the project-associated utility grid by provisioning power reserves to equalize power demand and power supply within the grid.

The BESS facility is designed to address power shortages within the grid connecting to the PV plant planned under the Project, to prevent and alleviate the occurrence of power outages within Tashkent Region. Power shortages can arise in the event of peak power demands, downtime events of power generation facilities feeding into the grid and declines in the electrical yield of the project-associated PV plant as a result of limited solar irradiance.

While the PV plant is set to augment the capacity of the existing grid, its yield is intermittent, as it is a function of solar irradiation, which is subject to both cyclic variations on a daily and seasonal scale, as well as irregular fluctuations due to transient changes in weather. A number of other climatic and weather-related factors can affect the productivity of the PV plant, such as extreme temperatures and wind conditions, which can affect the yield of the power plant, to a significant degree.

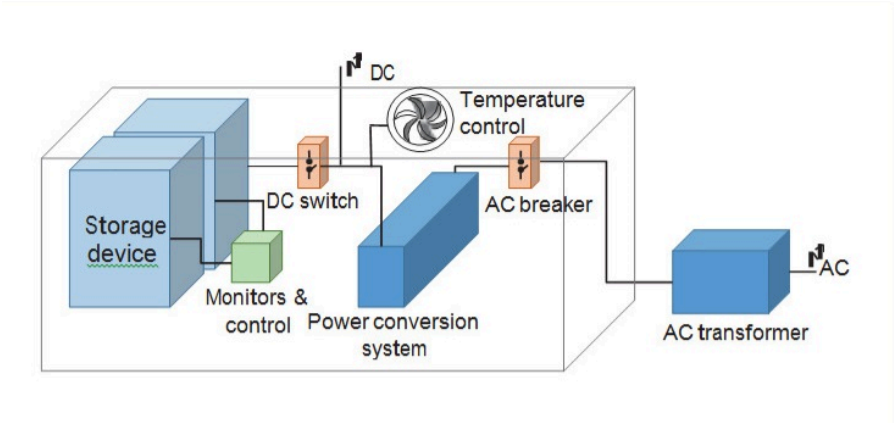


Figure 2-10 General schematic of a BESS facility

The main components of the BESS facility are outlined below.

BATTERY ASSEMBLY

The BESS will operate with Lithium-Ion batteries. On utility-scale BESS facilities, Li-ion batteries are superior to lead acid, nickel-cadmium, sodium-sulphur and redox flow batteries, due to their high performance on energy density, fast response time, longevity, coulombic efficiency, charging time and maintenance costs. A few disadvantages related to this battery technology include low charging rates in sub-zero temperatures and susceptibility to thermal runaway (uncontrolled heating and degradation), which necessitate over-current protection.

The smallest power storage unit of the battery planned assembly is the lithium cell. These cells will be wired into both serial and parallel configurations within separate lithium modules, to achieve the required output voltage per module. In turn, rows of lithium modules will be stacked into multiple lithium racks. The array of lithium racks will be housed by a modular arrangement of 9,340 mm (length) x 1,730 mm (width) x 2,600 mm (height) steel containers, with a total weight of 28,400 kilograms (kg). The entire battery assembly will be supplied by the Chinese-based manufacturer, Sungrow Power.

The table below provides the counts of the battery assembly units constituting the BESS facility.

Table 2-8 Total number BESS battery assembly components

BATTERY UNITS	TOTAL NUMBER
Battery racks	121
Battery containers	280

Battery containers have sumps on the bottom for any leakage or water accumulation which can be drained out of the container in a controlled manner using the drain valve for appropriate disposal. In addition to this, Owner Technical Specification (OTS) comprise of concrete or asphalt layer to prevent water infiltrating the soil, and a layer of sand-lime mix underneath the concrete or asphalt which would protect further contamination in case the concrete or ashphalt layer is compromised.

C4VH mentioned in the OTS is an older figure which has been updated to C3VH based on the Corrosion Study performance at the PV site which is very close to the BESS site. Based on this study, C3VH is a sufficient corrosion protection specification.

BATTERY MANAGEMENT SYSTEM

The Battery Management System (BMS) is an automated system that will perform continual monitoring of the battery assembly to ensure operation under optimal operating conditions (e.g., voltage, current, temperature, State of Charge), and the regulation of charging and discharging power. The design temperature of the Li-ion batteries is 20°C to 25°C.

POWER CONVERSION SYSTEM

The Power Conversion System (PCS) is an automated system that will charge and discharge the battery assembly. Charging will involve the import of AC power from the utility grid during off-peak (surplus power) periods, whereas discharging will involve the dispatch of reserved DC power to the utility grid.

Because the grid operates with AC power while the battery base operates with DC power, a PCS is required to enable a bi-directional conversion of electrical power between in between these facilities. This conversion will be carried out by hybrid inverters installed as part of the PCS.

In addition to current transformation, another form of power regulation between the battery base and utility grid is voltage adjustment. Power discharged to the grid must have a high voltage applicable to the grid, to minimize power losses over long-range transmission. Conversely, power imported into the BESS (for charging depleted reserves) must have a low voltage that is suitable for the batteries. The adjustment to the imported and exported power will be performed using Medium-Voltage (MV) step-up and step-down transformers, which will operate at a capacity of [TBA] mVA each.

Table 2-9 Total number PCS components

BATTERY UNITS	TOTAL NUMBER
Hybrid inverters	280
Step-up and step-down MV transformers	70

HV transformers	2
Battery containers	280

GRID CONNECTION

The connections between the battery assembly and the adjacent (existing) sub-station will comprise underground AC cabling and terminal (sub-station) buses. The table below outlines the planned grid connection components and their respective counts.

Table 2-10 Total number of grid connection components

BATTERY UNITS	TOTAL NUMBER
HV line	1
Underground interconnection cable	1

ENERGY MANAGEMENT SYSTEM

The Energy Management System (EMS) is a system will perform two vital functions in relation to BESS operation and maintenance via Supervisory Control and Data Acquisition (SCADA). The system will enable high-level monitoring of the operating conditions and performance of the battery assembly and PCS, to allow for timely corrective action that will be initiated at the master unit (control centre with manned console). Further, the system will coordinate the charging and discharging of battery units, based on critical parameters, such as State of Charge (SoC) and Depth of Discharge (DoD).

HEATING VENTILATION AND AIR CONDITIONING SYSTEM

The Heating, Ventilation and Air Conditioning (HVAC) system is a crucial element of the BESS facility, which regulates the ambient temperature of containerized battery assembly enclosures. Operation of the battery base within the optimal temperature is integral to ensuring optimal performance, maximizing the life span of the battery cells by reducing thermal degradation, and preventing thermal runaway which can lead to severe damage to affected battery assemblies/ clusters.

The BESS supplier uses R410A refrigerant which does not cause ozone depletion and has a relatively low global warming potential.

2.6.2 Ancillary facilities

Ancillary facilities refer to facilities planned as part of the project, which are (i) of secondary importance to the Project's operational objectives and (ii) directly owned, operated or managed by the Project Developer, EPC Contractor and O&M Company. This set of project

facilities will be established for auxiliary purposes during the Project's construction and operational phases, such as general maintenance and connection to enabling utility infrastructure.

2.6.2.1 Construction enabling and maintenance

The following ancillary facilities will be established to enable construction activities planned under the Project:

ACCESS ROADS

A number of existing access roads with sufficient capacity for construction-phase haulage provide access to the project sites.

For the PV power plant site, a short road branching out of the 4R-12 highway provides site access via the main gate along the eastern front. Another dirt track branches out of the highway south of the site, and this road can provide additional access via a secondary gate located south of the site.

In addition, a network of peripheral roads exists in the interior of the power plant site. During construction, maintenance roads connecting the peripheral roads to the various components constituting the Project's main and ancillary facilities, including the solar strings, inverters, central combiner boxes, transformer stations, battery containers, PCS, sub-stations, construction offices, laydown areas, operational offices and sanitation facilities will be developed.

An existing public road will be utilized for access to the BESS site and the interconnection cable corridor. The allocation of this road for the project has been approved by Parkent Khokimiyat, upon consultation. The existing road will not be widened; however, rehabilitation works (i.e., asphalt lining) will be carried out within the footprint of the existing road.

LAYDOWN AREAS

A temporary laydown and customs supervision area will be established within the perimeters of the PV plot and BESS sites, to allow for the storage of construction materials. On the overall PV plant site, these facilities will be located on the eastern front, which is relatively close to the sole entry gate for site access.

CONCRETE SUPPLY

Construction works will entail the construction of concrete structure, notably foundations and hardstanding for the planned PV plant and BESS facilities. Due to the hydrological features in and around the proposed sites, particularly the sensitive groundwater aquifers, and the proximity of Chirchik River, Karasu River and the associated feeder/ irrigational canals (as

relevant), concrete-batching plants will not be established within the project areas. Readymade concrete-mix feedstock will be supplied from batching plants located within remote supply bases.

CONSTRUCTION SITE OFFICES AND WELFARE FACILITIES

The Project's construction phase will employ a large workforce. At the time of this assessment, the development of construction labour camps was not planned. According to preliminary construction plans, suitable and existing accommodation facilities within the host districts and the outskirts of Tashkent City would be identified and utilized.

Most of the construction workers currently reside within private residences in Tashkent City. A minority of active workers have also rented a few private (standalone) residences in the nearby communities which are audited by the Project Company.

SANITATION FACILITIES

Sanitation facilities planned for the Project's construction phase include mobile toilets. Further, existing handwashing sinks within the toilet facilities connected to the administrative buildings owned by Uzuvtaminot will be utilized to the extent possible, in further coordination Uzsuvtaminot, if necessary.

A licensed wastewater collection contractor will be engaged to carry out a controlled extraction of sewage for transfer to designated wastewater treatment plants within the host districts or elsewhere in Tashkent Region.

SOLID WASTE FACILITIES

A waste storage area will be developed for the segregation and storage of construction waste. A licensed solid waste collection contractor will be engaged to carry out solid waste collection and transfer to designated waste management facilities for recycling and disposal as appropriate.

SECURITY SYSTEM

During construction, structural and administrative measures will be implemented to ensure site security. Various provisions will be made to safeguard on-site personnel, equipment, materials and assets from potential security incidents, such as theft, vandalism, arson and personal violence against construction workers.

- Permanent fencing for the PV plot site.
- Temporary fencing for the BESS site.
- Guard post (at the entry gate to the PV site) and entry registration.

- Surveillance systems (remote and on-site inspections).
- Lighting system.
- Provision of ID documents for all construction personnel.
- Access controls in form of guard-post registration, door locks and access control devices.
- Engagement with local authorities (i.e., makhalla security units/ guilds, khokimiyats and local police stations) as appropriate.

The plot on which the PV power plant facilities will be established is currently guarded by the National Guard service, considering the strategic importance of the resident water supply system, which provisions domestic water for about a third of the population of Tashkent City. The current security system is site-wide and will serve the project infrastructure for the duration of the project's construction phase. As power generation and storage facilities in the Republic of Uzbekistan likewise represent strategic assets of national importance, National Guard is mandated to provide full security services for both the PV power plant and BESS site throughout the Project's construction and operational phases.

FIRE SAFETY

The EPC Contractor's warehouse and offices are equipped with fire-fighting equipment including fire extinguishers and fire detection systems. A fire brigade service provider has also been engaged on a standby basis, for any fire emergency that may arise during construction. More provisions for addressing the risk of fire outbreak in the Project's construction phase and any associated interruption of water supply services are covered in Sections 14.4.1.2 and 15.4.1.3 of this Report.

2.6.2.2 Operations and maintenance

DRAINAGE SYSTEM

The drainage system for the Project's operational phase will consist of infiltration channels, and infiltration/ retention ponds, the majority of which have already been developed by Uzsuvtaminot.

FIRE SAFETY SYSTEM

Fire safety measures planned for the BESS operation include an array of fire detection, warning and suppression facilities. The O&M Contractor shall ensure that the Plant has a high level of fire detection and protection in accordance with National Fire Protection Association (NFPA) Codes, International Fire Code and with all applicable national and local codes and

regulations. In particular the recommendations of NFPA 971, NFPA 850 , NFPA 855, NFPA 68, NFPA 69, NFPA 13, NFPA 15, and the particular standards referenced therein, shall be followed. Where recommendations are interpreted as requirements of the NFPA and the applicable national and local codes and regulations, the more stringent requirements shall override others. For MV station fire detection and protection shall be as per NFPA 850 guideline only or as agreed between Power and Contractor during detail engineering stage.

No firefighting stations are located nearby the BESS site, with the capacity to suppress fires in battery installations. Therefore, the O&M Contractor shall demonstrate in his design how he intends to contain incidents. The Contractor shall identify the areas of fire risk and subsequently propose the types of fire protection/detection systems as may be required. Contractor shall provide a fighting system design that works at all the temperature condition of site, especially at lower temperatures.

Contractor shall consider Fire detection & alarm system, Portable fire extinguishers for buildings and MV transformers, clean gas fire suppression for Electrical rooms. Water Hydrant system for the HV power transformer at pooling substations suitable for operating with plant firefighting system. Automatic water spray system for power transformers is not required. The Contractor must consider dry hose with sprinkler arrangement in battery containers/rooms with water connection points outside the battery rooms/containers by considering the required safety distance to operate the hydrant valves during fire incidents due to thermal runaway. Hydrant valves, fire water tank and piping system shall be designed to operate using local water arrangement.

A pre-commissioning fire design report must be completed by the Contractor to demonstrate system protection in the event of an external fire risk and an internal fire risk (including thermal runaway condition of a battery, if applicable) within the BESS enclosure. Notwithstanding the above, the following are minimum requirements anticipated for installations which shall be supplied unless otherwise agreed:

- Automatic fire detection system with smoke detectors in all buildings onsite.
- Heat, gas and smoke detection in all enclosures.
- Fire suppression as per NFPA 855.
- In the case of a water-based FPS system for battery containers, the provided design must work at the site's minimum temperature limits. During these temperatures, FPS water shouldn't freeze.
- Fire extinguishers shall be provided in or near the control buildings, BESS enclosures and switchgears as required.
- Circuit breaker operation shall occur for stage two alarms (detection of both smoke and heat).

- Shutdown of HVAC upon fire detection.
- Both active and passive system (passive vent shall operate in case of failure in Active ventilation system) to vent the gas inside the enclosure post any thermal run-away event.
- Gas detection system designed for enclosure shall be linked to activate, active (mechanical) deflagration ventilation system such that the level of flammable gas inside the Enclosure does not exceed 25% of the LFL. At any case gas detection system shall be provided with minimum 2hrs of stand by power.

Alarms shall be signalled locally (audible and visible) and in the main control room and should

also permit remote connection. The fire detection and alarm shall be fed by DC or safe AC from the Uninterruptable Power System (UPS).

LIGHTNING PROTECTION SYSTEM

A complete lighting protection system will be installed for buildings and commissioned in accordance with relevant standards. Lighting points shall be installed in the BESS to allow operators to work on maintenance activities during the night-time. The rated voltage for these systems shall be 400/230 V, three-phase/single phase, 60 Hz. The lighting system shall include all necessary main and sub-distribution boards for normal and emergency lighting, lighting fixtures with lamps for indoor and outdoor lighting, furthermore lighting poles, power socket outlets, cables, cabling, wiring, switches and sockets and all fixing and fastening material for the whole system.

OPERATION AND MAINTENANCE OFFICE

An administrative office will be established to house the O&M Contractor's staff and components of the SCADA monitoring and control systems dedicated to the PV plant, collector sub-station and BESS infrastructure.

WAREHOUSES

A warehouse will be established within a central location in the BESS site, for operation-phase storage of spare materials and equipment. The warehouse will be situated next to the main office building.

SANITATION FACILITIES

Permanent sanitation facilities will be established within the O&M offices that will be constructed on site. Concrete underground septic tanks will be constructed for the collection and partial treatment of wastewater, and operational water level monitoring to ensure that

overflows occur, which could lead to the contamination of soil, surface water and groundwater.

The sewage collection system has been established in consultation with Uzsuvtaminot. All septic tanks within the PV plant site are provided with bund walls for containment of any contingent spills/ leaks.

A licensed wastewater collection contractor will be engaged to carry out a controlled extraction of sewage for transfer to designated wastewater treatment plants within the host districts or elsewhere in Tashkent Region.

SOLID WASTE FACILITIES

A waste storage area will be developed for the segregation and storage of operational waste within the PV plant and BESS sites, including electronic refuse and domestic waste. A licensed solid waste collection contractor will be engaged to carry out solid waste collection and transfer to designated waste management facilities for recycling and disposal as appropriate. Waste will be segregated, and special provisions and facilities will be used for the management of hazardous waste. Specialized and licensed contractors will be engaged for the collection and transportation of hazardous waste to licensed and appropriate facilities for the disposal or treatment of such waste.

SECURITY SYSTEM

During construction, structural and administrative measures will be implemented to ensure site security. Various provisions will be made to safeguard on-site personnel, equipment, materials and assets from potential security incidents, such as theft and vandalism.

- Permanent fencing for the PV plot site.
- Temporary fencing for the BESS site.
- Guard post (at the entry gate to the PV site) and entry registration.
- Surveillance systems (remote monitoring and on-site patrols).
- Lighting system.
- Provision of ID documents for all O&M personnel.
- Access controls in form of guard-post registration, checkpoints and access control devices.
- Engagement with local authorities (i.e., makhalla leadership, khokimiyats and local police stations) as appropriate.

As power generation and storage facilities in the Republic of Uzbekistan likewise represent strategic assets of national importance, National Guard is mandated to provide full security

services for both the PV power plant and BESS site throughout the Project's construction and operational phases.

2.6.3 Associated Facilities

Associated facilities refer to concomitant facilities, which are planned as part of the project but not covered by lender financing, without which the project would not be viable.

2.6.3.1 Loop-In-Loop-Out Connection

From the collector sub-station, a total of two 220 kV outgoing transmission lines, which will measure a length of 200metres. The LILO connection will be linked to the existing 220 kV Overhead Transmission Line (OTL) extending along the southern bounds of the PV plant and collector sub-station plot. The installation of the LILO OTL and its operation will be undertaken by NEGU, as set out in Project's PPA.

2.6.3.2 Infiltration Channels and Ponds

As described in Section 2.3.1, the overall area designated for the establishment of the PV plant site is currently utilized by Uzsuvtaminot, and a number of water supply facilities are distributed across the site. Consultations with Uzsuvtaminot indicated that the water supply facilities were developed around 1955, and some of the infrastructure is in disuse due to prolonged dilapidation. This infrastructure includes a total of 28 retention and infiltration ponds, most of which are dysfunctional.

As part of initiatory consultation, the utility administration issued a classified inventory of all existing water supply facilities resident within the sites and related location details. Regulatory sanitary buffers for all of the facilities were also delineated in the same document. In furtherance of the Presidential Resolution mandating the Project's implementation, Uzsuvtaminot also commenced arrangements for the handover of land use rights for residual (unoccupied) portions of the plot to the Tashkent Region Khokimiyat, and easement agreements with the Ministry of Energy and NEGU.

Representatives from Uzsuvtaminot further indicated that to optimize land use and provide sufficient area for the development of the PV plant facilities with the requisite setbacks, all facilities categorized as permanently inoperative will be decommissioned (e.g., backfilling of unusable retention ponds). To alleviate these losses and augment the infiltration capacity of the site for sufficient drainage during the Project's operational phase, the administration also recommended mutually beneficial drainage (and groundwater recharge) initiatives, which would entail the rehabilitation and development of drainage facilities. These measures would leverage the planned construction activities in improving drainage at relatively low

cost to the utility. Upon review, the Project Developer confirmed the feasibility of the drainage plan, which was subsequently incorporate into the detailed design.

The development of a common drainage system will be executed by the EPC Contractor during construction, under the supervision of Uzsuvtaminot. This will mainly involve:

- Rehabilitation and extension of the existing infiltration channels across the site, such that a total of four main infiltration channels will be upgraded for continued operation. The channels would continue to aid groundwater recharge with water channelled by the feeder canals.
- Rehabilitation of two existing infiltration ponds, and the development of an additional two retention and infiltration ponds. The new and revamped ponds will likewise enhance surface water capture within the groundwater intake zone.

The construction and rehabilitation of the water supply facilities will be carried out by the EPC Contractor in collaboration with the Uzsuvtaminot engineering team. Nevertheless, the operation and maintenance of these facilities will rest entirely with Uzsuvtaminot.

2.7 Construction Activities, Resources and Waste

2.7.1 Construction activities

The Project's construction phase will entail the following main activities:

2.7.1.1 Mobilization and early construction works

This will entail site clearance to remove any obstructive vegetation from construction zones and the solar array where shading should be eliminated. This will be followed by site levelling and grading to allow for construction and installation of temporary and permanent facilities.

Subsequently, multi-tier access roads will be constructed to enable transit within all sections of the project sites, and temporary fencing and demarcation will be established to ensure site security and public safety. Laydown areas, waste management areas, contractor offices, welfare and sanitary facilities will also be established within the sites. Utility connections will be developed for access to water and power supply.

Mobilization will also involve a phased dispatch of construction equipment, materials and labour to construction sites. The onboarding of the EPC contractor staff will include various technical and health and Health Safety Security and Environmental (HSSE) trainings.

The commencement of the Project's construction phase and available project employment opportunities have been publicised within the project-affected communities, to enable local content. At the ESIA stage, such opportunities were announced as part of the national EIA public hearings, as well as Focus Group Discussions (FGDs) within the affected makhallas. The

LALRP includes forward provisions for the extension of project employment opportunities to PAPs subject to livelihood impacts from the project's land-take.

2.7.1.2 Civil works

Civil works will kick off with the excavation works (with a maximum depth of 4-5 metres below ground level) to construct the foundations and hard-standings for the collector substation. Further earthwork will also include pile-driving for the installation of solar trackers, excavation of trenches for underground cabling, as well as the development of drainage ditches across the site.

2.7.1.3 Electrical and mechanical works

This scope of construction activities will involve the assembly and installation of the solar array, switchgear, collector sub-station, BESS and LILO superstructures, equipment sets and electronic devices. Mechanical works will mostly involve the installation of mounting structures/ trackers. It will also entail the installation of electrical connections suitable for various PV plant, sub-station, LILO and BESS components, including the grid interconnection works.

2.7.1.4 Demobilization

Upon the completion of the above construction activities, the EPC Contractor will proceed with demobilizing construction resources and the restoration of pre-construction conditions outside of the footprint of the Project's operational facilities. This will entail the phased disengagement of construction labour, site clean-up and transfer of all residual waste for controlled off-site, as well as mechanical completion.

A Demobilization Plan will be developed to guide demobilization activities. The Plan will include provisions to retain workers, particularly those based within the project-affected communities and districts, for suitable O&M labour.

2.7.2 Construction equipment

The following table provides a preliminary overview of equipment that will be used to perform various construction activities and operations:

The main equipment to be employed for construction activities includes excavators, bulldozers, mobile cranes, forklifts, trucks, trenchers, compactors, welding machines, and power generators, among others.

Summary counts for the anticipated construction equipment are provided in Table 2-11 below. The list is notably not exhaustive.

Table 2-11 Provisional inventory of construction equipment

BATTERY UNITS	TOTAL NUMBER
Bulldozer	2
Excavator	2
Mobile crane	2
Truck	2
Truck-mounted drill rig	6

2.7.3 Construction materials and waste

The planned construction activities will require a host of raw materials, that will be delivered to the PV plant and BESS sites and reserved within on-site storage facilities such as laydown areas and warehouses. Construction work will also generate various streams of liquid and solid refuse, which will require temporary and controlled on-site storage, prior to handover to licensed contractors for disposal and/or recycling at designated sites.

Table 2-12 provides a listing of various construction raw materials, which will be generated during the Project's construction phase. Detailed estimates for these materials were not available at the time of writing.

Table 2-12 Estimated quantities of raw construction materials

MATERIAL	QUANTITY
Water	84,503 m^3 per year
Concrete	20,000 tonnes
Steel	5,000 tonnes
Fuel (for generator and motorized machinery)	1.2 million litres

Water supplies for construction activities will be sourced from Chirchik River and Karasu River and/or the adjacent Khandam canal for the PV power plant and BESS respectively, and tankered to construction sites.

An overview of construction-phase waste materials and their respective estimated quantities is provided in Table 2-13 below.

Table 2-13 Estimated quantities of construction waste

MATERIAL	QUANTITY
Sewage	1,693 m^3 per year
Solid waste	600 tonnes

2.7.4 Power demand

Construction works for the development of the PV plant and BESS will demand an average 132,666 KWh of electricity per month. Electricity for construction works on the PV plant site will be sourced from the auxiliary power system utilized by Uzsuvtaminot. On the BESS site, an on-site diesel generator will be used for power generation.

2.7.5 Construction workforce

The Project Company established for the project implementation currently employs a total of 23 employees, 11 of whom are Uzbekistan nationals.

The EPC Contractor appointed for projection construction works is China Energy Engineering Corporation (CEEC). The construction workforce will comprise skilled and semi-skilled labour, with a peak total of 700 workers. A sizeable fraction of the contracted workforce (i.e., 40-60%) will be Chinese based, however recruitment for readily available specialists and blue-collar occupations will be reserved for Uzbekistan nationals and residents of the Project's affected communities, to the extent feasible.

The establishment of construction camps for worker accommodation is not envisaged. Workers will reside within rental housing in the nearby outskirts of Tashkent City, and to a lesser extent within rental property in the project-affected districts. Transportation service will be provided by staff vehicles, including buses. Any centralized accommodation facilities (i.e., new or existing) will be audited to ensure accommodation and sanitary conditions meet the requirements of the IFC/ EBRD guidelines for labour accommodation.

Beyond contracted labour, the Project will engage supply chain workers employed in the extraction and manufacture of raw materials associated with the manufacture of the PV plant, sub-station and BESS components. The apex supplier engaged by the EPC Contractor for the delivery of solar panels is JA Solar.

2.8 Operation and Maintenance Activities, Resources and Waste

2.8.1 Operational activities

The following Operation and Maintenance (O&M) activities will be carried out over the course of the Project's operational lifetime.

All land parcels under the ownership of the Project Company (via Ministry of Energy) will be managed by the Project Company, while remnant land under the ownership of Uzsuvtaminot (including portions of land under the easement agreement) will remain under the ownership and oversight of Uzsuvtaminot.

Considering the layout of the Project's O&M facilities in relation to the co-located water supply facilities, common overarching security systems and emergency response plans will be developed for mutual HSSE risks. Due to the nature of the O&M facilities and associated risks, the Project Company and O&M Company will be overall responsible for the implementation of operations-phase Occupational Health and Safety (OHS) Plans and the project-level Emergency Preparedness and Response Plan (EPRP).

The Project Company and O&M Contractor will coordinate with Uzsuvtaminot on the implementation of certain key safeguards for mutual HSSE risks expected for the operational phase. Alignment with these provisions will be ensured in form of an integrated Health, safety and Environment (HSE) and Emergency Preparedness and Response Plan (EPRP). The National Guard will provide security services for both the Uzsvtaminot and project-owned infrastructure.

2.8.1.1 Commissioning and Plant Handover

The tasks on this scope include the post-completion facility inspection, provisional and final acceptance testing, as well as handover to the Project Company. The main purpose of commissioning is to ensure the following:

- The facilities are structurally and electrically safe, in conformity with national and international (including, International Electrotechnical Commission) standards.
- The facilities are robust to a degree that guarantees operation over the duration of their operational lifespan.
- The construction and operation of the facilities matches the detailed designs, and that the performance of the facilities meets pre-set parameters.

Commissioning tests anticipated prior to the energization of the facilities include (but are not limited to) open-circuit voltage test, short-circuit current test, DC current test and performance ratio test.

2.8.1.2 Scheduled/ preventative maintenance

This includes routine maintenance activities aimed at preventing the occurrence of system faults and ensuring optimal performance, maximal yield and longevity of constituent equipment. Such maintenance includes yield and efficiency monitoring to identify causes of sub-optimal performance, dry-cleaning of solar modules (to remediate module soiling and debris), inspection of connection integrity (including insulation checks) for above-ground and underground wires, cables and bus bars, inverter and tracker servicing, repair of tracking motors, transformer oil replacement and vegetation control.

Regular cleaning for the PV panels will be carried out manually.

Preventative maintenance specific to the BESS facility include battery health monitoring, thermal management, and the maintenance of the HVAC system.

2.8.1.3 Unscheduled/ corrective maintenance

This type of maintenance is conducted in response to system faults and mainly involves the replacement or correction of defective system components. Common remedial maintenance activities that will be performed as part of O&M include inverter repair, replacement of blown fuses, rectification of tracking system faults, connection and insulation repairs/corrections for above-ground and below-ground wires, cables and bus bars, short circuit repairs and contingent response to any fire outbreak (i.e., in the event of inverter faults, thermal runaway and overcurrent).

Preventative maintenance specific to the BESS facility include battery replacement, HVAC maintenance and container servicing.

2.8.1.4 Performance monitoring, production forecasting and reporting

Based on the SCADA system, the O&M staff will monitor the performance of various PV plant and BESS equipment (as well as exogenous factors such as weather) and provide regular forecasting for power supply from the plants, for the reference of the off-taker.

Monitoring results and system maintenance will also be presented in regular O&M reports, which will inform financial modelling and any strategies to rectify performance shortfalls.

2.8.2 Operational equipment

Table 2-14 below provides a preliminary overview of equipment that will be used to perform various operation-phase activities and operations within the PV plant, sub-station and BESS facilities, and their respective counts.

Table 2-14 Provisional inventory of operational equipment

BATTERY UNITS	TOTAL NUMBER
Miscellaneous spare equipment parts/ devices (i.e., batteries, fuses etc.).	Supply on demand

2.8.3 Operational materials and waste

Materials required for planned operation and maintenance activities will be delivered to PV plant and BESS sites upon demand and reserved within the on-site warehouses. These materials will include water for sanitary and other maintenance activities. Operation and maintenance will also generate various streams of liquid and solid refuse, which will require

temporary and controlled on-site storage, prior to handover to licensed contractors for disposal and/or recycling at designated sites.

Operations-phase waste materials will include:

- Electronic waste
- Spent oils
- Domestic solid refuse from site offices
- Domestic wastewater/ sewage

2.8.4 Power demand

Auxiliary power supply is required to operate inverter control circuitry, transformer magnetizing circuitry, cooling fan, air conditioner, lights, computers, server and lighting. During the daytime, generated yield will provide auxiliary power, whereas during the night-time or downtime, power will be imported from the grid.

2.8.5 Operational workforce

The Project's operational workforce will include a full-time workforce of 13 personnel. In addition, a total of 20-25 specialist staff may be deployed for major maintenance activities.

NOMAC Maintenance Energy Services is the main O&M Contractor appointed for O&M support under the Project Company.

2.9 Project Milestones

The following pre-feasibility and feasibility studies, have been completed for the Project:

- Remote and on-site solar resource assessment
- Topographic survey
- Geotechnical survey
- Hydrological survey
- Commercial modelling

The Government of Uzbekistan commissioned the solar resource assessment in March 2023, and the study was undertaken by The Project Developer. Following the execution of the PPA, the Project Developer assigned Juru Limited and UzAssystem to undertake the engineering related feasibility surveys, in preparation for detailed design and construction.

The Project is currently in its development and detailed design phase, which are based around the completion of engineering designs, agreements with the appointed EPC Contractor and supplier, acquisition of various permits from competent authorities, and access to project financing.

Table 2-15 below provides and overview of the tentative schedule for subsequent stages of project implementation.

Table 2-15 Milestones for project implementation

IMPLEMENTATION PHASE	COMMENCEMENT DATE
Mobilization and early works for PV plant facilities	July 2023
Mobilization and early works for BESS facilities	April/ May 2024
Main construction works	September 2023
Commissioning	31 March 2024 (for 100MW PV Sub-Plant 1) 1 June 2024 (for 100MW PV Sub-Plant 2) September 2025 (for BESS Plant);
Operations	December 2025

3 REGULATORY AND ADMINISTRATIVE FRAMEWORK

3.1 National Laws and Regulations

3.1.1 Constitution of Uzbekistan

The Constitution of Uzbekistan has been amended following a referendum that took place on 30th of April, 2023. Key constitutional reforms in the context of the ESIA are as follows:

- Uzbekistan is a legal, social and secular state;
- Human rights may be restricted in order to maintain social morality and public order (for instance, homosexualism, considering cultural and religious perceptions of majority of population);
- Land can be private property (it is expected that more cases of owning land will be allowed, compared to the previous years when ownership status was granted in very few case);
- Prohibition of death penalty;
- Moreover, the following articles of the Constitution may be applicable for provisions relating to environmental and social aspects:
- Article 30. No one shall be convicted, punished, deprived of property, or any other right on the basis of a law that is not publicly promulgated.
- Article 40. Everyone shall have the right, both individually and collectively, to submit applications, proposals, and to lodge complaints with competent state bodies and organizations, citizens' self-governing bodies, officials and public representatives. Such applications, proposals and complaints shall be considered in accordance with the procedure and within the time-limit specified by law.
- Article 41. Everyone shall have the right to own property. The privacy of bank operations, deposits and accounts, as well as the right to inheritance shall be guaranteed by law.
- Article 42: Everyone shall have the right to decent work, to free choice of profession and occupation, favorable working conditions that meet the requirements of safety and hygiene, to fair remuneration for work without any discrimination and not below the established minimum wage, as well as the right to unemployment protection in the manner prescribed by law. The minimum wage shall be determined taking into account the need to ensure a decent standard of living for a person. It shall be prohibited to refuse to hire women, dismiss them from work and reduce their wages on the basis of pregnancy or having a child.
- Article 44: Any forced labor shall be prohibited, except as punishment under the court decision, or in some other Instances specified by law. Any form of child labor that poses a threat to the health, safety, morality, mental and physical development of the child, including those that prevent him or her from getting an education, shall be prohibited.

- Article 49: Everyone shall have the right to a favorable environment, reliable information about its condition. The State shall create conditions for the implementation of public control in the field of urban planning activities in order to ensure the environmental rights of citizens and prevention of harmful environmental impact. Draft urban planning documents shall be subject to public discussion in the manner prescribed by law. The State, under the principle of sustainable development, shall implement measures to improve, restore and protect the environment, maintain ecological balance.
- Article 58. Women and men shall have equal rights. The State shall ensure equal rights and opportunities for women and men in the administration of public and state affairs and in other spheres of social and state life.
- Article 61. It is the duty of citizens to protect the historical, spiritual and cultural scientific and natural heritage of the people of Uzbekistan. The historical, spiritual, cultural, scientific and natural heritage shall be protected by the state.
- Article 62. Citizens shall be obliged to protect the environment.
- Article 65. The basis of the economy of Uzbekistan, evolving to enhance the well-being of citizens, shall be a property in its various forms. The State shall create the conditions for the development of market relations and fair competition, and guarantee the freedom of economic activity, enterprise and labour, taking into account the priority of consumer rights. Equality and legal protection of all forms of property shall be ensured in Uzbekistan. Private property shall be inviolable. An owner may not be deprived of his or her property except in the cases and according to the procedure prescribed by law and on the basis of a court decision.
- Article 66. An owner, at his/her discretion, shall possess, use and dispose of his/her property. The use of any property must not be harmful to the environment or violate the rights and legitimate interests of other persons, society and the state.
- Article 68. The land, its minerals, waters, flora and fauna, other natural resources shall constitute the national wealth and shall be rationally used and protected by the state. Land may be privately owned on the terms and in the manner prescribed by law, which ensure its rational use and protection as national wealth.

3.1.2 Law on Nature Protection, 1992 (as Amended in 2021)

This law is the key national environmental law for the protection of the environment and the sustainable use of resources and the right for the population to a clean healthy environment. This law states legal, economic, and organisational basis for the conservation of the environment and the rational use of natural resources.

Article 25 of this law states that the State Environmental Expertise (SEE) is a mandatory measure for environmental protection, preceded to decision making process. In addition, the law prohibits the implementation of any Project without approval from SEE.

It should be noted that Article 53 of this law confirms that if an international treaty concluded by the Republic of Uzbekistan establishes rules other than those provided for by the legislation of the Republic of Uzbekistan on nature protection, the rules of the international

treaty shall be applied, except in cases where the legislation of the Republic of Uzbekistan establishes stricter requirements.

3.1.3 Law on Environmental Control, 2013 (as Amended in 2022)

The main objectives of this law include:

- Prevention, detection and suppression of violation of legislative requirements relating to environmental protection and rational use of natural resources.
- Monitoring the state of the environment, identifying situations that can lead to environmental pollution, irrational use of natural resources, pose a threat to the life and health of citizens.
- Determination of compliance with environmental requirements of any ongoing economic development activities.
- Ensuring compliance with the rights and legitimate interests of legal entities and individuals performing their duties in relation to environmental protection and sustainable use of natural resources.

The Article 7 of this law states that, the objects of environmental control are:

- Land, its subsoil, waters, flora and fauna, and atmospheric air;
- Natural and man-made sources of impact on the environment; and
- Activities, action or inaction that may lead to pollution of the environment and irrational use of natural resources, create a threat to the life and health of citizens.

3.1.4 Other relevant legislation

MANDATE FOR THE PROJECT

The Resolution of The President of The Republic of Uzbekistan No. Pq-189 "On Measures to Implement an Investment Project "Construction of Solar Photovoltaic Power Plant and Battery Electricity Storage System in Yurkochirchik District of Tashkent Region" was enacted on 14 June 2023.

THE NATIONAL/LOCAL REQUIREMENTS THAT REQUIRE THE PREPARATION AND SUBMISSION OF AN EIA:

The national Environmental Impact Assessment (EIA) procedure is principally required and regulated by the:

- Law "On Environmental Expertise" No.73-II of 25.05.2000 (as amended on 29.04.2021).
- Regulation on State Environmental Expertise (SEE), approved by Decree No.949 of the Cabinet of Ministers on 22 November 2018 which is replaced by "On the further improvement of the environmental impact assessment mechanism No.541, approved by Resolution of the cabinet of ministers of the Republic of Uzbekistan on 9 July 2020."

PUBLIC PARTICIPATION IN NATIONAL EIA

Based on changes in the national legislation regarding the process of National Environmental Impact Assessment conducting public consultation is now a mandatory part of Stage I of the National EIA process.

According to the Resolution of the Cabinet of Ministries of the Republic of Uzbekistan "On further improvement of mechanism for Environmental Impact Assessment" No. 541 dated 07.09.2020 the procedure of conducting public consultations is as follows:

- Annex 3 of the Resolution No 541 – Rules and regulations for conducting public consultations states that public consultations should include discussions and decision making regarding planned activities (for construction of any facility) that may have negative impacts on the environment.
- A non-technical summary regarding any planned project activity that is categorized as I & II group (in accordance with national requirements for categorization) shall be prepared. The NTS should include information about the following:
    - Brief description of the project;
    - Technology solutions and alternative options for the project;
    - Current state of the environment at the selected project site;
    - A brief assessment of socio-economic conditions;
    - Brief description of the causes and type of negative impacts on the environment as a result of the project;
    - Forecast and assessment of possible changes in the state of the environment, socio-economic conditions;
    - Forecast and assessment of project and non-project risks;
    - Measures to prevent, minimise and/or compensate for adverse impacts; and
    - Assessment of possible significant adverse cross-border impacts.
- A public consultation shall be based on the review of non-technical summary by providing equal rights to all participants to express their concerns, opinion and suggestions.
- The following entities shall be considered as part of public consultations:
    - Representatives of local departments of State Committee on Ecology and Environmental Protection who will be considered as observers of public consultations.
    - Local municipalities (considered as the responsible organisation for organising and inviting participants to the meetings);
    - NGOs'
    - All organisations interested in the project;
    - Local communities; and
    - Mass media.
- Expenses, if any, related to the public consultations shall be financed by the Project Developer.

In addition to the above National requirement on conducting public consultations, the Law of the Republic of Uzbekistan 'Regarding Appeals of Individuals and Legal Entities' No 378 dated 3.12.2014 (with amendments on 17th August 2017), regulates the appeals of individuals and legal entities to state bodies as well as to their officials. Appeals can be oral, written or electronic and regardless of their form and type are of equal importance. A people's 'Reception Office' is tasked with organising a direct dialogue with the population, ensuring the functioning of an effective system of appeals aimed at the full protection of their rights, freedoms and legitimate interests. Any applications are considered within 15 days from date of receipt and any additional consideration is completed within 1 month.

ENVIRONMENT

- The Law of the Republic of Uzbekistan "On Water and Water Use" (1993) as amended in 2022.
- The Law of the Republic of Uzbekistan "On Ecological Expertise" (2000) as amended in 2021.
- The Law of the Republic of Uzbekistan "On Atmospheric Air Protection" (1996, amended on 21.04.2021).
- The Law of the Republic of Uzbekistan "On Protection and Use of Vegetation" (1997) as amended in 2016.
- The Law of the Republic of Uzbekistan "On Protection and Use of the Wildlife" (1997) as amended in 2016.
- The Law of the Republic of Uzbekistan "On Protected Natural Reserves" (2004) as amended in 2022.
- The Law of the Republic of Uzbekistan "On Wastes" (2002) as amended in 2021;
- The Law "On the sanitary and epidemiological well-being of the population" (2015) as amended in 2021.
- The Resolution of the Cabinet of Ministries of the Republic of Uzbekistan №.541 "On further improvement of the environmental impact assessment mechanism' (2020) as amended in 2022.
- The Resolution of Cabinet of Ministries of the republic of Uzbekistan №.820 "On measures to further improve the economic mechanisms for ensuring nature" (2018) as amended in 2021.
- The Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No 14. "On approval of the regulation on the procedure for the development and agreement of projects with environmental standards" (2014) as amended in 2022.
- Resolution of Cabinet of Ministers of Republic of Uzbekistan No.95 "On approval of general technical regulations of environmental safety" (2020) as amended in 2022.

LAND RIGHTS, ACQUISITION AND RESETTLEMENT

- Civil Code of the Republic of Uzbekistan (1997) as amended on 8.11.2022.
- Land Code of the Republic of Uzbekistan (1998) as amended on 1.10.2022.
- Law of the Republic of Uzbekistan on State Land Cadastre No.666-I of 28.08.1998.
- Presidential Decree № UP-5495. Decree "On measures on cardinal improvement of investment climate in the republic of Uzbekistan".
- Appendix No. 2 to the Resolution of the Cabinet of Ministers № 146 (2011), regulation " On the Procedure for Compensation for Losses of Land Owners, Users, Tenants and Owners, as well as Losses of Agricultural and Forestry Production".
- Resolution № 911 of the Cabinet of Ministers (2019) "On the Procedure for withdrawal of land plots and compensation to owners of immovable property located on the land plot.
- Law No 781 "On procedures for the withdrawal of land plots for public needs with compensation" October 1st, 2022. The Law specifies cases when the land plots can be acquired for public need among which construction (reconstruction) of roads and railways of national and local significance is also specified. Law No. 781 also prescribes procedures of land acquisition, communication with project affected people (PAPs), compensation calculation, and demolition of affected assets. As of October 1st, 2022, all projects that require the acquisition of land for public needs should be managed in accordance with this Law.

LAND ACQUISITION AND RIGHT OF WAY

- With regards to the acquisition of land for Right of Way, Procedures to establish a right of way (ROW) in Uzbekistan are the same for legal entities and individuals. ROW or limited use of a land plot is determined in the Land Code of Uzbekistan, Civil Code (under the term servitude), and the Resolution of Cabinet of Ministries No.911 dated 16.11.2019. All grid interconnection works are expected to be undertaken within the existing ROW; however, for completeness, the requirements for establishing a ROW are presented below, and their applicability will be confirmed during the ESIA process.
- Article 30 of the Land Code (LC) determines engineering, electrical power and other lines and constructions as a reason for receiving the right to servitude. Following Article 30 of the Land Code, Article 173 of the Civil Code (CC), and Article 30 of Annex 1 of the Resolution of Cabinet of Ministers No. 1060 dated December 29, 2018, servitude is established by agreement between persons demanding the establishment of servitude and the owner, user, lessee, proprietor of the land plot. If they do not achieve consent, the servitude shall be established by a court decision at the user's claim. The agreement on servitude shall be subject to state registration and preserved when the land plot is transferred to another person. Servitude agreements can be terminated in cases of the cessation of the reason according to which it was established.
- Article 173 of CC also states that the burdening of a land parcel by servitude does not deprive the owner of the parcel of the rights of possession, use, and disposition of this parcel.

- Calculation and compensation of losses due to servitude agreement are performed following Law No 781 "On procedures for the withdrawal of land plots for public needs with compensation" (if it is a project for public needs) the Resolutions of Cabinet of Ministers No.146 from 25 May 2011 "On measures to improve the procedure for granting land plots for urban development activities and other non-agricultural purposes" and No. 911 from 16 November 2019 "On additional measures for enhancing modalities of providing compensation on withdrawal and allocation of land plots and safeguard the property rights legal and physical entities".
- Article 86 of the LC states that losses caused to the owners of land parcels, landowners, land users and lessees are liable to be fully refunded (including the lost profit) in the case of limitation of their rights in connection with land acquisition. Refunding of losses is carried out at the expense of the resources of the corresponding centralized funds for compensation of losses to individuals and legal entities in connection with the seizure of land plots from them for public needs and by enterprises, establishments and organizations the activity of which causes limitation of rights of land parcel owners, landowners, land users and lessees or worsening the quality of the neighbouring lands in the order established by legislation.
- Article 173 of the CC states that the parcel owner burdened with the servitude has the right unless otherwise provided by a Law, to demand from the person in whose interests the servitude is established proportional payment for the use of the parcel.

LABOUR AND EMPLOYMENT

- Labour Code of the Republic of Uzbekistan 1996 as amended on 18.05.2022.
- Law "On the employment of the population" No. 642 of 20.10.2020.
- Resolution of the Ministry of Labour and Social Protection of the Population, Ministry of Health of the Republic of Uzbekistan, registered on 29.07.2009, reg. number 1990 "About the approval of the list of occupations with unfavourable conditions, in which the use of the labour of persons under 18 years of age is prohibited".
- Decree No. 133 of 11 March 1997 to approve normative acts necessary for the realization of the Labour Code of the Republic of Uzbekistan.
- Decree of the Cabinet of the Ministers No. 1011 of 22 December 2017 "On Perfection of the Methodology of Definition of Number of People in Need of Job Placement, including the Methodology for Observing Households with Regard to Employment Issues, also for the Development of Balance of Labour Resources, Employment and Job Placement of Population".
- Decree of the Cabinet of the Ministers No. 965 of 5 December 2017 "On the Measures of Further Perfection of the Procedure of Establishment and Reservation of Minimum Number of Job Places for the Job Placement of Persons who are in need of Social Protection and Face Difficulties in Searching Employment and Incapable of Competing in Labour Market with Equal Conditions".
- Decree No. 964 of 5 December 2017 "On the Measures for Perfection of the Activity of Self-Government Bodies Aimed at Ensuring Employment, Firstly for the Youth and Women".

ARCHAEOLOGY AND CULTURAL HERITAGE

- Constitution of the Republic of Uzbekistan, the Criminal Code of the Republic of Uzbekistan.
- Law No. ZRU-229 "On protection and use of the objects of archaeological heritage" (13 October 2009).
- Law No. 269-II "On the Protection and Use of Cultural Heritage Sites (30 August 2001, as amended).
- Presidential Decree No. R-5181 "On improving the protection and use of objects of tangible cultural and archaeological heritage" (16 January 2018).
- Presidential Decree no. PP-4068 "Regarding the strengthening of the protection, management and enhancement of tangible and intangible cultural heritage" (19 December 2018). The relevance of these requirements will be determined during the ESIA process.

SAFETY ALONG OVERHEAD TRANSMISSION LINES

An essential standard for establishing OTL is SanPiN No.0350-17 "For the Protection of Atmospheric Air in Populated Areas of the Republic of Uzbekistan" (2017). This standard addresses health protection zones (HPZ), also known as setbacks. According to SanPiN No.0350-17, section 2.23.4, an HPZ must be established to protect the population from the effects of an OTL's electric field. HPZ's are defined as the land along the route of a high-voltage OTL in which the electric field strength exceeds 1 kV/m. For newly designed OTL, buildings and structures must be set back the following distances either side of the OTL[1]:

- 20 m for OTL with a voltage of 330 kV;
- 30 m for OTL with a voltage of 500 kV;
- 40 m for OTL with a voltage of 750 kV;
- 55 m for OTL with a voltage of 1150 kV.

Other relevant national laws and regulations to OTL projects include:

- Resolution of Cabinet of Ministers of Republic of Uzbekistan No.95 "On approval of general technical regulations of environmental safety" (2020).
- Decree of the Cabinet of Ministers of the Republic of Uzbekistan No.1050 "On approval of Rules for Protection of Power Grid Facilities, 2018".
- SanPiN & Norms No. 0236-07 "Sanitary norms and rules to ensure safety for people living near high voltage power transmission lines, 2007".

Electrical safety regulations pertaining to ecological receptors include the following:

1 The HPZ (set back) is defined as the distance from the outermost wires in a direction perpendicular to the OTL.

- Resolution of Cabinet of Ministers of Republic of Uzbekistan No.95 "On approval of general technical regulations of environmental safety" (2020).

  Requires the implementation of environmental safety measures for the protection of flora and fauna. This includes the prevention of death of wildlife species due to magnetic fields of power transmission lines and sanitary protection zones.

  Requires transformer substations in power transmission lines, their grids to have equipment (barriers, fences etc.,) to prevent animals from entering the territory of the substation.

- Decree of the Cabinet of Ministers of the Republic of Uzbekistan No.1050 "On approval of Rules for Protection of Power Grid Facilities, 2018".

  This determines the procedure for establishing protected zones for power grid facilities, as well as special conditions for using land located within the protected zones and ensure the functioning and operation of the said facilities.

  Construction of power grid facilities with 110, 220 or 500kV in protected areas of state nature reserves, protected areas of nature parks and state biosphere reserves etc shall be allowed with the permission of the Cabinet of Ministers of the Republic of Uzbekistan.

MANAGEMENT OF PUBLIC GRIEVANCES

- The Resolution No. 728 provides for a centralized Grievance Redress Mechanism (GRM) for the resolution of broad-ranging grievances from the public.
- This system draws on a publicly accessible online platform for the collection of grievances from residents across the country. The Portal allows any member of the public to submit a grievance, for the attention of various authorities within the various domains of local and central Government. The application for grievance resolution can target any authority within the hierarchy of executive Government. Upon initial review of the grievance statement by the target authority, the grievance is allocated to the most relevant LGA for further review and remedial action. In the event that resolution cannot be delivered by the most relevant LGA level, the grievance is cascaded higher along the administrative hierarchy, until an appropriate executive decision is provided by a competent authority.

3.2 International Conventions and Protocols

The proposed Project must comply with the environmental requirements of the following protocols and conventions listed in the Table below of which the Uzbekistan is a signatory:

Table 3-1 International Protocols and Conventions

NAME OF INTERNATIONAL PROTOCOL/CONVENTION	SIGNED/ RATIFIED	RELEVANCE TO THE PROJECT
UN Framework Convention on Climate Change	Accession: 20 June 1993	The Project will comply with all national standards for GHG

Name of International Protocol/Convention	Signed/ Ratified	Relevance to the Project
Kyoto Protocol to UNFCCC	Ratified: 12th October 1999	emissions in order to contribute to Uzbekistan's targets.
Paris Agreement to UNFCCC	Signed: 19th April 2017	
Montreal Protocol on Substances that Deplete the Ozone Layer (with London, Copenhagen, Montreal amendments)	Accession: 10th June 1998	The Project will support Uzbekistan's contribution towards the protection of the ozone layer by refraining from use of ozone depleting substances.
Vienna Convention on the Protection of Ozone Layer	Accession: 18 May 1993	
UN (Rio) Convention on Biological Diversity	Accession: 19th July 1995	The Project will implement mitigation and management measures to ensure the conservation and protection of terrestrial and canal ecology during the Project lifecycle.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	Accession: 10th July 1997	The Project staff and workers will be strictly forbidden from trading in any wild flora and fauna found in the Project site or outside the Project boundaries.
Convention on Migratory Species of Wild Animals	1 May 1998	The project will implement mitigation and management measures to ensure conservation of terrestrial and avian migratory species where identified.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	Accession: 7th February 1996	The Project will be required to adhere to all national and international standards for hazardous waste generation and management.
United Nations Convention to Combat Desertification	Ratified: 31 August 1995	The Project will not result in accelerated desertification through sourcing of its materials and will contribute to sustainable development.
UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes	Accession: 4th September 2007	The canal south of the project site is found between the border of Uzbekistan and Tajikistan. Therefore, the Project will ensure that any impacts to the canal I.e. discharge are mitigated and managed in accordance with the national and lenders requirements.
Paris Convention on Protection of the World Cultural and Natural Heritage	Succession: 13th January 1993	The Project will implement mitigation and management measures where items/sites/monuments of cultural or natural heritage are identified within or near the Project boundaries and notify the relevant authorities immediately.

Name of International Protocol/Convention	Signed/ Ratified	Relevance to the Project
Stockholm Convention on Persistent Organic Pollutants	Accession: 28th June 2019	The Project will implement control measures to eliminate any use of chemicals under Annex A and B and reduce the unintentional release of those under Annex C.

3.3 Institutional Framework

Key organisations with responsibility for environmental management in Uzbekistan are:

- Cabinet of Ministers of the Republic of Uzbekistan (COM).
- Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC).
- The Centre for State Ecological Expertise, which is under the MEEPCC.
- The Cabinet of Ministers of the Republic of Uzbekistan governs the executive body in the Republic of Uzbekistan following the Constitution of the Republic of Uzbekistan (Article 98), and the Law of the Republic of Uzbekistan "On the Cabinet of Ministers of the Republic of Uzbekistan" (new edition of 2019). The COM exercises the following main functions.
- Implements measures on rational use and protection of natural resources.
- Coordinates the work of state bodies on joint conducting of natural protection events.
- Implements a large-scale ecological program of national and international importance.
- Takes measures to eliminate the consequences of accidents and disasters as well as natural disasters.

The Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC) is the main regulating body of state administration on environmental protection issues. The primary responsibilities of the MEEPCC include ensuring the implementation of a unified state policy on environmental safety, environmental protection, and the use and reproduction of natural resources; and enforcing state control over the compliance of ministries, state committees, departments, enterprises, institutions, and organisations, as well as individuals, with respect to the use and protection of land, mineral resources, water, forests, flora and fauna, and atmospheric resources. Structurally, the MEEPCC consists of the central unit (located in Tashkent), regional units (oblast) and local (district) units.

The Centre for State Ecological Expertise: The Centre for State Ecological Expertise's activities are directly related to the evaluation of materials for EIA and the issuance of documents determining compliance with environmental requirements for planned or executed business and other activities, as well as determining the admissibility of the implementation of the object of environmental expertise.

Due to the cross-cutting nature of sustainable development and the environment, virtually all other state bodies have some responsibility towards them. Other Ministries, Departments and Agencies (MDAs) related to E&S impact management in the context of the Project include (but are not limited to):

- Ministry of Energy of the Republic of Uzbekistan.
- Ministry of Health.
- Ministry of Poverty Reduction and Employment.
- Ministry of Water Resources.
- Ministry of Agriculture.
- Hydrometeorological Service Agency (Uzhydromet) under the Ministry of Natural Resources of the Republic of Uzbekistan.
- Inspection of Mining, Geology and Industrial Safety Control (Kontekhnazorat) under the Ministry of Mining Industry and Geology of the Republic of Uzbekistan.
- Ministry of Tourism and Cultural Heritage.
- Ministry of Emergency Situations.
- Cadastre Agency under the Ministry of Economy and Finance of the Republic of Uzbekistan.

3.4 Lenders E&S Requirements

The Project developer is pursuing an amount of project finance from a number of Financial Institutions (FIs), which seek to mainstream environmentally and socioeconomically sustainable development planning through the evaluation and management of E&S risks associated with investment projects, in step with:

- Internal E&S policies, standards and guidelines.
- Industry-wide, voluntary E&S risk assessment and management frameworks drawing on well-developed and internationally accredited E&S performance standards.

The Project's prospective lenders include European Bank for Reconstruction and Development (EBRD), German Investment Corporation (DEG), Islamic Development Bank (IsDB), KfW and Proparco/ French Development Agency (FDA). Some of these FIs are subscribed to the IFC Performance Standards (PSs) and Equator Principles Financial Institutions (EPFIs).

The E&S policies, frameworks and performance standards applicable to the Project on the basis of the prospective lenders are outlined in the following sub-sections.

3.4.1 European Bank for Reconstruction and Development (EBRD)

The European Bank for Reconstruction and Development (EBRD) has an internal Environmental and Social Policy (2019) and a set of specific Performance Requirement (PRs) covering key environmental and social components for consideration, assessment and management in their investments. These reflect EBRD's commitments to promote EU environmental standards as well as the European Principles for the Environment in their investments. The Bank's guiding PRs include:

- PR1: Assessment and Management of Environmental and Social Impacts and Issues;
- PR2: Labour and Working Conditions;
- PR3: Resource Efficiency and Pollution Prevention and Control;
- PR4: Health and Safety;
- PR5: Land Acquisition, Involuntary Resettlement and Economic Displacement;
- PR6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- PR7: Indigenous People;
- PR8: Cultural Heritage;
- PR9: Financial Intermediaries, and
- PR10: Information Disclosure and Stakeholder Engagement

3.4.2 German Investment Corporation (DEG)

The DEG undertakes E&S due diligence for its investment portfolio, in accordance with its Guideline for Environmental and Social Sustainability (GESS). The Corporation is a member of the KfW Bankengruppe, having endorsed the United Nations Environment Programme (UNEP) Initiative for Financial Institutions on the Environment and Sustainable Development. The GESS references a commitment to observing E&S requirements promoted by the European Development Finance Institutions (EDFIs), which include the Equator Principles (EPs), IFC Performance Standards (IFC PSs) and the material stipulations of the Environmental, Health and Safety Guidelines of the World Bank Group, and the Conventions of the International Labour Organisation (ILO). These requirements are broadly described further below.

IFC Performance Standards

The IFC Performance Standards are a key component of the IFC's Sustainability Framework and directed towards clients (i.e. party responsible for implementing and operating the project that is being financed), providing guidance on how to identify risks and impacts. The IFC Performance Standards are designed to help avoid, mitigate, and manage risks and

impacts throughout the life of a project as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities.

The IFC Performance Standards (2012) are listed below:

- Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
- Performance Standard 2: Labour and Working Conditions
- Performance Standard 3: Resource Efficiency and Pollution Prevention
- Performance Standard 4: Community Health, Safety, and Security
- Performance Standard 5: Land Acquisition and Involuntary Resettlement
- Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- Performance Standard 7: Indigenous Peoples
- Performance Standard 8: Cultural Heritage

WBG EHS Guidelines (2007)

The World Bank Group International Finance Corporation (IFC), Environmental, Health and Safety (EHS) General Guidelines of April 2007 superseded the World Bank Handbook issue of 1998. In terms of specific guidelines to control environmental externalities (e.g. wastewater quality etc.), EHS guidelines have been set out by IFC and the World Bank Group to provide general guidelines for its members when involved in a project or when providing financial support to a project. These guidelines contain general and industry-specific examples of Good International Industry Practice (GIIP). In summary, it should be noted that the following IFC EHS Guidelines are relevant to this project:

- General EHS Guidelines (2007).
- Electric Power Transmission and Distribution (2007).
- Guidelines for Water and Sanitation (2007).

Equator Principles

The Equator Principles (EP) is a risk assessment framework used by financial institutions to determine, assess and manage the environmental and social risk in Project's financing. At present, a total of 139 financial institutions from 39 countries have adopted the Eps. The Equator Principles were updated in 2006 (EPII), 2013 (EPIII) and a further update (EPIV) came into effect in October 2020. The EPs currently include the following guiding principles for E&S due diligence:

- Principle 1: Review and Categorisation.
- Principle 2: Environmental and Social Assessment.
- Principle 3: Applicable Environmental and Social Standards.
- Principle 4: Environmental and Social Management System and Equator Principles Action Plan.
- Principle 5: Stakeholder Engagement.
- Principle 6: Grievance Mechanism.
- Principle 7: Independent Review.
- Principle 8: Covenants.
- Principle 9: Independent Monitoring and Reporting.
- Principle 10: Reporting and Transparency.

The EPIV issue establishes the minimum E&S standards to be adopted by EP Financial Institution (EPFIs) as those from IFC Performance Standards on Environmental and Social Sustainability (Performance Standards), the World Bank Group Environmental, Health and Safety Guidelines (EHS Guidelines) and/or the relevant host country laws, regulations and permits that pertain to environmental and social issues.

3.4.3 PROPARCO

Proparco is a development finance institution partly owned by the French Development Agency. The Corporation's Environmental and Social Governance (ESG) framework is rooted in the E&S management instruments of the AFD Group, the principles common to European donors, IFC's Performance Standards, the ILO international labour standards, the FAO criteria, and basic principles such as those of the Universal Declaration of Human Rights.

AFD E&S Risk Assessment and Management Framework

The French Development Agency has established an Environmental and Social Risk Management Policy (2017), which provides for the development of operating procedures to identify, prevent or mitigate environmental and social risks and impacts, as well as any human rights violation that could result from AFD-funded activities.

All operations financed by AFD are required to comply with the national regulations of the country where the operation is implemented, including for environmental and social issues. However, as regulations in some of the countries where AFD operates are incomplete or under development, AFD uses as a reference a number of performance standards, good practices and directives produced by international standard-setting organizations, as well as major conventions on sustainable development, which altogether include:

- The World Bank Safeguard Policies for public sector financing.
- The UN Principles for Responsible Investment (UNPRI).
- The IFC Performance Standards.
- The United Nations Universal Declaration on Human Rights.
- The ILO fundamental conventions on labour law.
- The United Nations Convention on the Elimination of All Forms of Discrimination against Women.
- The OECD guidelines for multinational enterprises.

3.5 Project E&S Risk and Assessment Categorization

3.5.1 Categorization by national legislation

PROJECT CATEGORISATION

In the regulatory context, the Project's categorization in terms of E&S risk level is carried out on using sector-specific criteria set out in the Resolution No. 541 on "Measures for the Further Improvement of Environmental Impact Assessment Procedures". The Resolution provides the following E&S risk categories for power-generating facilities:

- Thermal, photovoltaic, wind power and other power-generating facilities with a capacity of 300 MW or higher – Category I (high risk).
- Thermal power plants and other power-generating facilities with a capacity of 100 MW to 300 MW – Category II (medium risk).
- Thermal, photovoltaic, wind power, and other power-generating facilities with less than 100 MW capacity – Category III (low risk).

At the time of the national EIA study, the constraints on the development of the PV power plant were not fully determined and the original planned capacity of 400 MW was considered. Accordingly, the Project was classed as a Category I (High Risk) activity, which requires a full national EIA process.

EIA PROCESS

Pursuant with Resolution No. 541, the Project is subject to a national EIA process (OVOS) consisting of three stages. Separate national EIA studies are required for the PV plant and BESS developments. The stages constituting the OVOS process are outlined below.

- Stage I – Referred to as the Preliminary Statement of Environmental Impacts (or PZVOS).

  The PZVOS study is commissioned at the Project's planning stage and performed by qualified E&S consultants. The objective of the study is the generic assessment

of potential E&S impacts associated with a given project, and the development of mitigation measures, the implementation of which is guided in an Environmental Management Plan (EMP) constituting the PZVOS report. Upon completion, the PZVOS report is submitted to the Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC) for review.

Provided the assessment is considered sufficient, a positive conclusion is issued, which provides permission for the implementation of the Project's construction phase. In the event that the assessment is considered insufficient, a directive is issued to either (i) upgrade the PZVOS report based on specific comments or (ii) undertake a follow-up (Stage II) ZVOS study. A positive PZVOS conclusion for any given project is valid for a period not exceeding three years from the date of issue.

- Stage II – Referred to as the Statement of Environmental Impacts (or ZVOS).

  The requirement for a ZVOS (Stage II) study is contingent on the review of the PZVOS (Stage I) study. Where the PZVOS report review establishes the need for an expanded assessment, the ZVOS study is commissioned. The objective of the ZVOS study is to provide a more detailed assessment of potential E&S impacts, in addition to the formulation of commensurate mitigation plans. Upon completion, the ZVOS report is submitted to the Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC) for review.

  Provided the assessment is considered sufficient, a positive conclusion is issued, which provides permission for the implementation of the Project's construction phase. In the event that the assessment is considered insufficient, a directive is issued to upgrade the PZVOS report based on specific comments. A positive ZVOS conclusion for any given project is valid for a period not exceeding three years from the date of issue.

- Stage III – Referred to as the Statement on Environmental Consequences (or ZEP)

  The ZEP study is commissioned at the Project's implementation stage and performed by qualified E&S consultants, prior to the start of commissioning activities. At the final stage of the national EIA process, additional and thematic modelling assessments are commissioned to quantify the Project's emissions and discharges into receiving environments. Based on this round of assessment, the ZEP study is intended to provide elaborate mitigation and monitoring plans. Upon completion, the ZEP report is submitted to the Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC) for review.

  Provided the assessment is considered sufficient, a positive conclusion is issued, which provides permission for the implementation of the Project's commissioning and operational phases. In the event that the assessment is considered insufficient, a directive is issued to upgrade the ZEP report based on specific comments. A positive ZEP conclusion for any given project is valid for a period not exceeding two years from the date of issue.

The completion of the national EIA process (OVOS) and the issue of a positive conclusion, as a permit for project construction (or commission and operations, as appropriate) is amongst the focus areas of the Project Lenders' ESDD. Positive national EIA conclusions (approvals) have been issued for both the PV plant and BESS (including interconnection) sites.

3.5.2 Categorization by E&S performance standards of Project Lenders

EBRD

According to the EBRD Environmental and Social Policy (2019), the Bank has established the following project E&S risk categories:

- Category A – Category for projects which could result in potentially significant adverse future environmental impacts which, at the time of screening, cannot readily be identified or assessed. An Environmental Impact Assessment (EIA) is therefore required to identify and assess the future environmental impacts associated with the proposed project, identify potential environmental improvement opportunities, and recommend any measures needed to prevent, minimise, and mitigate adverse impacts. An indicative list of Category A projects is presented in Annex 1 of the Policy.

  The Policy further defines Category A Projects as those that are planned to be carried out or are likely to have a perceptible impact, including cumulative impact in combination with other relevant past, present and reasonably foreseeable developments, on sensitive locations of international, national or regional importance, such as critical habitats or other ecosystems which support priority biodiversity features, areas of archaeological or cultural significance, and areas of importance for indigenous peoples or other vulnerable people. Projects which may result in significant adverse social impacts, such as physical and/or economic displacement, to people or group(s) of people who are affected or likely to be affected directly or indirectly by the project, are also placed under Category A.

- Category B – Category for projects in which potential environmental and/or social impacts are typically site-specific, and/or readily identified and addressed through effective mitigation measures. The scope of environmental and social appraisal will be determined by EBRD on a case-by-case basis.

  Category C – Category for projects which are likely to have minimal or no potential adverse environmental and/or social impacts.

PROPARCO

As stated in the AFD Environmental and Social Risk Management Policy (2017), AFD analyzes and classifies all potential projects into High – Substantial – Moderate – Low environmental and social risks, depending on the extent of the potential risks borne by the operation. The classification takes into account the nature and scale of the operation, the location and sensitivity of the affected area, the severity of the potential environmental and social risks and impacts, as well as the client's capacity to manage them.

This classification aims to determine the nature and depth of the environmental and social assessment required and the level of environmental and social standards the project will be

required to comply with, as well as the needs to engage stakeholders and the level of information required. The project categorization is conducted right from the identification stage, of the expected intensity of its most sensitive component from an environmental and/or social perspective. In this classification process, AFD takes into account the direct, indirect, cumulative and induced risks and impacts in the area of influence of the operation.

The Policy establishes the need for a detailed Environmental and Social Assessment (ESA) for projects in both the High and Substantial Risks category, and a simplified form (e.g., a specific chapter of the feasibility study) for those in the Moderate Risks category. It is stated that no environmental and social assessment is required for projects in the Low Risks category. For High and Substantial risk projects, the analyses conducted (ESA, ESMP, RAP) must be subject to a free, prior and informed consultation of the people potentially affected by the project, the central and local administrations impacted, and civil society representatives involved in environmental and social issues.

On this basis, the Project in its entirety is provisionally classed as a Substantial Category undertaking, which requires a detailed ESIA study, an ESMP and sufficient stakeholder engagement.

DEG

The Corporation is an EPFI and will therefore follow the project E&S risk categorization established in the Equator Principles. In the EP framework, projects are categorised based on the magnitude of potential environmental and social risks and impacts, including those related to human rights, climate change, and biodiversity. Such categorisation is based on the International Finance Corporation's (IFC) environmental and social categorisation process, as outlined below. The EPFI's environmental and social due diligence is commensurate with the nature, scale and stage of the Project, and with the categorised level of environmental and social risks and impacts.

- Category A – Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented. the Assessment Documentation includes an Environmental and Social Impact Assessment (ESIA). One or more specialised studies may also need to be undertaken.
- Category B – Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures. A limited or focused environmental or social assessment may be appropriate, applying applicable risk management standards relevant to the risks or impacts identified during the categorisation process.
- Category C – Projects with minimal or no adverse environmental and social risks and/or impacts. A limited or focused environmental or social assessment may be appropriate,

applying applicable risk management standards relevant to the risks or impacts identified during the categorisation process.

4 APPROACH TO ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

4.1 Scope of Work and Key Deliverables

4.1.1 National EIA

The key deliverables pertaining to the national EIA process (OVOS), in line with pertinent legislation, are as follows:

- Stage I - Preliminary EIA Report (PZVOS).
- Stage II - Statement of the Environmental Impact (ZVOS).
- Stage III - Statement on Environmental Consequences (ZEP).

As detailed in Section 3.5.1 of this Report, MEEPCC can issue a 'positive conclusion' based on the first stage of the national EIA (PVOS), thereby permitting the completion of all construction works planned under the Project and obviating the requirement for the second (conditional) stage of the national EIA (ZVOS) in advance of construction.

The PZVOS and ZVOS studies for the development of the PV plant was undertaken by Nazar Business and Technology (NBT), and a positive conclusion (PZVOS approval) for this project component was issued on 2nd June 2023. A separate PZVOS study for the development of the BESS facility was conducted by Juru Limited. A positive conclusion for this separate study was issued on 15th September 2023.

Following the issue of a positive conclusion on the first (and second as relevant) stages of the national EIA process to advance construction, the completion of the third stage of the national EIA and issue of a positive ZEP conclusion for this study will precede the start of any commissioning and operational activities planned under the Project.

4.1.2 Lenders ESIA

The key deliverables of the ESIA process for the lenders are:

- ESIA Scoping Report; and
- Detailed ESIA Report.

The E&S package of documents (delivered alongside the ESIA) for the Project will also include:

- Stakeholder Engagement Plan (SEP).

- A plan set to identify the full range of project stakeholders and provide a differential engagement strategy for each stakeholder grouping over the course of the Project's construction and operational phases, including an external Grievance Redress Mechanism (GRM) for resolving complaints and concerns from third party stakeholders.

- Land Acquisition and Livelihood Restoration Plan (LALRP)
    - A plan set to identify and assess physical and economic displacement impacts associated with the establishment of the Project's physical footprint and any requisite safety buffers (as applicable), in conjunction with appropriate compensation and livelihood restoration measures for tenure-differentiated categories of PAPs subjected to involuntary resettlement.
- Construction Environmental & Social Management Plan (CESMP)
    - The overarching management plan (prepared following the issue of the project ESIA and E&S policy) set to guide the management of project-related E&S impacts in line with regulatory requirements and lender E&S performance standards, at the Project's construction phase. The Plan will further underpin the development of the construction-phase Environmental and Social Management System (ESMS), by linking relevant E&S aspects and impacts to respective mitigation commitments and the monitoring arrangements for impact and mitigation monitoring by the E&S organization deployed for construction.
- Operational Environmental & Social Management Plan (OESMP)
    - A plan that is analogous to the C-ESMP and set to underpin the operations-phase ESMS, at the Project's operational stage.

4.2 ESIA Methodology

4.2.1 Scope of the ESIA

The scope of potential E&S impacts for the purposes of the bankable ESIA includes the following:

- E&S impacts associated with the main facilities constituting the Project (i.e., PV plant and BESS). The Project's main facilities are described in Section 2.5 of this document.
- E&S impacts associated with the ancillary facilities constituting the Project (i.e., laydown areas, contractor offices, temporary and permanent sanitation facilities etc.). The Project's ancillary facilities are described in Section 2.5 of this document.
- E&S impacts associated with the associated facilities constituting the Project (i.e., LILO OTL and utility drainage/ groundwater recharge facilities). The Project's associated facilities are described in Section 2.5 of this document.

4.3 Consideration of Project Alternatives

Several technological and locational alternatives have been taken into consideration in the course of the project's conceptual planning, feasibility studies and detailed design. The following sub-sections provide an overview of the alternatives considered, with a focus on economic viability, and environmental and socioeconomic criteria that constitute the basis of the project ESIA.

4.3.1 Technological considerations

The project design is based on the selection of the best technological options determining various parameters of solar power yield, transmission efficiency and the longevity of various electronic components.

The optimization strategies used in the design of the power PV plant include the following:

- Selection of a site with minimal shading from topographic features and structures (e.g., nearby buildings, trees, mountains and OTLs).
- Selection of a site with sufficient space to minimize inter-row shading between solar strings throughout the daytime.
- Selection of high-quality modules with bifacial capability, enhanced efficiency, robust architecture, low temperature sensitivity, and a low degradation rate.
- Single-axis solar tracking to maximize the capture of solar radiation along the east-west (azimuth) motion of the sun and adjusting the tilt angle to maximize capture of solar radiation along the north-south (zenith) motion of the sun.
- Robust and galvanized tracker models have been selected for resistance to strong winds and corrosion.
- Minimization of cable runs, optimization of cable dimensions, as well as selection of efficient transformers and inverters to minimize power losses.
- Use of inverter model with a high Maximum Power Point Tracking (MPPT) capability to ensure that the PV modules are operating at maximum efficiency despite fluctuations in solar irradiance.
- Integration of a complete SCADA system to enable the timely identification and remediation of system faults, and thereby reduce the incidence of operational downtime and yield deficits.
- Use of Li-ion batteries with a high energy density and coulombic efficiency to enable a high-power output and round trip efficiency for stable power supply.

4.3.2 Locational considerations

A number of factors determine the suitability of a given site for solar power generation. As such, the identification of candidate sites and final site selection are based on a number of

technical feasibility studies. Site investigation undertaken as part of the feasibility studies took stock of several viability factors described below.

4.3.2.1 Solar resource

Solar irradiance is amongst the principal factors governing the location of solar power plants, as the intensity of incident solar radiation varies both spatially and temporally, depending on variables such as time of day, season of the year, amount of humidity and cloud cover, dust conditions, and shading from surrounding features. Global Horizontal Irradiation (GHI) is the best indicator of the amount of solar radiation received per unit area, which covers both direct radiation from the sun, and scattered radiation reflected by the atmosphere and surrounding surfaces. The GHI is initially estimated using satellite-based data, to determine broad regions with potentially high irradiation. Subsequently the GHI is measured using site-based sensors and adjusted using climatic variation data from nearby meteorological stations, to determine smaller candidate sites with the highest solar power potential.

The figure below illustrates the spatial variation in GHI across Uzbekistan, based on data collected by Solargis and for solar resource mapping by the World Bank. Measurements from a network of meteorological stations across the country indicate that solar irradiance is highest between the months of May and September, with highest insolation recorded in July.

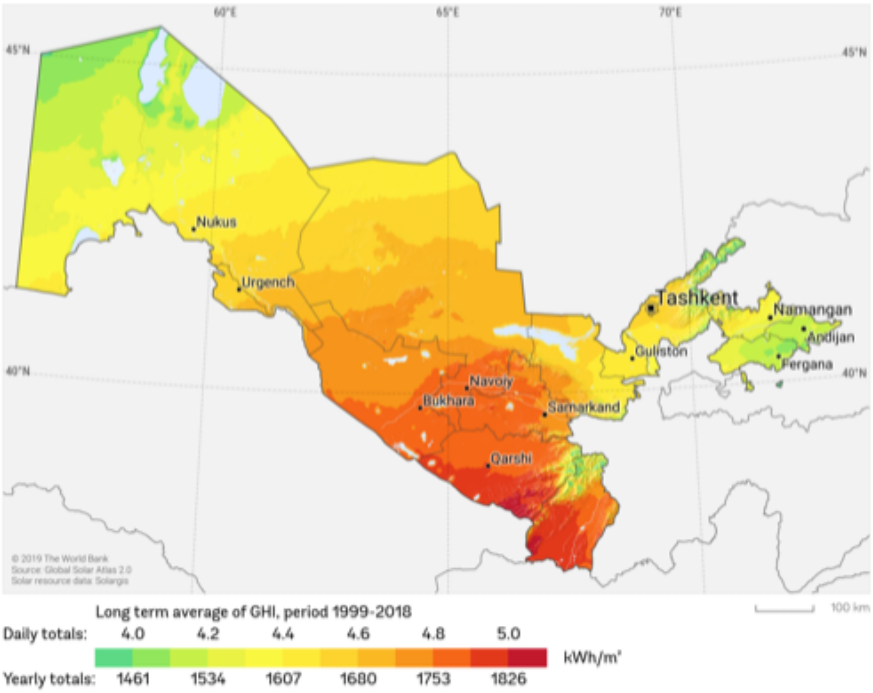


Figure 4-1 GHI variation across the regions of Uzbekistan

The solar assessment carried out by China Energy Engineering Group Anhui Electric Power Design Institute in 2003 did not identify any undeveloped areas of land within Tashkent

region, of equivalent or greater solar resource potential. The final selected sites in Nurobod District are conducive for sufficient solar irradiation, with a peak GHI level of 238 kW/m^2. With the opted PV plant technology, the energy yield analysis taking into account the annual variability of solar irradiance and insolation indicates a mean annual power generation potential totalling 1,264,937 MWh.

An important factor affecting local irradiance and potential yield is the degree of on-site shading from high-rise structures and topographic features (e.g., trees, OTLs, buildings etc.).

4.3.2.2 Area and land-use

The development of solar power generating facilities demands a sizeable area of land. The spatial extent of a potential site is an integral parameter in terms of potential yield, taking into account the number of solar modules required to meet the target generation capacity and yield, and the significance of inter-row shading on the power productivity.

In addition to space, potential sites should ideally not be occupied, to minimize adverse impacts on potentially affected land users and livelihoods and the duration of land reallocation and acquisition processes. Industrially developed sites that are compatible with the establishment of solar power facilities, should otherwise accommodate the solar arrays and other PV plant components. It is important that any co-located infrastructure and surrounding land use do not impinge on PV generation by light interception (shading) and module soiling. Natural elements of the environment within potential sites, such as vegetation canopy and avifauna, can also contribute to soiling.

Considering the scarcity of suitable unoccupied land in the region, best efforts were made to site the PV power plants in areas with relatively low-priority land-use (i.e., areas without residential, intensive crop cultivation and/or industrial property).

4.3.2.3 Climatic extremes and hazards

Besides the availability of sufficient mean irradiance, climate related pressures are an additional criterion for the selection of the Project site. Strong winds (in excess of 16-20 m/s) pose the risk of damage to mobile solar trackers and costly plant downtime. Likewise, flooding from major rivers or extensive stormwater runoff can cause severe erosion which can undermine the foundation of PV module mounting structures and result in washout and associated downtime. Further, heavy, and sustained snowfall can constrain solar insolation, overload the solar panels and impede tracker movement by ground-based build-up, whereas dust storms can cause a significant drop in insolation and yield.

Historical climate and weather records indicate that the selected sites are not prone to the regular occurrence of the above extreme climate events.

4.3.2.4 Geotechnical and hydrological conditions

The viability of a project site further depends on its geotechnical and hydrological conditions, considering the implications of the sub-surface environment on the integrity, stability, and performance of designed sub-structures and superstructures. Dedicated geotechnical and hydrological surveys have been conducted within the final designated sites in Nurobod, Pastdargom and Karakul Districts.

The studies investigated the resident geology, soil-bearing capacity of the soils, resistivity of the soils, groundwater level, drainage patterns, flood risk and as well as the chemical properties of the soils and groundwater. The results of these studies were evaluated to ensure that due provisions are designed to ensure the stability and integrity of planned structures (e.g., erosion and corrosion protection) and effective depths for grounding systems.

4.3.2.5 Grid connection

The grid connection requirements are an important consideration in the location of PV projects. The projects should be established with respect to grids that offer an adequate capacity, (ii) availability and (iii) proximity. The transmission conductors and switchyards constituting the recipient transmission line must have a rating that corresponds to the power yield, require minimal down-time for maintenance, and be located close to the proposed generation sites to minimize the cost of connection facilities.

4.3.2.6 Access

Site access is a notable factor of construction cost and time, in terms of the linkage of potential sites to transit corridors for the Project's construction and operational phases. The designated site is located along 4R-12 Road, which enables convenient transportation and linkage to logistical hubs and retail outlets within Tashkent City.

The proximity of the main road obviates the need for the construction of lengthy off-roads leading to the project location, and associated costs and lead time.

4.3.3 Project Alternatives

Considering the scarcity of suitable land in Tashkent Region, the binding performance specifications set out in the PPA, and the best technological features already adopted in the Project's detailed design, no feasible technological alternatives for the development of the PV plant development were identified. However, a number of candidate sites were identified for feasibility investigation.

4.3.3.1 BESS site

At the outset of the Project, a total of eight candidate sites were delineated with a broad tract of land in Parkent district. Engineering feasibility studies, E&S constraints analyses and stakeholder engagement was carried out to determine the suitability of each site. Besides proximity to an existing electrical sub-station, priority criteria for site selection included the absence of significant land-use/ ownership, sufficient distance from natural habitats, water bodies and utility assets.

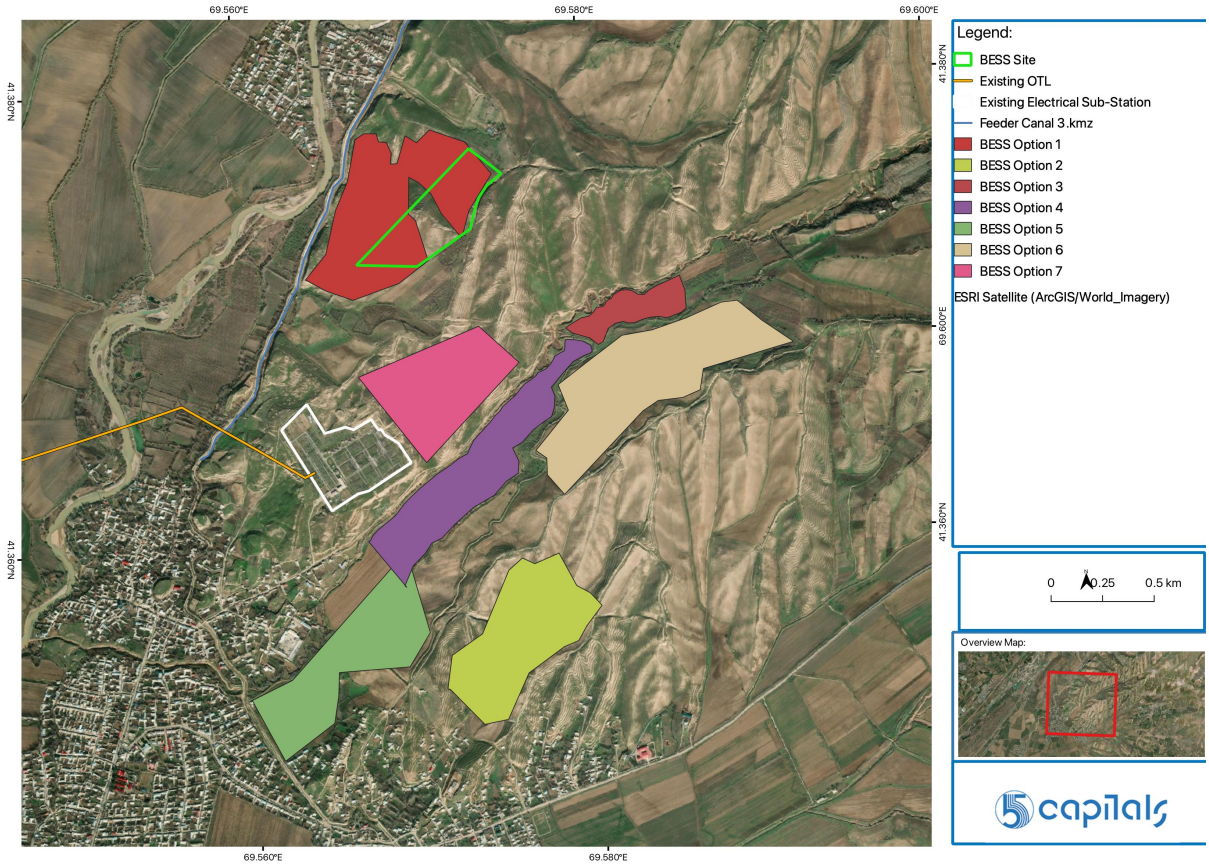


Figure 4-2 Alternative BESS sites considered for the Project

The selected site provides suitable conditions and is free of any built-up establishments, and is therefore considered most favourable from an E&S perspective.

4.3.3.2 BESS access route

A total of two BESS access route alternatives were taken into consideration at the Project's feasibility and detailed design stages. While the former route (marked by yellow line in Figure 11-3 below) was provisionally selected for ESIA assessment, a follow-up transportation route survey and E&S constraints study were conducted for the latter alternative.

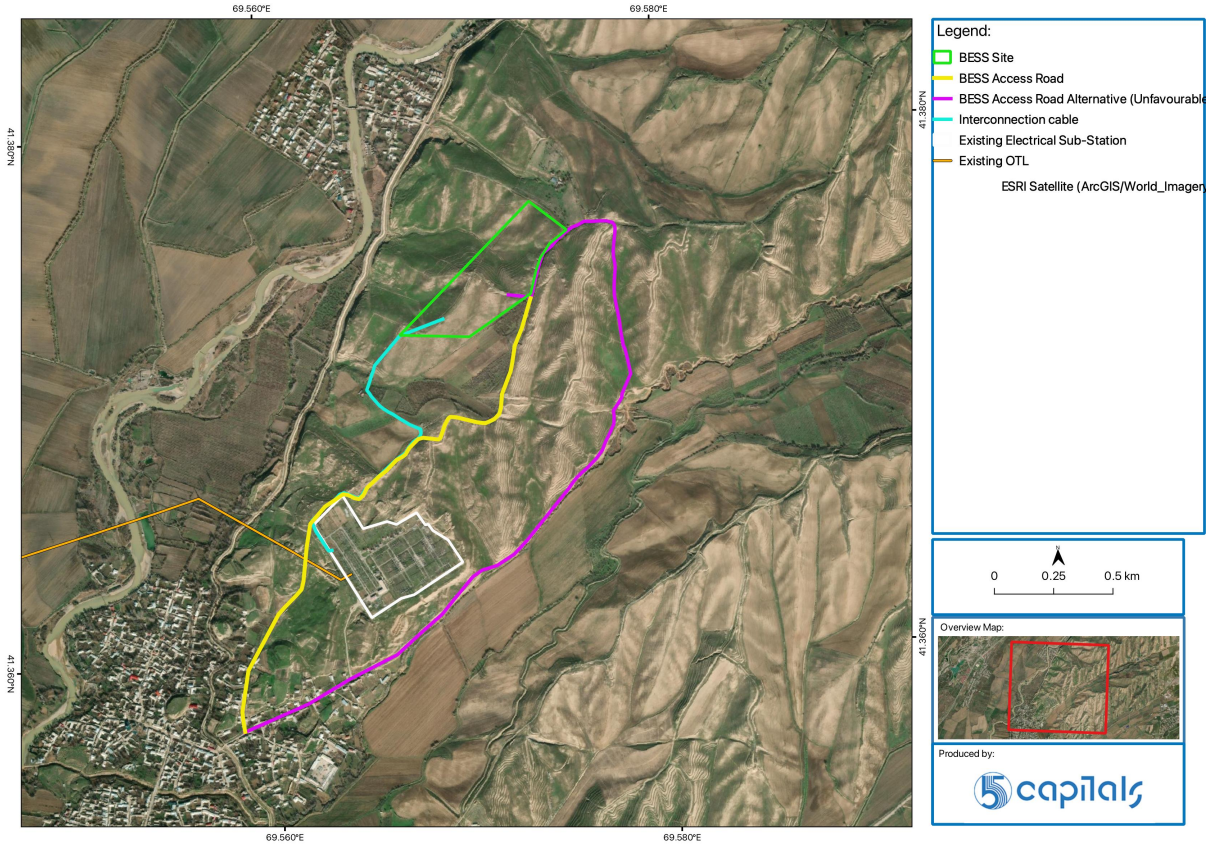


Figure 4-3 Access roads for transit to and from the BESS site

The follow-up feasibility studies altogether indicated that the former access route surveyed as part of the ESIA was the most favourable alternative, considering the following constraints on the eastern (latter) route:

- The eastern (alternative) route is close to an existing, unprotected canal, which poses the need for drainage works and related impacts on nearby farmland and residential areas.
- The eastern route is located closer to sites of archaeological interest and planned cultural heritage exploration.
- A larger number of receptors (i.e., residential facilities and adjacent farmland) are located along the eastern route, which are potentially vulnerable to noise and vibration, dust, drainage and health and safety hazards associated with potential roadworks and traffic along this route.
- The eastern route would require significant widening and grading works in its north-eastern portion, which poses additional impacts on nearby pastures and farmland. At the outset of the feasibility survey, the eastern route was understood to be generally wider and therefore potentially favourable on this basis. Upon ground truthing, and cadastral reviews to ascertain the width of the existing public roads along the original (western) and eastern routes, the original route was confirmed to have sufficient lateral capacity for the purposes of project-related transportation.

At the time of this assessment, no rehabilitation and upgrading works were considered necessary for the existing access route selected for the Project's transit corridor. The utilization of this road does not warrant any additional land-take.

4.3.3.3 No project alternative

The zero alternative is not regarded as favourable, as the project is set to deliver on nationally important energy objectives, in face of the ongoing power shortages in Tashkent Region. In addition, the Project aligns with the national movement towards a cleaner and more efficient power sector, to meet the rising demand for energy within the country.

4.3.4 Baseline Studies

E&S baseline studies are an integral aspect of the Project's ESIA process. These studies serve to define the baseline (pre-project) condition of potentially affected E&S receptors (i.e., Valued Environmental Components (VECs)) and thereby provide a frame of reference for monitoring E&S impacts at the Project's implementational stage.

4.4 Impact Assessment and Significance Criteria

In order to obtain a credible assessment of environmental and social impacts, the assignment of "effect significance" to each identified impact needs to be a robust, consistent and transparent process. The methodology to assess 'effect significance' is outlined below and follows an International Best Practice based on the assumption that the significance of an impact on resources or receptors is considered to result from an interaction between three factors:

- The nature and magnitude of the impact (i.e. a change in the environment, social and/or health baseline conditions);
- The number of resources or receptors affected (i.e. humans and the environment); and
- The environmental value or sensitivity of those resources or receptors to the change.

A three-step approach has been used to determine the significance of environmental effects, as follows:

- Step 1 – Evaluation of value/sensitivity of resource or receptor;
- Step 2 – Assessing the magnitude of the impact on the resource or receptor; a
- Step 3 – Determining the significance of effects.

IDENTIFICATION AND EVALUATION OF SENSITIVE RECEPTORS

Sensitive receptors are defined as:

- Elements of the ***environment*** that are of value to the functioning of natural systems (i.e. areas or elements of ecological, landscape or heritage value, species, habitats and ecosystems, soil, air and water bodies or land-use patterns);
- ***Human*** receptors, such as stakeholders (i.e. users of dwellings, places of recreation, places of employment, community facilities or household relocation) and human systems (e.g. employment market, population disease susceptibility and disease communicability, exposure to toxicity of chemicals).

Table 4-1 Environmental Value of Receptor or Resources

VALUE (SENSITIVITY)	DESCRIPTION OF VALUE
Very High	High importance and rarity on an international scale and limited or no potential for substitution. The receptor has already reached its carrying capacity, so any further impact is likely to lead to an excessive damage to the system that it supports. Locations or communities that are highly vulnerable to the environmental impact under consideration or critical for society (e.g. indigenous peoples, hospitals, schools).
High	High importance and rarity on a national scale, and limited potential for substitution. The receptor is close to reaching its carrying capacity, so a further impact may lead to a significant damage to the system that it supports. Locations or communities that are particularly vulnerable to the environmental impact under consideration (e.g. residential areas, vulnerable/marginalized groups).
Medium	High or medium importance and rarity on a regional scale, limited potential for substitution. The receptor is already significantly impacted, but it is not close to reaching its carrying capacity. Further impacts will get increase the stress of the underlying system, but evidence does not suggest that it is about to reach a critical point. Locations or groups that are relatively vulnerable to the environmental impact under consideration (e.g. commercial areas).
Low (or Lower)	Low or medium importance and rarity on a local scale. The receptor is not significantly impacted and shows a large spare carrying capacity. Impacts are not likely to generate any noticeable stress in the underlying system. Locations or groups that show a low vulnerability to the environmental impact under consideration (e.g. industrial areas).
Very Low	Very low importance and rarity on a local scale. The receptor is not impacted and shows a very large spare carrying capacity. Impacts are very unlikely to generate any noticeable stress in the underlying system. Locations or groups that show a very low vulnerability to the environmental impact under consideration (e.g. industrial areas).

IDENTIFICATION AND EVALUATION OF POTENTIAL IMPACTS

During the evaluation undertaken, the following types of impacts will be considered:

- Direct Impacts - Potential impacts that may result from the construction, commissioning, and operations of the Project acting directly on an environmental or social receptor;

- Indirect Impacts – Potential impacts which are not a direct result of a Project activity, that may be realised later in time or at distances further removed from the project footprint, but are normally a result of a complex pathway;
- Cumulative Impacts – Changes to the environment that are caused by an action in combination with other past present and future actions.
- Beneficial Impacts – Those impacts that have a positive, desirable or favourable effect on the sensitive resources or receptors (e.g. landscape providing artificial habitat for a variety of species, jobs opportunities during the construction and/or occupation phases of a project);
- Adverse Impacts – Those impacts that are detrimental and have a negative influence on the environment, social structures, resources or other receptors;
- Secondary Impacts - Potential impacts that may result from the implementation of protection measures applied to mitigate potential direct impacts;
- Event Related Impacts - Potential unplanned or accidental impacts stemming from an unintentional event such as fire, explosion, oil spill, etc.; and

DEFINING IMPACT MAGNITUDE

The magnitude of the impact will be defined wherever possible in quantitative terms. The magnitude of an impact has a number of different components, for example:

- The extent of physical change;
- The level of change in an environmental condition;
- The permanence of impact and the reversibility of the impacted condition;
- Its spatial footprint;
- Its duration, its frequency; and
- Its likelihood of occurrence where the impact is not certain to occur.

Where necessary, the determination of impact magnitude may be assisted through the use of computer modelling (as outlined in the Terms of Reference sections herein). The criteria used for identifying the magnitude of impacts is provided within the table below.

Table 4-2 Criteria for magnitude of Impacts

MAGNITUDE	DESCRIPTION OF MAGNITUDE
Major	Adverse: Loss of resource and/or quality and integrity; severe damage to key characteristics, features or elements. A major impact is usually large scale, permanent and irreversible. Beneficial: Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality.
Moderate	Adverse: Significant impact on the resource, but not adversely affecting the integrity; Partial loss of/damage to key characteristics, features or elements. Moderate impacts usually extend above the site boundary, and are usually permanent, irreversible or cumulative. Beneficial: Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.

MAGNITUDE	DESCRIPTION OF MAGNITUDE
Minor	Adverse: Some measurable change in attributes quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. Minor impacts usually are only noticeable within the site and are temporary and reversible. Beneficial: Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse: Very minor loss or detrimental alteration to one or more characteristics, features or elements. Beneficial: Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

4.4.1 Determining Significance of Effects

The significance of effects is a combination of the environmental value (or sensitivity) of a receptor or resource and the magnitude of the project impact value (change). In other words, it is this product of the impact acting on the receptor that produces an environmental effect. The table below provides criterion used for determining the significance of environmental effects through consideration of the potential magnitude of impact and sensitivity of the associated receptor. Definitions of each significance categories are provided.

Table 4-3 Criteria for Determining Significance of Effects

		MAGNITUDE OF IMPACT (DEGREE OF CHANGE)				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
SENSITIVITY OF RECEPTOR	**Very High**	Neutral	Minor	Moderate or Major	Major	Major
	High	Neutral	Minor	Minor or moderate	Moderate or Major	Major
	Medium	Neutral	Negligible or minor	Minor	Moderate	Moderate or Major
	Low	Neutral	Negligible or minor	Negligible or minor	Minor	Minor or moderate
	Very Low	Neutral	Negligible	Negligible or minor	Minor	Minor

Table 4-4 Definition of Significance of Effects

Significance Category	Criteria
Very Large	Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
Large	Important considerations at a local scale but, if adverse, are potential concerns to the project and may become key factors in the decision-making process.
Moderate	These effects, if adverse, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.
Slight	Local issue unlikely to be of importance in the decision-making process. Effects do not exceed statutory limits. Nevertheless, they are of relevance in enhancing the subsequent design of the project and consideration of mitigation or compensation measures.
Neutral	No effect or effect that is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error. No mitigation is required.

4.4.2 Mitigation & Management Measures

It is noted that the Project will incorporate certain mitigation as a function of its design (e.g. air emissions control, wastewater treatment plants). Where applicable, these measures will be included to the Project description.

In addition to the mitigation incorporated in the Project design, the ESIA will consider the assessed impacts to develop further measures (where necessary) for applicable construction and the operational phase impacts.

4.4.3 Residual Impacts

The residual impacts section will consider the overall significance of impacts following the implementation of the mitigation and management measures not already included to the design and project activities. The significance of such impacts will be re-evaluated based upon the same criteria used to determine the impact significance stated above.

4.5 Framework for Environmental and Social Management

The ESIA will include a standalone framework to guide the Project parties in establishing structures for the management of E&S risks, impacts, opportunities and compliance associated with both the construction and operational phases of the Project.

The Framework will outline systematic structures and management programmes that will be further detailed in the project specific Environmental and Social Management Plans:

- Construction Environmental & Social Management Plan (CESMP)
- Operational Environmental & Social Management Plan (OESMP)

A preliminary C-ESMP based on this ESIA issue has been prepared for the EPC Contractor in preparation of main construction works on the PV power plant site and all works on the BESS site. The C-ESMP will be updated following the completion and external review of the detailed ESIA for final issue. The O-ESMP will also be developed based on the ESIA, prior to the start of commissioning and operations.

4.6 ESIA Reporting Structure

In order to align the ESIA with the requirements for environmental and social assessment established by the various lenders, the ESIA report is proposed to be presented in the following format developed by 5 Capitals:

- Volume 1: Non-Technical Summary
- Volume 2: ESIA - Main Text, Tables and Figures
- Volume 3: Framework for Environmental & Social Management
- Volume 4: Appendices

Volume 1 will include a Non-Technical Summary (NTS) of the ESIA, including the main outcomes, and conclusions.

Volume 2 will comprise the main text of the ESIA and full impact assessment, with mitigation, management and monitoring measures identified.

Volume 3 will provide the Framework for Environmental and Social Management as outlined above.

Volume 4 will comprise all technical appendices relevant to the studies and ESIA.

4.7 Stakeholder Engagement

The following sections elaborate on the objectives of stakeholder engagement and a preliminary identification of various project stakeholders, in terms of their implementing roles and broader relation to the project. A description of stakeholder engagement activities completed up to the completion of the detailed ESIA is also provided below. A more elaborate description of the stakeholder engagement background and a program for forward engagement is provided in the Stakeholder Engagement Plan (SEP) submitted in tandem with this Report.

STAKEHOLDER ENGAGEMENT OBJECTIVES

Stakeholder engagement amongst the key requirements for the conduct of the Project's ESIA, under national law and the Project Lenders' E&S performance standards. According to these instruments, a meaningful and adaptive stakeholder engagement process which begins at reasonably early stages of project planning and continues throughout subsequent stages of project implementation, is intended to fulfil the following E&S performance objectives:

- To establish a participatory, informative and transparent dialogue with parties with the potential to influence the project and/or become affected by the project, as well as constituencies with an interest in the outcome of the project.
- To leverage and integrate local and expert knowledge in the identification and assessment of E&S impacts, subsequent optimization of the project design and effective mitigation planning.
- To establish community buy-in and ensure the delivery of sustainable project benefits to targeted beneficiaries.

Stakeholder engagement is a 'live' process that must be organized by means of a dedicated and documented Stakeholder Engagement Plan (SEP). The SEP developed at the bankable ESIA stage was built upon the rounds of stakeholder engagement discharged as part of the national EIA process. The basis for the preparation of the project SEP and an overview of the SEP commitments are detailed below.

STAKEHOLDER MAPPING

The preparation of the Stakeholder Engagement Plan (SEP) commenced with a stakeholder mapping exercise. The wide range of stakeholders associated with the Project were identified and classified based on the review of the Project's legal framework and the preliminary identification of E&S impact receptors by means of desktop research and field reconnaissance. In terms of administrative capacity, the project stakeholders were classified as follows:

1. Project-affected landowners and land users.
2. Project-Affected Communities (PACs).
3. Local Government Authorities ((LGAs) i.e., regional and district administration).
4. National Ministries, Departments, and Agencies (MDAs).
5. Non-Governmental Organizations (NGOs).
6. Project Lenders.

Subsequently, the stakeholders were characterized and prioritized in terms of their relevance to the project to enable a differential engagement strategy, such that the scope, modes and frequency of planned consultation and disclosure are commensurate with the parties'

roles, risks, and interests in relation to the Project. This systematic characterization enabled a subsequent level of stakeholder categorization on the basis of their relation to the project, and in a decreasing order of priority:

- Decision-making stakeholders (Category 'D') – entities charged with the implementation, appraisal and/or regulation of the various project aspects, and with subsequent resolution which can critically affect the course of the Project (i.e., national regulators and Project Lenders).
- Impact-based stakeholders (Category 'A') – entities that are potentially impacted by the Project directly or indirectly.
- Interest-based stakeholders (Category 'I') – entities that are neither affected by the project nor bear any executive influence on the project but hold certain interests in the project.

The EBRD PR1 and PR5, and IFC PS1 and PS5, define vulnerable groups as sections of project-affected communities that are subject to disproportionate adverse socioeconomic impacts from projects, by virtue of characteristics such as gender, gender identity, sexual orientation, religion, ethnicity, indigenous status, age (including children, youth and the elderly), physical or mental disability, literacy, political views or social status. On this basis, the list of criteria for the identification of vulnerable community members or sections in the context of the Project includes the following:

- Community with ethnic minorities resident in Istiqlol Makhalla (community), which is situated south of the PV plant site.
- Any households within project-affected communities, which are (i) employed in natural resource-based livelihoods (i.e., smallholder crop farming and livestock rearing) and (ii) subject to economic displacement.
- Any households within project-affected communities, which are (i) subject to economic and displacement, and (ii) do not have legally demonstrable (formal) rights to project-affected landholdings and pastural areas.
- Households in which more than two members or the household head are disabled.
- Households in which more than two members or the household head are chronically sick.
- Female-headed households.
- Child-headed households.
- Households with an elderly head (over 60 years).
- Households living in extreme poverty (i.e., under the national basic poverty line).

STAKEHOLDER ENGAGEMENT PROGRAM

For the purposes of this ESIA, a number of stakeholder engagement modes are planned for subsequent consultation and disclosure vis-à-vis the various stakeholder groups identified. The

table below outlines the applicability of these engagement modes, taking into account the stakeholder categories, the size and geographical distribution of the stakeholder groups, sensitivity of stakeholder information, and social factors affecting the participation and expression of certain community groupings.

Table 4-5 Applicability of different stakeholder engagement modes

STAKEHOLDER ENGAGEMENT MODE	APPLICABILITY
Formal consultative letters/ correspondence	• Inviting stakeholders to public meetings. • Disclosing information to a large and/or extensive target audience. • Formal project introduction and preliminary rounds of consultations with MDAs, LGAs and other authorities.
Community meetings	• Initial disclosure for project introduction, description of potential E&S impacts impact management strategies, for the information of the general public within project-affected communities. • Initial consultation with community members with regard to the general E&S context, potential E&S receptors and impacts, appropriate management measures and related recommendations. • Responses to general project-related queries from affected communities. • Presentation of the plan for subsequent rounds of engagement and grievance management.
Leaflets and infographics	• Presentation of lucid summary information regarding the project objectives, plan, associated E&S impacts and corresponding management measures. • Illustration of project design, and various E&S management processes (i.e., ESIA, grievance redress mechanism etc.). • Providing reference where attendance of meetings is not possible or oral presentations delivered during prior meetings is not well understood.
Household surveys	• Collection of detailed household-level socioeconomic information, from a representative sample of households resident within project-affected communities and districts. • Collection of voluntary and sensitive information that may otherwise be reserved on public consultation platforms.
Focus Group Discussions (FGDs)	• Collective consultations with affected communities, which target a specific groups or guilds for discussions based around certain E&S topics. • Exclusive and safe platforms for engaging with marginalized or minority groups who may otherwise be underrepresented or intimidated with regard to self-expression, during general community meetings.
Key Informant Interviews (KIIs)	• Consultation on key resource persons and subject matter experts from local communities, district and regional administration, MDAs and NGOs. • May be conducted for follow-up consultations with various authorities, following an initial round of consultative correspondence. • Useful for collecting expert information related to key E&S topics applicable to specific locations.
Participatory site visits	• Site visits for ground truthing and observation, attended by project-affected affected entities, including community members and/or relevant officials from competent authorities. • Useful for the demarcation of plot boundaries (for affected landholdings) and utility asset surveys.

Official announcements and media coverage	• Written notices posted in community centres and project information centres. • Notices disseminated to communities by phone calls, phone messages, emails, door-to-door visits or local media. • Useful for official announcements and notices related to project milestones of account to affected stakeholders.
Local and online disclosure of E&S safeguard documents	• Suitable for engagement aimed at consultation and disclosure within the public domain, which can result in material changes to the Project's E&S safeguard documents and the Project Company's Environmental and Social Management System (ESMS). • Local disclosure of E&S safeguard documents (i.e., ESIA Non-Technical Summary (NTS), LALRP, and SEP) at strategic Project Information Centres (PICs) within local communities (i.e., makhalla offices, school libraries and country offices of Project Lenders, as appropriate). • Online disclosure of E&S safeguard documents (i.e., ESIA, LALRP, and SEP) on the websites of Project Lenders.

Following the stakeholder analysis and the selection of suitable engagement modes, a forward Stakeholder Engagement Plan (SEP) was drawn up to ensure that the scope, frequency and differential means of engagement are commensurate with the role and relevance of each stakeholder group.

The above-described modes of stakeholder engagement will be conducted in a manner that is culturally appropriate, understandable to target audiences, and free of manipulation, coercion and intimidation. The timing and location of community meetings and FGDs will be organized with efforts to ensure sufficient and equitable representation of groupings or constituencies whose attendance may be constrained by a lack of mobile communication, transportation means and overriding workplace or domestic commitments. Oral and written communication will be made in local languages, namely Uzbek and Russian, as appropriate. Where engagement is focused on international stakeholders, the default language will be English. All modes of engagement will be documented by minutes of meetings and attendance and/or document dispatch logs, as relevant.

It is noted that the SEP will be a live document that will be updated over the course of project planning and project implementation. Potential and actual E&S risks, impacts and receptors will change with the (i) progression of project activities, (ii) variation in project plans and (iii) exogenous developments in the Project's legal framework. Accordingly, the range of relevant stakeholders and corresponding engagement requirements will evolve in turn. The timing and frequency of engagement is set to ensure timely engagement that will play an instrumental part in minimizing the Project's adverse E&S impacts while enhancing development benefits to relevant constituencies.

The table below provides an overview of the project stakeholders (grouped by administrative capacity and relation to the project), their respective consultation and disclosure agenda, and the engagement mode for each.



Figure 4-4 Key Informant Interview (KII) with Uzsuvtaminot local engineer (left) and KII with community member encountered close to the BESS site (right)

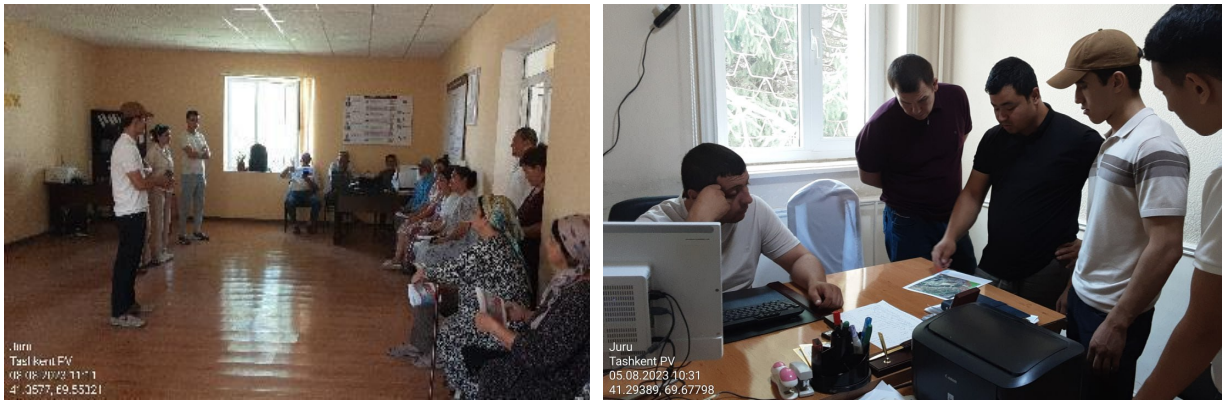


Figure 4-5 Key FGD with women in Kavardan Makhalla (left) and KII with Parkent District Cadastral Department (right)

Table 4-6 Overview of project stakeholders, and their respective engagement modes, consultation agenda and inputs

ADMINISTRATIVE ORDER	STAKEHOLDER	RELEVANCE CATEGORY	CONSULTATION AGENDA	MODE OF ENGAGEMENT	INPUTS TO DATE
Project-affected landowners and land users (PAPs)	Land users – Herders	**A:** Landowners subject to economic displacement as a result of land acquisition for the Project's development.	• Disclosure of project plans, potential E&S impacts, and mitigation strategies. • Request for information on potentially impacted property, resources and land tenure. • Establishment of the Project's external Grievance Redress Mechanism (GRM).	• Official announcements. • Community meetings. • Focus Group Discussions (FGDs). • Key Informant Interviews (KIIs) (LALRP-stage). • Household surveys (LALRP-stage).	Site surveillance, various forms of community and makhalla consultations did not reveal and landowners for the PV plant, BESS and cable interconnection site. Only several professional herders were identified as using the BESS site occasionally for informal grazing.
Project-Affected Communities (PACs/ Makhallas)	Tashtogizoq Yangiobod Gulobod Istiqbol Istiqlol Taraqqiyot Qirgizovul Kavardan	**A:** Communities subject to E&S impacts from various project aspects.	• Disclosure of project plans, potential E&S impacts, and mitigation strategies. • Request for information on potentially impacted public infrastructure and resources. • Request for specific information on local demography, household economy and social services. • Establishment of the Project's external Grievance Redress	• Official announcements. • Community meetings. • FGDs. • Household surveys (ESIA-stage). • Project leaflets	Community members requested information regarding the project developer, and safety of the power generation and power storage facilities. Residence also asked for community development initiatives such as the donation of PV panels for domestic power

Administrative Order	Stakeholder	Relevance Category	Consultation Agenda	Mode of Engagement	Inputs to Date
			Mechanism (GRM).		generation, and road upgrading works. Residents wanted to understand what part of the land would be acquired and if it would have an impact on herders that rotate with livestock from time too time.
	Local women Local youth Other vulnerable groups within local communities	**A:** Community members subject to disproportionate or unique E&S impacts from various project aspects.	• Disclosure of project plans, potential E&S impacts, and mitigation strategies. • Request for information on potentially impacted public infrastructure and resources. • Request for specific information on local demography, household economy and social services. • Request for information on factors of socioeconomic vulnerability. • Establishment of the Project's external Grievance Redress Mechanism (GRM).	• Official announcements. • FGDs. • Household surveys (ESIA-stage).	Women did not raise any specific concerns regarding gender-specific project impacts and opportunities. Women and local youth indicated that they would be interested in project employment.

Administrative Order	Stakeholder	Relevance Category	Consultation Agenda	Mode of Engagement	Inputs to Date
	Ethnic minority in Istiqlol makhalla	**A:** Community members subject to disproportionate or unique E&S impacts from various project aspects.	• Disclosure of project plans, potential E&S impacts, and mitigation strategies. • Request for information on potentially impacted public infrastructure and resources. • Request for specific information on local demography, household economy and social services. • Request for information on factors of socioeconomic vulnerability. • Request for information on cultural integration and intangible cultural heritage. • Establishment of the Project's external Grievance Redress Mechanism (GRM), and request for related recommendations.	• Official announcements. • FGDs. • Household surveys (ESIA-stage). • Project leaflets.	The community made a request for employment opportunities, particularly for semi-skilled labour during construction and possible operations. The community did not reveal any sensitive intangible cultural heritage.
	Commercial and industrial facilities nearby the PV plant site (i.e., grain	**A:** Entities that are subject to construction-phase impacts such as noise, vibration, dust and traffic congestion.	• Disclosure of project plans (objectives, design and activities). • Disclosure of the Project's	• Brief meetings with property owners and security	No particular concerns or recommendations. were provided during

ADMINISTRATIVE ORDER	STAKEHOLDER	RELEVANCE CATEGORY	CONSULTATION AGENDA	MODE OF ENGAGEMENT	INPUTS TO DATE
	storage, cotton processing and recreational business)		GRM. • Request for any immediate queries and/or concerns.	personnel. • Project leaflets.	the engagements.
Local Government Authorities (LGAs / Khokimiyats)	Makhalla Chairman and committee.	**D:** -Grass-roots administration and monitoring of development projects, and coordination with district administration. -Front-line response to community grievances.	• Disclosure of project plans (objectives, design and activities). • Request for information on potentially impacted public infrastructure and resources. • Request for general information on local demography, household economy and social services. • Request for general information on socioeconomically vulnerable community groupings. • Request for information on local biodiversity and ongoing conservation initiatives. • Establishment of the Project's external Grievance Redress Mechanism (GRM).	• Formal consultative letters/ correspondence. • KIIs.	Provided information on the usage of the HESS site, by herders in particular. Assisted the disclosure of cut-off dates for the LALRP surveys (for meetings with herders to obtain more information on informal land use and establish possible livelihood impacts).
	Yuqorichirchik District Khokimiyat.	**D:** -District-level planning and administration of development projects. -Preparation of land-use proposals, approval of subsequent land-use plans, commissioning of cadastral registration of landholdings, and administration of Land Lease Agreements (LLAs).			Provided information regarding key resident livelihoods, some of which are agricultural.
	Parkent District Khokimiyat.	**D:** -District-level planning and			Provided information regarding key

ADMINISTRATIVE ORDER	STAKEHOLDER	RELEVANCE CATEGORY	CONSULTATION AGENDA	MODE OF ENGAGEMENT	INPUTS TO DATE
		administration of development projects. -Preparation of land-use proposals, approval of subsequent land-use plans, commissioning of cadastral registration of landholdings, and administration of Land Lease Agreements (LLAs).			resident livelihoods, some of which are agricultural. Confirmed their role in environmental and social monitoring during the implementation of projects. Provided expert support for the tree inventory on the PV plant site.
	Tashkent Region Khokimiyat.	**D:** Regional planning and administration of development projects.			Provide information on historical land use and recent allocation to CHA. Provided expert support on queries relating to cultural heritage and biodiversity.
National Ministries, Departments, and Agencies	Ministry of Energy.	**D:** Review and approval of project design, land acquisition, operational off-take and O&M of planned power generation	• Disclosure of plans and designs for the main project facilities.	• Ad-hoc formal consultative letters/ correspondence.	Approval of project plans and design.

Administrative Order	Stakeholder	Relevance Category	Consultation Agenda	Mode of Engagement	Inputs to Date
(MDAs) – Energy.		facilities post PPA term completion.			
	National Electricity Grids of Uzbekistan (NEGU).	**D:** Review and approval of project design, land acquisition, operational off-take and O&M of planned interconnection facilities post PPA term completion.	• Disclosure of project plans and design.	• Ad-hoc formal consultative letters/ correspondence.	Approval of project design.
	Uztranzgaz.	**D:** Provision of general information on planned and existing gas pipelines within the project-affected areas, and execution of laws and regulations pertaining to the operation and maintenance of gas supply infrastructure (e.g., appropriate buffer zones).	• Disclosure of project plans (objectives, design and activities). • Request for information on existing gas pipelines located in and around the project area. • Request for regulatory buffers for gas pipelines located in and around the project area.	• Formal consultative letters/ correspondence. • Participatory site visit.	Two operational Category I (high-pressure) gas pipelines are located nearby the project sites. The buffer distances for the pipes are 300 and 500 metres. These buffers were observed. Subsequently, technical conditions were provides with protocols for pre-construction coordination and construction-phase oversight of the cable installation across an operational gas pipeline.
	Hududgaz	**D:** Provision of district-level	• Disclosure of project plans	• Ad-hoc formal	N/A.

ADMINISTRATIVE ORDER	STAKEHOLDER	RELEVANCE CATEGORY	CONSULTATION AGENDA	MODE OF ENGAGEMENT	INPUTS TO DATE
		information on existing gas pipelines within the project-affected areas, and execution of laws and regulations pertaining to the operation and maintenance of gas supply infrastructure.	(objectives, design and activities). • Request for information gas pipelines located in and around the project area. • Request for regulatory buffers for gas pipelines located in and around the project area.	consultative letters/ correspondence.	
MDAs – Environment and Climate Change.	Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC).	**D:** - Provision of information on biodiversity and ecologically important water resources within the project-affected areas. -Execution of laws and regulations pertaining to environmental management. -Review of national EIA reports for planned project facilities. -Issue of environmental permits for construction and operation. -Follow-up monitoring of E&S compliance.	• Disclosure of project plans (objectives, design and activities). • Request for information on any species and habitats of conservation concern within the project-affected areas, and recommendation for the relocation/ replanting of any threatened species. • Request for information on any ongoing conservation programs and protected areas in and around project-affected areas.	• Formal consultative letters/ correspondence.	Instruction to carry out comprehensive baseline biodiversity surveys within the project sites. No potentially resident species of conservation concern were highlighted.
	MEEPCC Tashkent Region Office.	**D:** -Provision of information on biodiversity and ecologically	• Disclosure of project plans (objectives, design and activities).	• Formal consultative letters/	Upon notice, carried out tree inventory surveys on the PV

ADMINISTRATIVE ORDER	STAKEHOLDER	RELEVANCE CATEGORY	CONSULTATION AGENDA	MODE OF ENGAGEMENT	INPUTS TO DATE
		important water resources within the project-affected areas, and related conservation programs. -Implementation of contingent pre-construction biodiversity surveys. -General monitoring of E&S compliance during the Project's construction and operational phases.	• Ad-hoc request for information on any species and habitats of conservation concern within the project-affected areas. Ad-hoc request for information on any ongoing conservation programs and protected areas in and around project-affected areas.	correspondence.	plant site.
	MEEPCC Tashkent Region Office.	**D:** -Provision of information on biodiversity and ecologically important water resources within the project-affected areas, and related conservation programs. -Implementation of contingent pre-construction biodiversity surveys. -General monitoring of E&S compliance during the Project's construction and operational phases.	• Disclosure of project plans (objectives, design and activities). • Ad-hoc request for information on any species and habitats of conservation concern within the project-affected areas. • Ad-hoc request for information on any ongoing conservation programs and protected areas in and around project-affected areas.	• Formal consultative letters/ correspondence.	N/A
	MEEPCC Yuqorichirchik District Office.	**D:** -Provision of information on biodiversity and ecologically important water resources within	• Ad-hoc request for information on the presence of species and habitats of conservation concern within the project-	• Formal consultative letters/ correspondence.	Upon notice, arranged for tree inventory surveys on the PV plant site.

ADMINISTRATIVE ORDER	STAKEHOLDER	RELEVANCE CATEGORY	CONSULTATION AGENDA	MODE OF ENGAGEMENT	INPUTS TO DATE
		the project-affected areas, and monitoring of environmental management within project-affected areas. -Conduct of contingent, pre-construction biodiversity surveys. -General monitoring of E&S compliance during the Project's construction and operational phases.	affected areas, and recommendation for the relocation/ replanting of any threatened species. •		
	Institute of Zoology of the Academy of Sciences of the Republic of Uzbekistan.	**I:** Provision of information on biodiversity and technical support on ad-hoc baseline surveys for specific faunal species and habitats.	• Information on the extent of occurrence and are of occupancy (or population statistics), for any potentially affected faunal species or habitats of conservation concern.	• Ad-hoc formal consultative letters/ correspondence.	N/A
	Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan.	**I:** Provision of information on biodiversity and technical support on ad-hoc baseline surveys for specific floral species and habitats.	• Information on the extent of occurrence and are of occupancy (or population statistics), for any potentially affected faunal species or habitats of conservation concern.	• Ad-hoc formal consultative letters/ correspondence.	Recommendation to carry out comprehensive baseline botanical surveys in the BESS site.
MDAs – Land Administration	District Khokimiyats.	**D:** -Preparation of land-use proposals, approval of subsequent land-use plans, commissioning of cadastral registration of landholdings, and administration	• Request for cadastral information for delineation of potentially affected landholdings. • Request for information on landowners and land-users	• Formal consultative letters/ correspondence. • KIIs.	Preliminary information on the zoning, ownership and usage of land within the PV plant and BESS sites.

ADMINISTRATIVE ORDER	STAKEHOLDER	RELEVANCE CATEGORY	CONSULTATION AGENDA	MODE OF ENGAGEMENT	INPUTS TO DATE
		of Land Lease Agreements (LLAs).	based in and around the project sites. • Request for information on the tenure of potentially affected landholdings.		
	Chamber of State Cadastres of the Cadastre Agency (CSC) Tashkent Region Office.	**D:** Cadastral registration of landholdings, based on approved land-use plans developed by Uzdaverloyiha State Research and Design Institute.	• Ad-hoc requests for cadastral information for delineation of potentially affected landholdings.	• Formal consultative letters/ correspondence.	N/A
MDAs – Water resources	Uzsuvtaminot.	**D:** -Provision of information on planned and existing potable water supply facilities within the project-affected areas, and execution of laws and regulations pertaining to the operation and maintenance of related infrastructure (e.g., appropriate buffer zones). -Issue of permits for use of potable water supply system during construction (i.e., utility connections and water consumption).	• Request for information on existing water supply facilities in and around the project sites. • Request for contextual regulatory buffers for water supply facilities located within the PV plant site, during the Project's construction and operational phases.	• Formal consultative letters/ correspondence. • KIIs.	Preliminary locations of existing water intake facilities within the sites and key buffer distances have been provided.

ADMINISTRATIVE ORDER	STAKEHOLDER	RELEVANCE CATEGORY	CONSULTATION AGENDA	MODE OF ENGAGEMENT	INPUTS TO DATE
	Chirchik-Akhangaran Basin Irrigation Systems Department.	**D:** -Provision of information on planned and existing irrigational water supply facilities within the project-affected areas, and execution of laws and regulations pertaining to the operation and maintenance of related infrastructure (e.g., appropriate buffer zones). -Issue of permits for use of water supply system during construction (i.e., water abstraction).	• Request for information on existing irrigational canals in and around the project sites. • Request for contextual regulatory buffers for the canals in and around the project sites, during the Project's construction and operational phases. • Request for any additional considerations and recommendation with regard to potential E&S impacts. •	• Formal consultative letters/ correspondence.	Provided information on the local usage of Chirchik River.
MDAs – Health, Sanitation, Safety and Security	Sanitary and Epidemiological Welfare and Public Health Service of The Republic of Uzbekistan.	**D:** -Execution of laws and regulations pertaining to public health and safety. -Establishment of sanitary and health and safety buffer zones. - Regular monitoring of E&S compliance in relation to impacts on environment and public health and safety.	• Disclosure of project plans (objectives, design and activities). • Request for information on sanitary and safety buffers for planned project facilities and existing utility assets and water bodies located in and around the project sites.	• Formal consultative letters/ correspondence.	Feedback on Health Protection Zones for the PV plant, BESS and OHTL connections.
	Toza Hudud	**A:** State waste management agency that is responsible for the provision of waste collection and management services within	• Ad-hoc request for information on the availability, location and capacity of waste	• Formal consultative letters/ correspondence.	No longer operates in the districts

ADMINISTRATIVE ORDER	STAKEHOLDER	RELEVANCE CATEGORY	CONSULTATION AGENDA	MODE OF ENGAGEMENT	INPUTS TO DATE
		project-affected makhallas (communities).	treatment and disposal facilities in the project affected districts and the broader Tashkent Region.		
	Ministry of Emergency Situations of the Republic of Uzbekistan.	**I:** Emergency response to natural disasters and other contingencies, and mobilization of humanitarian aid.	• Ad-hoc request for information on emergency response capacity and protocols, for natural and other contingencies in relation to the project (i.e., fire outbreak and river flooding).	• Formal consultative letters/ correspondence.	Written response was pending at the time of writing
MDAs – Industry, Commerce and Livelihoods	State Committee on Sericulture and Wool Development Industry.	**D:** Custodianship of land reserved for governmental, communal and private pastural use.	• Request for information on any existing pastural land parcels in and around the project sites. • Request for information on tenure of pastural land. • Informational on number of potentially affected herders.	• Formal consultative letters/ correspondence.	Confirmed the absence of any designated pasture lands within the project-affected districts,
	State Committee of the Republic of Uzbekistan on Geology and Mineral Resources.	**D:** Provision of information on planned and existing mineral exploration surveys (and related exclusion zones within the project-affected areas, and any geotechnically hazardous land.	• Request for information on any existing or planned prospecting areas in and around the project sites. • Request for information on any geotechnically hazardous land in and around the project sites.	• Formal consultative letters/ correspondence.	Written response was pending at the time of writing

Administrative Order	Stakeholder	Relevance Category	Consultation Agenda	Mode of Engagement	Inputs to Date
MDAs – Transportation	Ministry of Transportation.	**I:** Provision of information on the transport infrastructure within the project-affected areas, and execution of laws and regulations pertaining to the operation and maintenance of related infrastructure (e.g., tonnage, drainage, upgrade or extension of existing roads and traffic regulation).	• Ad-hoc request for feedback on any upgrades to the existing roads for the Project's construction and operational phases (in addition to directives from regional and/or district departments.	• Formal consultative letters/ correspondence.	N/A
MDAs – Labour	Ministry of Employment and Labour Relations of the Republic of Uzbekistan.	**I:** Execution of laws and regulations pertaining to the labour in Uzbekistan, and provision of guidelines to implement new legal requirements.	• Ad-hoc request for guiding information on any newly enacted legal requirements for local employment.	• Formal consultative letters/ correspondence.	Written response was pending at the time of writing
MDAs – Cultural Heritage	Academy of Sciences – Cultural Heritage Agency.	**I:** Provision of information on tangible and intangible cultural heritage within the project-affected areas, and execution of laws and regulations pertaining to the labour in Uzbekistan.	• Request of information regarding any existing cultural heritage sites, or the potential for the existence any physical cultural resources within the sites. • Request for information on any requisite archaeological surveys in and around the project sites.	• Formal consultative letters/ correspondence.	Information on three cultural heritage sites within the project sites' 3 kilometre radius. No renowned/ UNESCO world heritage sites are found within the areas.
	Academy of Sciences – Institute of Archaeology.	**I:** Provision of information on tangible and intangible cultural heritage within the project-affected areas, and completion of archaeological surveys for the national inventory of cultural	• Request for information on any ongoing archaeological surveys in and around the project sites. • Request for information on	• Formal consultative letters/ correspondence.	Implementation of a pre-construction survey within the BESS plot, to confirm the absence of any cultural heritage sites/

ADMINISTRATIVE ORDER	STAKEHOLDER	RELEVANCE CATEGORY	CONSULTATION AGENDA	MODE OF ENGAGEMENT	INPUTS TO DATE
		heritage sites.	any archaeological findings and/or cultural heritage sites in and around the project sites.		tangible resources.
Project Lenders (FIs)	EBRD, DEG, IsDB, KfW, and Proparco/ AFD	D: Providing project finance and undertaking related due diligence over the period of the financing agreement.	• Feedback on the identification, assessment and management of project-related E&S risks, in the Project's planning and implementation stages.	• Formal dialogue as part of initial E&S due diligence, and subsequent E&S monitoring.	Pending.

Competent authorities such as Uzsuvtaminot, Institute of Archaeology, Cultural Heritage Agency and Uztransgaz will play an active role in the implementation of C-ESMP impact mitigation and monitoring requirements which align with the mandates and internal policies of these authorities (i.e., aquifer protection and management of spills around water supply facilities, protection of known and unknown tangible cultural heritage and safe earthworks and electrical installations around the gas pipeline intersecting the underground cable route).

GRIEVANCE REDRESS MECHANISM (GRM)

Objectives of the GRM

In accordance with lender-prescribed E&S requirements, including the EBRD PR10 and the IFC PS 1, an external GRM has been developed, to enable the timely identification and resolution of grievances and concerns from project stakeholders and the project-affected communities in particular. In line with applicable regulatory requirements and international guidelines, the GRM development was aimed at establishing a system that is:

- Designed to ensure prompt receipt of project-related grievances and concerns, as well as timely acknowledgement of receipt, investigation and implementation of effective remedial action.
- Objective, understandable and transparent.
- Culturally appropriate.
- Readily accessible to all constituencies, with points of contact including local leadership and female CLOs.
- Open to confidentiality at the will of aggrieved entities.
- Free of manipulation, intimidation and retribution.
- Free of charge to aggrieved entities.
- Open to judicial recourse, in event that default GRM avenues fail to deliver satisfactory resolution.

Promulgation of the GRM

Stakeholders categorized as "Affected Entities (A)" will be informed about the purpose and structure of the GRM, and the process for the management of project-related grievances at the early stages of the ESIA. For affected communities and vulnerable constituencies in particular, the introduction of the GRM will create awareness around the stakeholders' rights to invoke the Project's GRM facilities. The following methods will be used for publicizing the GRM:

- Formal consultative letters/ correspondence.

- Official announcements.
- Community meetings.
- FGDs and KIIs.
- Household surveys during ESIA baseline studies.

The GRM will be widely publicized within project-affected communities, using project introduction leaflets where appropriate.

GRM process and procedures

The GRM process fundamentally involves the collection and investigation of project related grievances, subsequent remediation and follow-up communication with aggrieved entities. In instances where participatory investigative procedures conclude that the grievance is not legitimate (i.e., unrelated to the Project or lacking substantiation), the investigation results and/or requests for additional information will be communicated to the aggrieved entities, with prior notice. Following resolution or delivery of requisite clarification with regard to processed grievances, a follow-up round of engagement will be held with aggrieved entities to close-out the grievance and/or obtain feedback as appropriate.

The GRM will be a well-documented process, to enable effective communication and tracking of remedial action at any responsible interfaces within the E&S consulting team and Project Company. The GRM will allow for the delivery of oral and/or written grievance by aggrieved entities. Reporting channels for external grievances will include:

- General consultation forums (i.e., community assemblies, FGDs, KIIs).
- Phone calls.
- Email correspondence.
- Grievance box at entry points to project sites.
- Written/ oral delivery to project personnel, including CLOs and security personnel (security personnel at the Project's entry points and site office(s) must be aware and trained to deal with any grievances appropriately).

Where complainants opt to submit grievances in writing, grievance forms will be filled, for the reference of designated CLOs. The CLOs will register all grievances and related details on an internal grievance log and track the progress of corresponding management measures on the same document. The speed of remedial response is a key to ensuring the management of related E&S impacts, by means of GRM-aided identification of risks and impacts. The GRM has been designed to deliver corrective action over a standard duration of two weeks from the date of grievance issues. However, certain grievances may require lengthy investigation or a complex sequence of corrective action. Where resolution is not achieved in the standard time, the grievants will be given a notice to provide an update on the progress of

the case, pending procedures and an estimated time to completion. The table below provides an overview of the GRM process.

Table 4-3 Grievance management process, actors and timeline

STAGE	TIMELINE
Grievance is received/submitted	-
Grievance is logged and acknowledged	Within 7 working days of grievance being submitted
Grievance is investigated	Within 14 working days of grievance being submitted*
Proposed resolution conveyed to grievant	Within 14 working days of grievance being submitted
If applicable following dissatisfaction of resolution by Grievant	
Actions to re-assess grievance/propose new solution/inform Grievant of final decision	Within 14 working days of notification of dissatisfaction by Grievant
In the event that a grievance cannot be resolved between the two parties a mediator will be involved i.e. local leaders who understand the culture and practices within the Project site.	Within 14 working days of notification of dissatisfaction by the Grievant.
Grievances that are not resolved at the project level - a grievance committee involving senior E&S personnel from the Project Company, community development officials from district khokimiyats and any other relevant authorities (if required).	Within 30 working days of notification of dissatisfaction by the Grievant.

Grievance holders and whistle blowers will be entitled to the volition of confidentiality, to preclude any associated risk of reprisal. Where grievances are raised anonymously, procedural investigation and resolution will be undertaken based on the information provided. However, follow-up engagement to obtain feedback on the effectiveness of corrective measures will not be feasible in such cases. E&S due diligence and monitoring may require external reference to grievance log, to verify and assess grievance redress efforts. The issue of grievance logs for external reference will involve the redaction of personal information to eliminate the risk of reprisal.

GRM points of contact

The front-end points of contact for reporting grievances include Community Liaison Officers (CLOs) as well as local leaders in project-affected communities (makhallas). The designated CLOs constitute the local E&S consulting team (i.e., Juru Limited), and will represent the Project Developer, pending the recruitment of direct CLOs by the Project Company. These

actors will be responsible for recording and escalating grievances for official response, and for follow-up engagement for grievance closure and feedback receipt. The GRM points of contact and their respective contact details are listed in the table below.

Table 4-7 Contact details for GRM points of contact

COMPANY	CONTACT DETAILS
Project Company	Name: Khaled AlGammaz Tel: +998 95 115 5106 Email: kalgammaz@acwapower.com
EPC Contractor	Name: Arsalan Habib Tel: +998 95 140 9061 Email: habib_a@ceec.net.cn
O&M Company	Name: Alisher Ametov Tel: +998 99 460 5667 Email: alisher.ametov@nomac.com

Grievances collected by the CLO will be resolved in coordination with the EPC Contractor and Project Company as relevant, based on the GRM procedure outlined in this Report and detailed in the Project's Stakeholder Engagement Plan (SEP).

Note: During the Project's construction phase, the CLOs will communicate with local community leaders and district khokimiyats on a monthly basis (or upon relevant notifications from these parties) concerning any grievances not reported through the dedicated GRM information channels.

Customary (or conventional) platforms for reporting community grievances may include written and oral communication with local community leaders and members of the district khokimiyats (including those raised in community meetings and social media broadcasts).

The project CLOs will monitor any grievances raised on these alternative platforms on a regular basis and register any such complaints on the project grievance logs for redressal procedures in line with the dedicated external GRM.

Further details on the Project's external GRM are provided in the SEP submitted in tandem with this Report.

SEP IMPLEMENTING PARTIES

In the ESIA phase of project planning, the SEP and GRM will be implemented by the Consultant, in collaboration with Juru Limited. The Consultant will report E&S grievances to the Project Developer and the Project Lenders, as appropriate, to initiate investigation and corrective action. The locally based CLOs will carry out the following stakeholder engagement tasks, on behalf of the Project Developer.

- Preparation of stakeholder engagement materials (i.e., consultative letters, presentations, leaflets etc.)
- Phased consultation and information disclosure in accordance with the SEP.
- Preparation and compilation of stakeholder engagement records.
- Receipt and record keeping for lodged grievances, follow-up liaison and record of feedback following resolution.

Upon the ESIA, the CLOs working with the Project Company and EPC Contractor will take over stakeholder engagement and the management of community grievances.

FORWARD PLAN

Further information of the stakeholder engagements completed to date, and the plan for future consultation and disclosure will be provided in the final (ESIA) version of the Stakeholder Engagement Plan (SE)

5 GEOLOGY, SOILS AND HYDROLOGY

5.1 Legal Requirements and Standards

5.1.1 National laws and regulations

The protection of geological formations, soil and water resources in Uzbekistan is regulated by the following laws and regulations:

SOIL QUALITY

- SanPiN No.0272-09 Sanitary rules and norms for compiling hygienic justifications for soil protection schemes from pollution in Uzbekistan": The Sanitary Rules and Norms include the basic requirements for development of hygienic justification for the soil protection schemes against pollution, duties and functions of state sanitary supervision bodies in this area.
- SanPiN No.0191-05 Maximum permissible concentrations (MPC) and Approximate allowable concentrations (AAC) of exogenous harmful substances in soil: This defines MPC values of chemicals and pesticides polluting the soil. MPCs and AACs are designed to ensure that there is no negative direct or indirect impact on human health, its future generations and public health through soil contact.
- SanPiN No.0212-06 Sanitary rules and norms for the hygienic assessment of soil contamination of different types of land use: This document provides a unified methodology for hygienic assessment of soil pollution using a nomenclature of indicators of soil hygienic condition, which should be used both in the development of regulatory and technical documentation on the hygiene of soils, and in assessing the degree of its pollution.

WATER RESOURCES

Water resource management, allocation and use in Uzbekistan falls under the Ministry of Agriculture and Water Resources (MAWR), which oversees national authorities I.e. provisional and district departments of agriculture and water resources, and inter provincial and inter district river management authority.

- Constitution of the Republic of Uzbekistan.

Article 55 states "Land, depths, water, flora and fauna and other natural resources are national wealth, should be rationally used and are under state protection."

- The Law of the Republic of Uzbekistan "On water and water use" (1993 as amended on 01.12.2021).

This law enshrines the key objectives for water legislation in Uzbekistan setting the following requirements:

- Article 1 requires "Regulation of water relations; effective use of water; protection of water from pollution, littering and exhaustion; prevention and liquidation of harmful impact on water resources; improvement of state water objects; and protection of the rights of enterprises, organisations, farms and citizens in the field of water relations."
- Article 3 stipulates that "Water resources are the state property and wealth of the Republic of Uzbekistan, should be rationally used and is protected by the state."

The law authorises the State through authorized agencies to carry out management and control of water use and protection.

Other key legislations and standards relevant to the Project include:

- SanPiN No 0255-08 which provides the criteria for hygienic assessment of the level water bodies contamination for health risks to the population in Uzbekistan.
- Decree of the Cabinet of Ministers No.255 of 31.03.2018 On the approval of some administrative regulations of the provision of public services in the field of nature use (scheme for issuing permits for special water use or water consumption) as amended on 15.01.2020.
- SanPiN RUz No. 0318-15. Hygienic and anti-epidemic requirements for the protection of water in reservoirs on the territory of the Republic of Uzbekistan.
- The Decree № 981 of December 11 2019 "Regulation on procedure of establishing water protection zones and sanitary protection zones for water bodies on the territory of the Republic of Uzbekistan"

The law sets water protection zones around rivers as follows:

- For rivers with a capacity of more than 100 cubic meters of water per second – 300 – 500 meters.
- For rivers with a capacity from 5 to 100 cubic meters of water per second – 100 – 300 meters.
- For rivers with a capacity from 2 to 5 cubic meters of water per second – 50 – 100 meters.
- For rivers with a capacity of less than 2 cubic meters of water per second – under 35 – 50 meters.

The width of the water protection zone along the entire length of the rivers is set differently depending on the flow of water in each segment of its length. When developing projects for the establishment of water protection zones of rivers and non-drying small rivers, taking into account a complete study of the real conditions on the ground, the upper boundaries of water protection zones can be specified. At the same time, lowering of the lower boundary of water protection zones is not allowed.

5.1.2 Lender requirements

5.1.2.1 EBRD

Performance Requirement 3 on Resource Efficiency and Pollution Prevention and Control establishes general requirements for pollution prevention as follows:

- The assessment process must identify technically and financially feasible pollution prevention and control techniques that are best suited to avoid or minimise adverse impacts on human health and the environment. Such techniques will be appropriate to the nature and scale of the project's adverse impacts and issues; and
- The Project must meet the relevant EU substantive environmental standards, where these can be applied at the project level. Where no EU substantive environmental standards at project level exist, the Project will identify, in agreement with the EBRD, other appropriate environmental standards in accordance with GIP.

Where no thresholds for soil and groundwater quality parameters are specified in the existing national guidelines, soil and groundwater quality will be benchmarked against the Dutch standards.

The Dutch Standards lists Target and Intervention Values. Target values refer to background concentrations that occur naturally in soils (based on the Netherlands) and are considered to reflect good soil quality that requires no remediation (no action). Intervention Values relate to cases of soil and groundwater contamination which are dangerous to the health of humans and the natural environment. These levels of contamination typically require remediation and appropriate treatment and disposal. The Dutch Standards for the most significant pollutants are presented in the table below. Where a parameter is not covered by the National Standards in the table above, the Dutch Standards will be referenced for benchmarking purposes.

5.1.2.2 EPFIs

IFC Performance Standard 3 on 'Resource Efficiency and Pollution Prevention' requires the client and/or the Project to:

- Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; and
- Prevent the release of pollutants to water and land due to routine, non-routine, and accidental circumstances, or when not feasible, minimize and/or control the intensity and mass flow of their release.

5.2 Baseline Conditions – PV Plant Site

In April 2023, a geotechnical survey of the PV plant site was carried out by Juru Limited, to investigate the physical and chemical properties of resident soil deposits and the underlying geological formations for subsequent detailed design of robust civil and electrical works.

A hydrological survey was also conducted within the PV plant site from April to May 2023. The hydrogeological study integrating into the survey was intended to provide information regarding the variation in groundwater levels across the site, the general direction of groundwater flow and hydraulic properties of the resident aquifer. This information will be incorporated into the detailed design of civil, drainage and electrical works. UzAssytem was subsequently engaged in a supplemental hydrological survey focused on the flood risk associated with the unlikely event of dam failure in the upper course of Chirchik River and river channel migration nearby the PV plant site.

The ESIA involved a review of the geotechnical and hydrological survey information, as well as site walkovers and soil sampling. These ESIA-stage studies were aimed at establishing the geological composition of the PV plant site, as well as baseline levels of the quality, permeability, compaction potential, stability, erodibility, thermal conductivity and rippability of resident soils.

The following sub-sections elaborate on the existing geological, soil and hydrological context of the PV plant site, based on information yielded by technical feasibility studies and ESIA-oriented baseline surveys.

5.2.1 Seismicity of the project location

A number of significant seismic events have been recorded in Uzbekistan since 1900. Recent earthquakes in the country include the Tashkent earthquake, which struck Tashkent City in 1966, and the Ferghana Valley earthquake, which occurred in parts of Ferghgana Region. The Ritcher-scale magnitude of these events was registered at 5.2 and 6.1 respectively. Because Uzbekistan falls within a zone of high seismic activity, national seismic zoning maps have been developed in efforts to identify areas with particular vulnerability to seismic hazards.

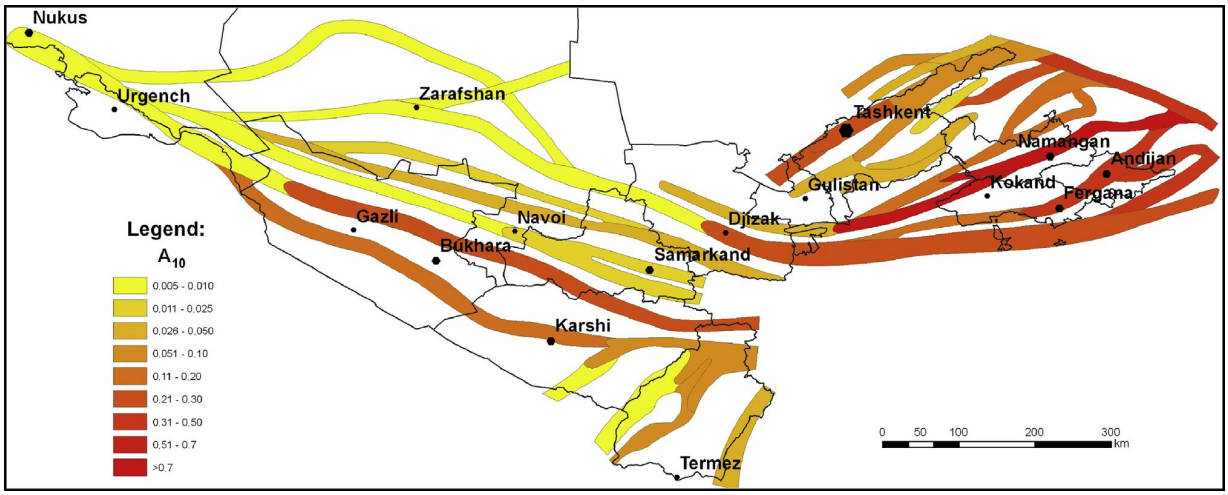


Figure 5-1 Spatial variation in seismic activity (frequency of seismic events) in Uzbekistan

Information on seismic hazards in Tashkent region was sourced from the seismic zoning map of Uzbekistan (OSR, 2011). The map indicates that the severity of an earthquake with a 50-year return period in districts within and around the project location measures a magnitude and Peak Ground Acceleration (PGA) of 8 and 350 cm per square second respectively. On this basis, the seismic hazard of the project location can be regarded as high. There is minor potential for soil liquefaction due to the shallow resident groundwater table, and other geotechnical attributes. The seismicity of the area and seismic loading parameters have been factored into the design of the foundations for various structures on the PV power plant and BESS sites.

5.2.2 Geology and soils

5.2.2.1 Geology and soil classification

Drilling and soil logging carried out as part of the geotechnical survey revealed that the bedrock overburden largely comprises quaternary alluvial deposits deriving from the Syrdarya complex. In-situ seismic refraction testing, double ring infiltration tests and subsequent sieve analyses indicate that the unconsolidated formation consists of well-drained and coarse soil. Gravel accounts for the dominant fraction, with the remainder largely including sand, cobbles, and a negligible amount of clay. Measured content of organic matter in the soil ranges from 0.31 to 0.6%.

Groundwater was encountered at depths ranging between 1.3 and 7.5 metres below ground level. In terms of general categorization by moisture level, the soils situated in the vadose and phreatic zones can be described as wet and saturated respectively.

5.2.2.2 Sher strength

In-situ standard penetration tests and standard laboratory tests were performed to characterize the mechanical properties of resident soil, particularly shear strength and consolidation (and subsidence) potential. These tests confirmed that the granular characteristics, density, plasticity and permeability of the soil equate to a relatively high load bearing capacity, suitable for moderately deep foundations.

5.2.2.3 Soil aggressivity

As part of the geotechnical survey, electrical resistivity testing was conducted using Vertical Electrical Sounding (VES) equipment at numerous locations. The resistivity values recorded indicated a low level of soil aggressiveness across the site. Soil concentration of sulphates was found to range from 82 to 160 mg/kg, while that of chloride was recorded between 20 to 40 mg/kg. The relatively low concentration of these mineral constituents poses a low corrosive effect on planned steel, aluminium and concrete sub-structures.

5.2.2.4 Soil thermal conductivity

The thermal conductivity and thermal diffusion of resident soil was measured in a total of 30 pits. Based on the results of this testing, the maximum depth of soil frost is estimated to be 70 cm with a return period of 50 years. The soils exhibit generally high thermal conductivity, which is conducive for optimal operation of underground cables, particularly those with a high current loading.

5.2.2.5 Soil erosion

Observations conducted as part of the hydrological survey did not reveal any major signs of erosion within the PV plant site. The topography of the site is relatively flat, and no rills and gullies were noted. Areas with exposed (bare) clayey top soil are potentially vulnerable to erosion from stormwater runoff.



Figure 5-2 Areas with dry clayey topsoil around infiltration ponds within the PV site

5.2.2.6 Soil quality

The PV plant site is located within the perimeter of a protected groundwater source (aquifer) that is utilized for domestic water supply for Tashkent region. Groundwater abstraction and related auxiliary facilities (including guard posts and administrative buildings) are the only establishments within the site. The site is fenced and heavily guarded, with unauthorized public access being prohibited. No other land uses have been observed over the course of ESIA-stage baseline surveys. Due to its sparse to dense vegetative cover and proximity to Chirchik River, the site is also utilized by wildlife including small sized mammal and avian species.

No visual and olfactory indicators of point source pollution were noted in the course of the site walkovers. Leaching and runoff from crop farming, livestock rearing, and aquacultural establishments within the upstream riverine corridor north of the site were provisionally considered to be potential diffuse sources of pollution for resident surface water, groundwater, and soils (amongst other cumulative urban discharges).

SOIL SAMPLING METHODOLOGY

Precautionary soil sampling was carried out to establish the baseline levels of soil quality as part of the ESIA study, considering the potential for the legacy contamination around the site and on-site contamination during the Project's construction and operational phases. The results of the geotechnical survey did not identify substantial variation in the geological, drainage and land-use characteristics of the study area. The site can therefore be considered homogenous, and soil sampling strata were not delineated. The sampling strategy was further scaled on the basis of the following considerations:

- A total of eight representative sampling locations were targeted within the PV plant site, for establishing a baseline frame of reference for future monitoring.
- The sampling locations were distributed to provide an even coverage of the entire site.

The following table provides the GPS coordinates of the locations selected for soil samplings.

Table 5-1 GPS coordinates of soil sampling sites on the PV plant site

SAMPLE NO.	LATITUDE	LONGITUDE
S 01	41.364948°	69.517941°
S 02	41.346094°	69.492494°
S 03	41.356455°	69.499769°
S 04	41.339355°	69.491535°
S 05	41.340300°	69.477126°

S 06	41.327498°	69.469105°
S 07	41.359289°	69.516520°
S 08	41.366718°	69.518401°

The soil sampling locations within the PV plant site are indicated in Figure 5-3 below.

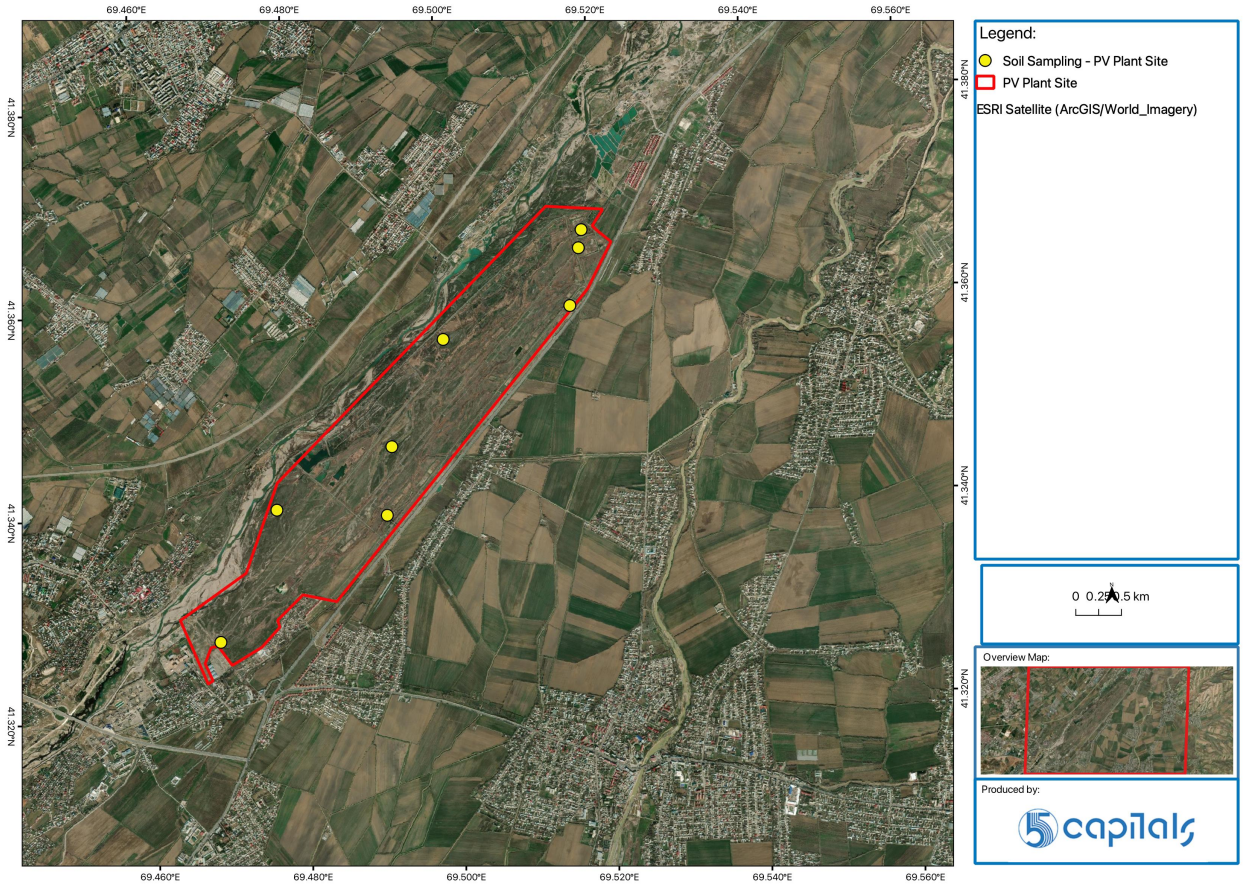


Figure 5-3 Soil sampling locations within the PV plant site

Soil sampling was conducted within the PV plant site on 13th June 2023. In terms of the sampling methodology, the top layer with litter and natural (organic) residue was scrapped off, and soil samples were extracted from a depth of 20 cm below the ground level, using a stainless-steel spatula/ shovel. The soil samples (weighing 500 grams each) were collected in airtight nylon bags, labelled accordingly, and placed in cooler boxes. A chain of custody was observed in the transfer of the samples to a nationally accredited laboratory, with a holding time not exceeding 48 hours.

The suite of parameters selected for soil quality testing includes (but is not limited to) heavy metals (cadmium, mercury, arsenic etc.), hydrocarbons, microbial agents (coliforms etc.) as well as saline/ alkaline mineral constituents (e.g., sulphates, carbonates and chlorides).

ANALYTICAL RESULTS FOR SOIL QUALITY TESTING

The full listing of the soil quality test parameters and results for collected soil samples are presented in Table 5-2 below.

Table 5-2 Results of quantitative analyses for soil samples taken within the PV plant site

Parameter	Unit	Lower Detection Limit	Sample ID								Maximum Permissible Concentration[2]	Dutch Intervention Target Value
			S01	S02	S03	S04	S05	S06	S07	S08		
pH	-	1-14	8.2	8.2	8.2	8.3	8.2	8.2	8.4	8.4	-	-
Sodium (Na)	mg/kg	40.0	19,000.0	19,000.0	17,000.0	13,000.0	18,000.0	16,000.0	7,700.0	10,000.0	-	-
Potassium (K)	mg/kg	80.0	29,000.0	28,000.0	27,000.0	22,000.0	26,000.0	23,000.0	23,000.0	23,000.0	-	-
Iron (Fe)	mg/kg	60.0	43,000.0	42,000.0	37,000.0	54,000.0	42,000.0	50,000.0	31,000.0	27,000.0	-	-
Nitrate (NO_3)	mg/kg	0.0	6.3	5.1	7.0	8.3	8.2	8.0	4.5	4.5	130.0	-
Cadmium (Cd)	mg/kg	0.0	<0.005	<0.005	0.1	0.1	0.1	0.0	0.1	0.3	-	0.8
Chromium (Cr)	mg/kg	1.0	31.0	24.0	25.0	23.0	27.0	15.0	23.0	20.0	6.0	100
Copper (Cu)	mg/kg	1.0	19.0	17.0	26.0	18.0	17.0	16.0	14.0	12.0	3.0	36.0
Lead (Pb)	mg/kg	0.1	22.0	23.0	37.0	34.0	21.0	28.0	29.0	27.0	32.0	85.0
Manganese (Mn)	mg/kg	20.0	1,000.0	750.0	870.0	740.0	890.0	660.0	450.0	590.0	1,500.0	-
Mercury (Hg)	mg/kg	-	<0.03	0.1	0.2	0.2	0.2	0.3	0.1	0.2	2.1	0.3
Nickel (Ni)	mg/kg	1.0	67.0	56.0	73.0	73.0	63.0	76.0	36.0	30.0	4.0	35.0

[2] Thresholds specified in SanPiN No.0191-05

Zinc (Zn)	mg/kg	1.0	56.0	52.0	190.0	110.0	42.0	69.0	74.0	72.0	23.0	140.0

As shown in Table 5-2 above, soils resident within the PV plant site exhibit generally good quality, with no substantial exceedances of internationally recognized thresholds which would signal ongoing impact from nearby soil and/or groundwater pollution sources. Baseline soil concentrations of Chromium, Copper, Lead and Zinc at nearly all sampling locations are in excess of local standards for soil quality but do not exceed the Dutch threshold values.

Baseline soil concentrations of Nickel within all sampling locations are in excess of both local and international standards for soil quality. Elevated concentrations of Nickel and other heavy metals across the site can be attributed to the chemical composition of resident geology and inflows from Chirchik River.

5.2.3 Hydrology and flood risk

5.2.3.1 Chirchik River

The project sites are located within the fourth sub-catchment of the Chirchik River basin. This basin is part of the wider Syrdarya basin, which lies within the Aral Sea mega-basin. The Chirchik River Basin is defined by the topographic descent between the foot of the Tian Shan mountain range (to the north-east), and the section of Syrdarya river valley cutting across the Aydar lake depression (to the south-west).

The basin measures an area totalling approximately 13,321 square kilometres, with an elevation profile ranging between 3,611 and 435 metres above sea level. Chirchik River originates from the confluence the Chatkal, Koksuv and Pskem rivers. These primary rivers derive from the glaciers of the Western Tianshan Mountains.

The headwaters of Chirchik River are channelled through Charvak Dam, and two more reservoirs are located in the lower reaches of the river. From its source, the river is fed by two major tributaries, namely Ugom and Aksaqotasay, besides an additional nine smaller ephemeral tributaries. The Chirchik river watershed was constructed in ArcGIS using an optimized Digital Elevation Model (DEM) sourced from the ALOS global database.

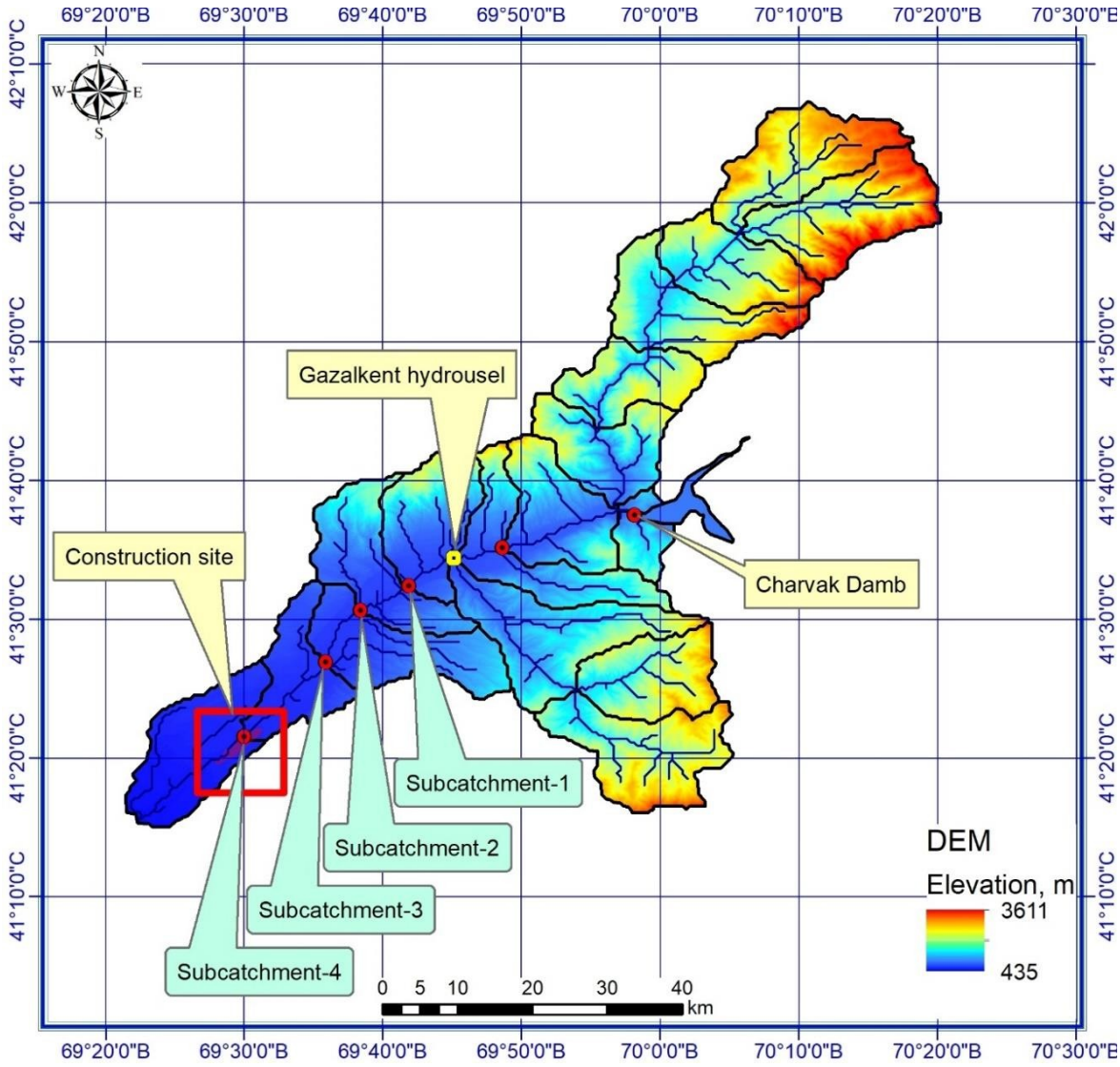


Figure 5-4 Location of the project site within the Chirchik river basin

The hydrological survey involved on-site measurements to gather hydro-morphological information from the section of Chirchik river running along the western boundary of the PV plant site. A summary of this information is provided in the table below.

Table 5-3 Hydro-morphological profile of Chirchik River near the PV plant site

RIVER CHANNEL ATTRIBUTE	MEASURED VALUE
Mean width	280-300 metres
Mean depth	3-7 metres
Gradient	4.3%
Mean flow rate	224 m^3/s

The hydrological survey indicates that the meandering banks of Chirchik river are situated at variable distances from the PV plant site boundary. The shortest intervening distance was recorded on the south-western end of the site. Nevertheless, a mandatory minimum buffer of 50 metres has been prescribed for the Project by relevant authorities[3], which provides for both sanitary and flood protection.

The section of the river adjoining the site is characterized by a series of meanders and channel splits. The development of the river bends over time, can be attributed to the slow-down of flow in the river's middle course, and uneven deposition, which in turn causes a lateral erosion of the riverbanks.

5.2.3.2 Feeder channels

Chirchik River flows from the north-eastern heights of the Tian Shan mountain range towards the low-lying Syrdarya river valley. The project area is situated along the middle course of Chirchik River, where the channel is characterized by a relatively steep gradient and pronounced valley. Feeder channels to provide for irrigated agriculture and other water-intensive activities on the south-eastern side of the river therefore stem from upstream sections of the river, to allow for gravity flow across the area.

A total of two open channels are situated within the PV plant site. The first feeder channel originates from a part of Chirchik River located about 3.3 km away. At the time of writing, official information on the capacity and designated purpose of this channel was not available. Nevertheless, a scan of the satellite imagery and on-site observations indicate that the channel supplies water to a cluster of fish farms (located north-east of the project site), and to the groundwater intake zone within the PV plant site.

[3] Uzbekistan Ministry of Agriculture and Water Resources, Uzbekistan Cabinet of Ministers.



Figure 5-5 View of Chirchik river channel situated west of the PV plant site (left) and BAF canal located east of the PV plant site (right)

The second channel, locally known as the BAF canal, draws its waters from Karasu River, which branches out of Chirchik River, about 9 kilometres from the PV plant site. Baseline survey observations and review of the satellite imagery indicate that the channel distributes water across a network of smaller irrigation channels, which cater to the agricultural expanse surrounding the project sites.

The BESS site is also located close to two major water courses. The western boundary of the area lies about 362 meters and 220 metres away from Karasu River and Khandam Canal respectively.

5.2.3.3 Groundwater

The hydrological survey conducted within the PV plant site established groundwater levels in the range of 0.6 to 5.4 metres below ground level. Groundwater level monitoring records obtained during the survey indicate that groundwater levels peak in the winter and drop to their annual minimum in the summer months of June and July. The water levels recorded do not represent static water table conditions, considering the effective drawdown from the continual operation of the utility wellfield.

According to the hydrogeological report, the underground water regime within the PV plant site is predominantly influenced by interflow from the north-western mountain range. The water table is also influenced by the canals stemming from Chirchik River and, to a lesser degree, by precipitation.

5.2.3.4 Flood risk

STORM EVENT FLOODING

A flood risk assessment for the PV plant site was carried out as part of the hydrological survey. The assessment involved the (i) construction of a catchment-wide DEM, (ii) collection of hydrometric information spanning the past three decades, (iv) the derivation of several drainage coefficients, and (v) the modelling of flood events using unsteady flow calculations.

Historical information on the annual maxima of precipitation and Chirchik River over the period 1991 – 2022 was obtained from the nearest meteorological station and flow monitoring stations. Frequency analyses for extreme precipitation and riverine discharge events were carried out using the Gumbel distribution, considering rainfall and flooding magnitudes corresponding to 50-year and 100-year return periods. The 50-year and 100-year return periods represent Annual Exceedance Probabilities (AEP) of 2% and 1% respectively. The frequency analysis of extreme river flows/ discharge was based on numerical hydrological models that account for several categories of overflow losses (using reliable literature coefficients).

The hydrological extremes that can be expected within the above-mentioned return periods are outlined in the table below. Precipitation and discharge extremes taking into account climate change modelling were taken into consideration. Nevertheless, historical data indicates that the mean annual discharge of Chirchk River is significantly less than its maximum discharge capacity, partly due to flow control structures such as dams and barrages.

Table 5-4 Simulated 50-year and 100-year storm event magnitudes

SIMULATED EVENT	2% AEP (50 YEARS)	1% AEP (100 YEARS)
Rainfall	52.7 mm	55.6 mm
River water flow (discharge)	878.9 m^3/s	953.7 m^3/s

The riverine (fluvial) floods and ponding (pluvial) floods generated by the 50-year and 100-year precipitation extremes were simulated using the HEC-RAS hydraulic modelling software. The software models drainage by solving two-dimensional (Saint Venant) equations for unsteady flow. The simulation results for both scenarios are shown in the figures below. The 12×12 metre ALOS DEM of the entire catchment and a 1×1 metre DEM limited to the solar PV footprint were utilized for flood simulation.

For specificity in relation to riverine flooding, the focal stretch of Chirchik River was split into three sections. The simulation results for the worst-case flood event (with a 100-year return period) are presented in the figures below.

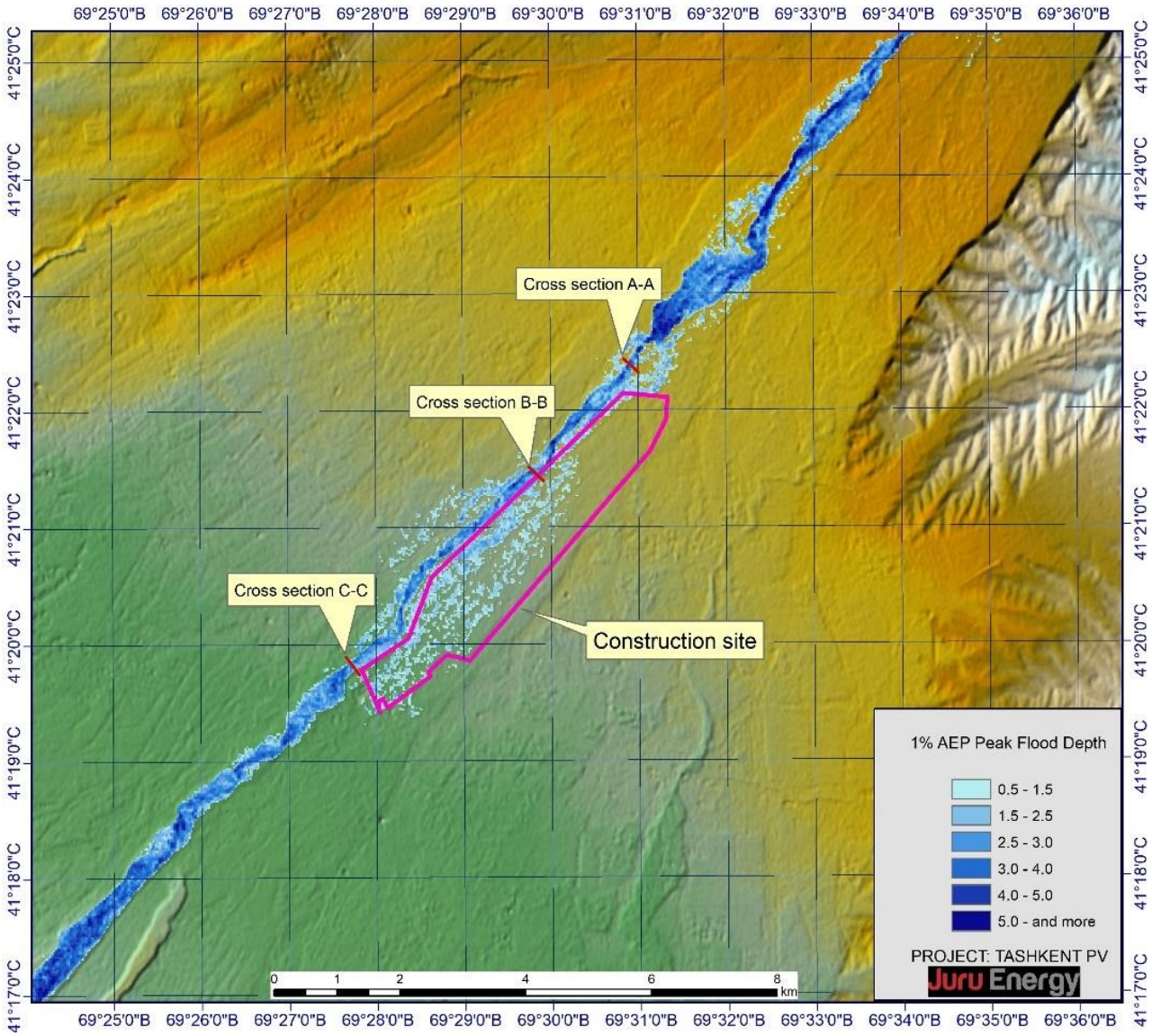


Figure 5-6 River swelling and pluvial floods within the PV plant site in a 100-year storm event

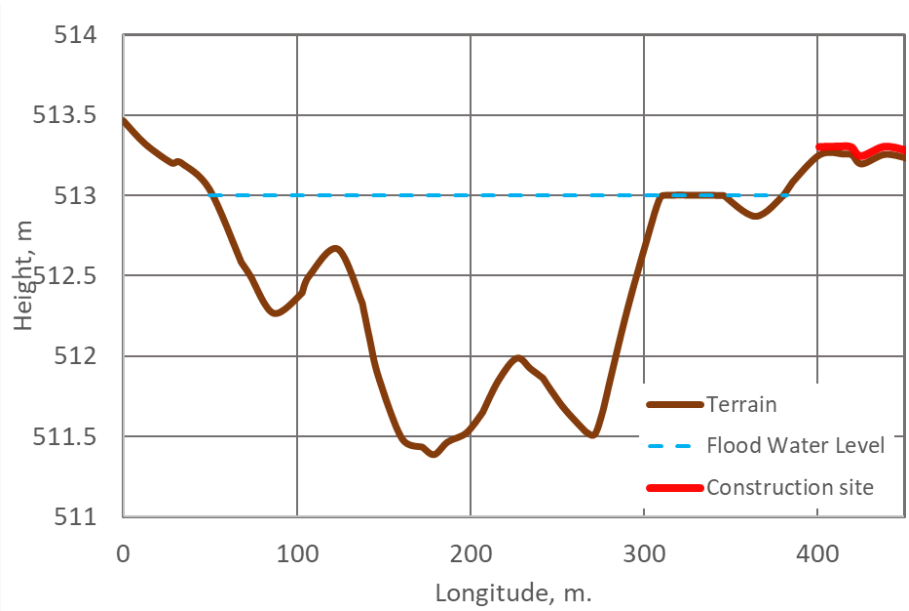


Figure 5-7 Maximum surface water level of Chirchik River relative to the elevation of the PV plant site in a 100-year storm event

These results indicate that river swelling during 50-year and 100-year floods will not cause flooding beyond the riverbanks, within the PV plant site. This outcome is attributed to the significantly high slope of the river section along the PV plant site, and significant erosion along the riverbed.

The simulation further demonstrates that the site is prone to ponding within the existing depressions (infiltration ponds), due to the associated rise in the inherently high water table. To manage the risk of ponding within the site, the following drainage measures will be implemented during construction.

- A total of four drainage channels will be established along the longitudinal span of the PV plant site.
- Inoperative (exhausted) infiltration ponds established by Uzsuvtaminot will be backfilled as part of site grading.
- All of the main project facilities will be sited away from operational infiltration ponds and channels, considering sanitary and overflow buffers.

DAM BREACH FLOODING

The PV plant site lies 50 kilometres south-west of the Charvak Dam. Charvak Dam can be characterized as an earth and rock-fill dam, with a straight axis, a symmetrical profile, a plastic central core made of loam, lateral prisms made of riprap and sand and gravel transition zones between them. The height of the dam measures 168 metres, whilst the crest

level is 896 metres high. The dam structure includes upstream and downstream cofferdams. The core of the dam is made of loamy soil with a vertical shape of a narrowed profile with an expansion at the base from above, protected by riprap and a concrete road surface. The width of the core at the top is 4.0 m, at the base 90.0 m. A concrete plug sits at the base of the core to a height of 14.0 m and its full width. On the axis of the core, along the perimeter of the dam base, a concrete tooth is provided (i.e., a postern), from which the strengthening cementation of the rock under the base of the core and a deep two-row cementation curtain were made. The grouting postern is rectangular in shape with a vaulted ceiling and internal dimensions of 3.8 x 4.0 m, length 680 m. An anti-filtration line of the damp in the continuation of the loamy core and the gallery is a deep two-row and single-row grouting screen, constructed to a depth of 40–80 m. The lateral dam shoulders are made of stone. The upper part of this slope at a height of 15.0 m from the crest of the dam is fixed with monolithic reinforced concrete slabs 1.0-0.5 m thick, laid on sandy-gravelly soil.

The transition zone, a two-layer filter following the contour of the core, is laid between the riprap and the loamy core. The dam`s two-layer filter is adopted from the condition of preventing the development of all types of mechanical suffusion in the core. After backfilling the dam to the design profile in the middle of 1976, work was carried out to further increase the height of the dam to the extent of its possible settlement. The value of the build-up in the deepest place, above the canyon, was taken equal to 2.0 m with a successive decrease in the height to the sides to zero. To reduce seepage water horizons in the sides of the gorge and prevent seepage water from wedging out at high upstream elevations, special discharge drainage galleries are provided on the right and left banks. On the right bank, this role is played by two auxiliary access tunnels left from the construction period with additional insets. On the left bank, drainage tunnels are placed in accordance with the position of the groundwater depression curve, the strike of the layers that make up the left bank slope. It is given that full volume of reservoir is 2006 million cubic metres, of which 1580 million m^3 and 426 million m^3 represent useful storage and dead storage respectively.

A dam failure analysis and modelling of resultant flood scenarios was performed using the HEC-RAS software. The computation was based on two-dimensional unsteady flow and dam breach equations, and on Monte Carlo simulations. Based on the best available information on the hydrological context of Charvak Dam, the analysis was focused on a piping-type dam failure. The analysis began with the determination of quantitative ranges for the following dam breach geometry parameters, using four different literature-derived methods:

- Breach bottom width.
- Side slopes.
- Breach development time.
- Initial piping elevation.

After establishing numerical ranges for the above parameters, Monte Carlo simulations were used to generate a total of 1,000 possible breach geometries and their respective hydrographs. A probability distribution was subsequently applied to the hydrographs, in order to determine a total of four peak discharge scenarios corresponding to 1%, 10%, 50% and 90% AEP.

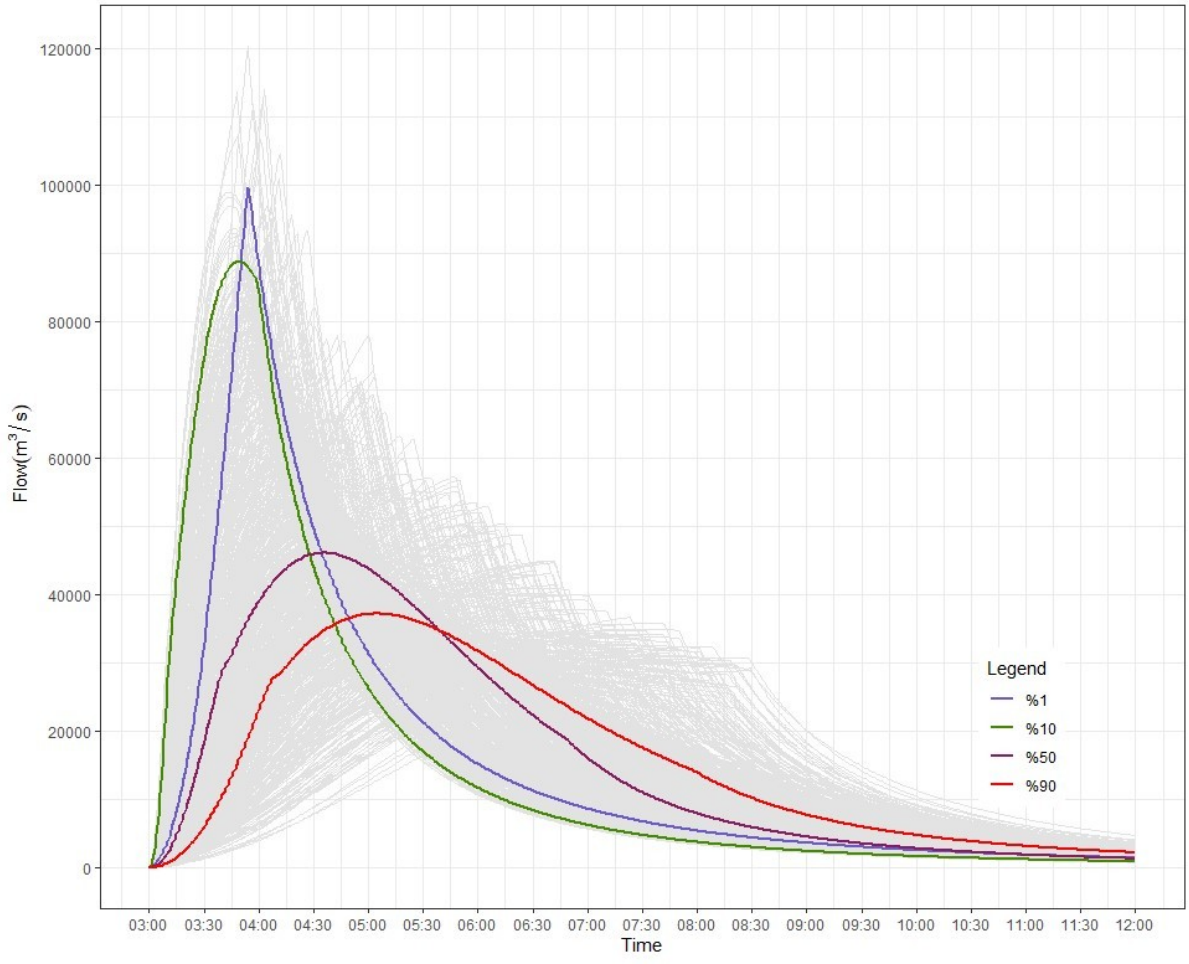


Figure 5-8 Hydrographs generated for 1%, 10%, 50% and 90% AEP flood scenarios

A two-dimensional hydraulic model was subsequently set up based on the four select hydrographs. Terrain roughness for flood modelling within the river basin was derived using 10-metre resolution satellite imagery sourced from the European Space Agency (ESA), and literature-based Manning's coefficients for the various land cover zones delineated within

the imagery. The hydraulic model was run to determine the (i) peak depth of alluvial flooding, and (ii) arrival time of the peak-flows, within the PV plant site, for each of the four flood scenarios. The model outputs for the worst-case (1% AEP) dam failure scenario are displayed in the figures below.

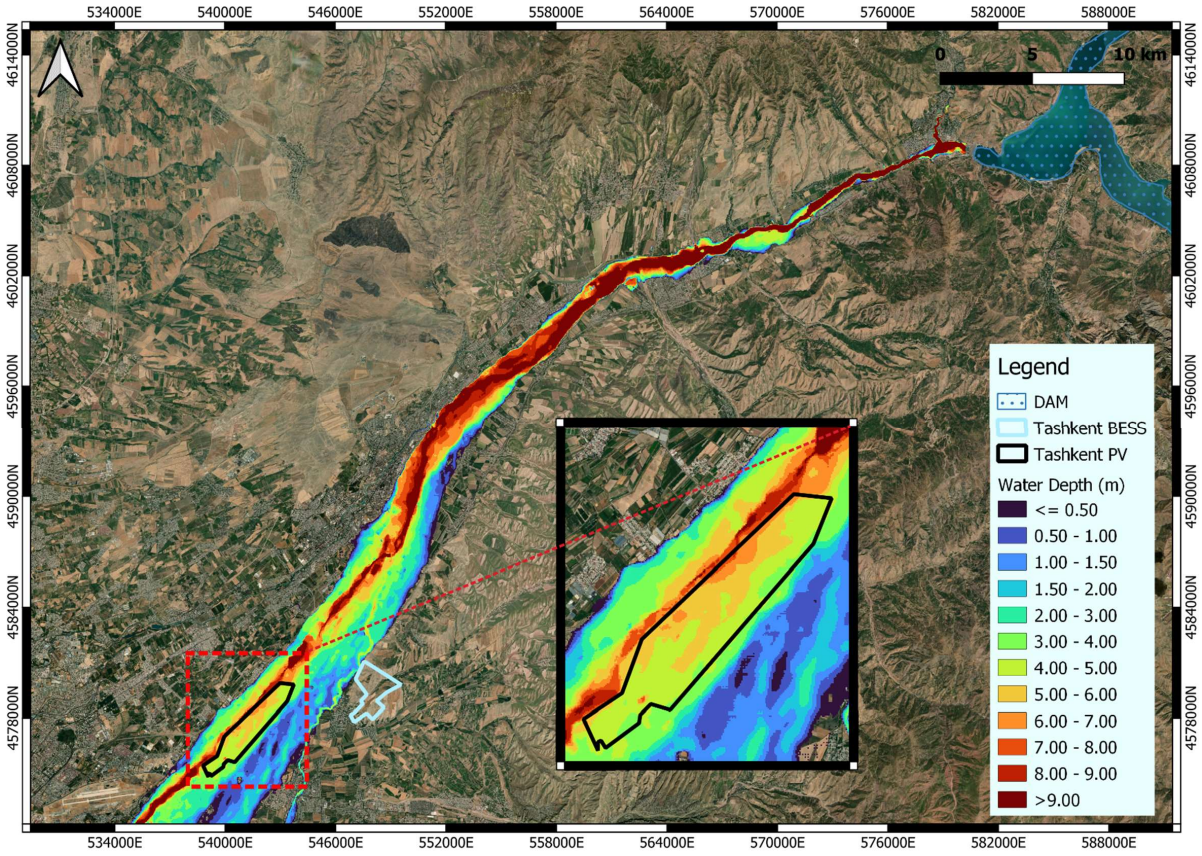


Figure 5-9 Spatial variation on floodwater depths within the PV plant site in the event of a 1% AEP dam failure

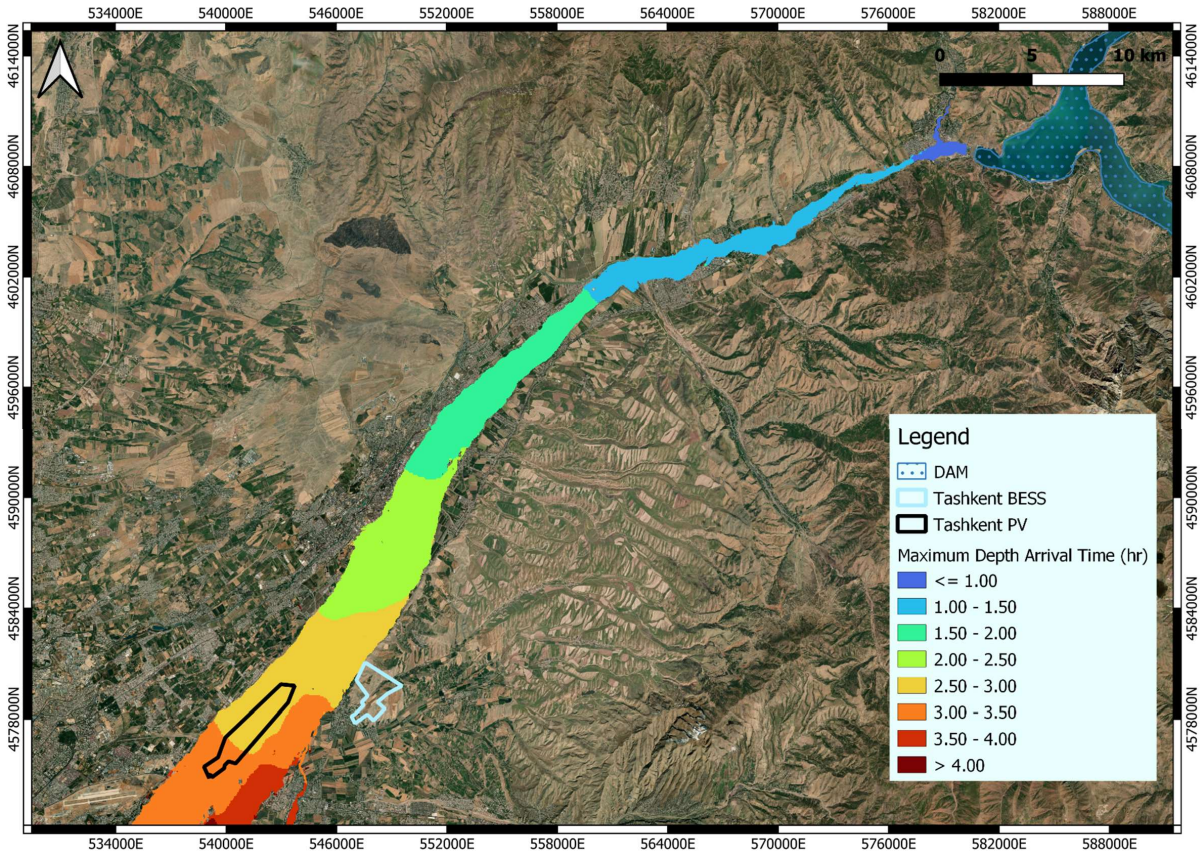


Figure 5-10 Spatial variation on peak-flow arrival times for the PV plant site in the event of a 1% AEP dam failure

As shown in the flood maps above, taking the worst-case (1% AEP) dam failure scenario into account, peak alluvial flooding within the PV plant site can be expected to occur within the PV plant site three hours post the dam break event, at a depth of five to six metres above ground level.

A number of flood control structures are currently operational along the upstream length of Chirchik river, including numerous canals and intercepting weirs.

CHANNEL MIGRATION

A review of satellite imagery for the period 1990-2023 indicates that the hydro-morphological profile of Chirckik river channel has changed along the channel section located west of the PV plant site. The width and position of the river channel was delineated using a waterbody analysis based on Landsat imagery, whereby the Modified Normalized Difference Water Index (MNDWI) was used to trace the shifting channel. The waterbody analysis revealed that over the study period, the river channel moved towards PV plant site (eastward) in 1994 and 2010. The analysis also showed that the channel moved away from the PV plant site (westward) in subsequent years, with evidence of a decline in the river discharge over the

period 2018 – 2023. The changes in the spatial extent of Chirchik River nearby the PV plant site is displayed in the figure below.

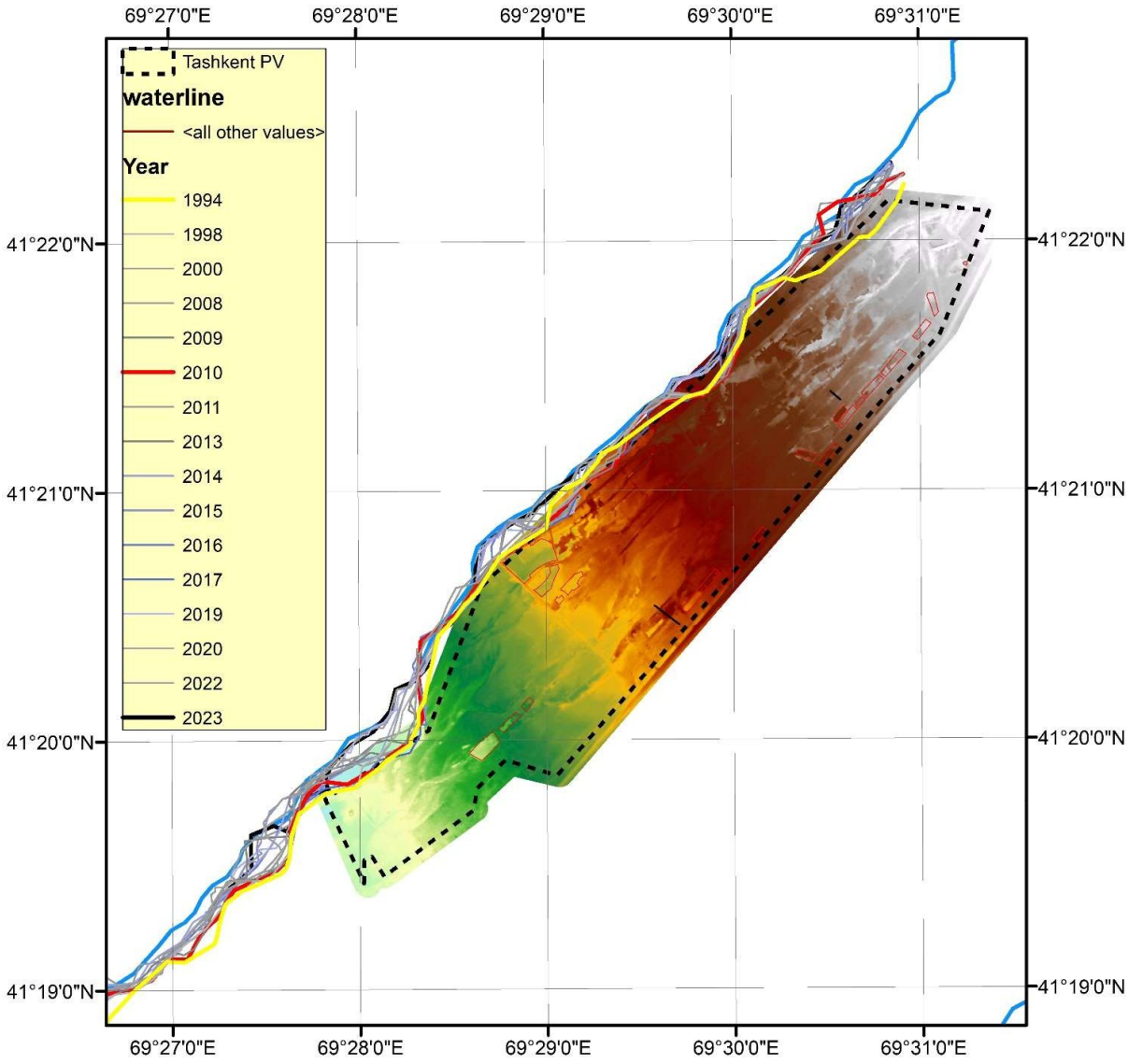


Figure 5-11 Changes in the position of the Chirchik River channel nearby the PV plant site

Following the waterbody analysis and the review of temporal changes in the position of the river channel west of the PV plant site, a scouring analysis was performed using HEC-RAS, in order to assess the risk of eastward bank erosion and consequent river channel migration towards the PV plant site. A collection of secondary databases was used to characterize the sediment within the riverbed, flood plain and the nearby PV plant area. The parameters for sediment transport were set based on the best available information. The peak river discharge for simulating the worst-case eastward erosion scenario was based on the maximum discharge recorded for Chircking river in the year 2017 (registered at 365 m^3/s). While the river bank erosion is an incremental, long-term process, the historical peak river

discharge is considered appropriate for the evaluation of the worst-case scour event. The outputs of the scour model are displayed in the figure below.

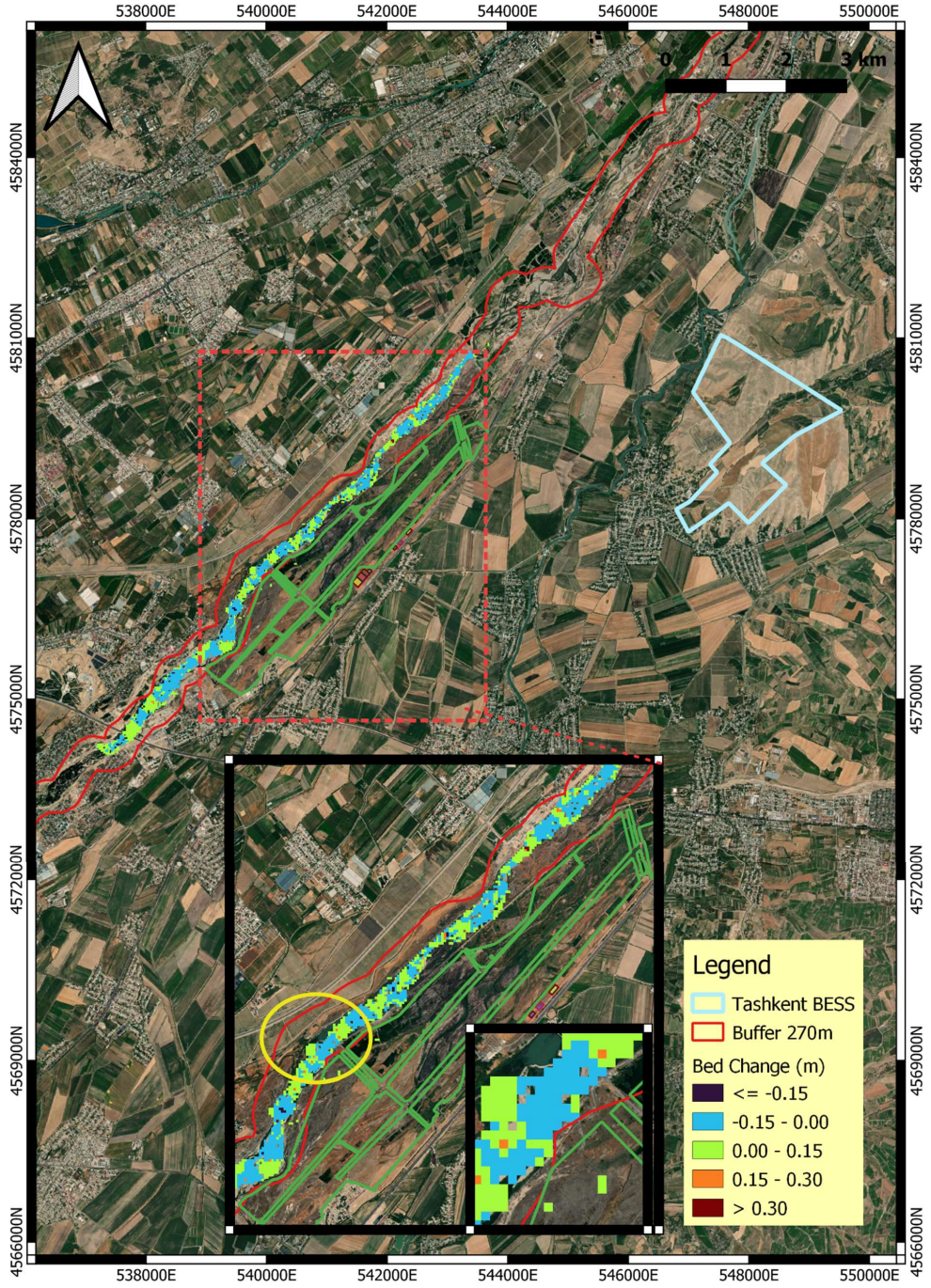


Figure 5-12 Worst-case eastward migration of the Chirchik River channel near the PV plant site

As shown in the illustrations above, the river scour analysis concluded that the eastward migration of the river channel in the event of peak stormwater flows in the order of recent peak flows would not encroach upon the PV plant footprint.

5.2.3.5 Groundwater quality

The PV plant site is located on a protected aquifer (hydraulic capture zone) utilized by Uzsuvtaminot. The entire area is designated a source protection zone, and public access is not authorized.

No visual and olfactory indicators of point source pollution were noted in the course of the site walkovers. Leaching and runoff from crop farming, livestock rearing, and aquacultural establishments within the upstream riverine corridor north of the site were provisionally considered to be potential diffuse sources of pollution for resident surface water, groundwater, and soils (amongst other cumulative urban discharges).

GROUNDWATER SAMPLING

Precautionary groundwater sampling was carried out to establish the baseline levels of groundwater quality as part of the ESIA study, considering the potential for the legacy contamination around the site and on-site contamination during the Project's construction and operational phases. Due to the invariable site usage and hydrogeological context, the site can be considered homogenous and the sampling strategy for groundwater was set taking the following into consideration:

- A total of two representative sampling locations were targeted within the PV plant site, for establishing a baseline frame of reference for future monitoring.
- The groundwater sampling locations selected taking into account the general direction of groundwater flow.
- Representative locations for groundwater sampling are aligned with a select two soil sampling locations, to enable correlation analysis in the event of soil contamination.
- No monitoring wells were installed on the site; therefore, groundwater samples can only be extracted from operational pumping wells (without purging etc.).

The following table provides the GPS coordinates of the selected sites.

SAMPLE NO.	LATITUDE	LONGITUDE
S 01	41.376474°	69.518938°
S 02	41.327333°	69.459614°

The groundwater sampling locations are shown in Figure 5-13 below.

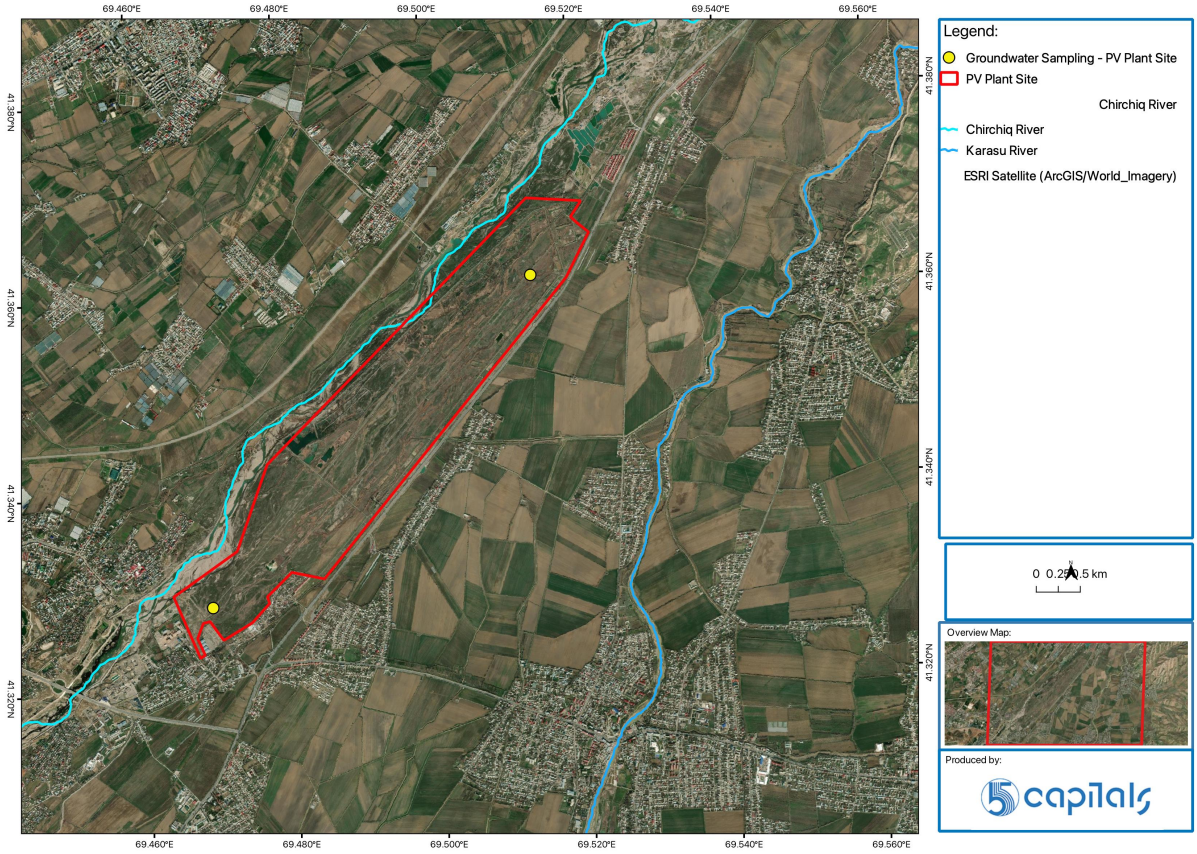


Figure 5-13 Groundwater sampling locations within the PV plant site

Groundwater sampling was carried out on 1st June 2023. Groundwater samples were extracted from taps connecting to the pumping wells. The samples were collected in one litre HDPE containers, labelled accordingly, and placed in cooler boxes. A chain of custody was observed in the transfer of the samples to a nationally accredited laboratory, with a holding time not exceeding 48 hours.

The suite of parameters selected for water quality testing included (but is not limited to) heavy metals (cadmium, mercury, arsenic etc.), hydrocarbons, microbial agents (coliforms etc.) as well as saline/ alkaline mineral constituents (e.g., sulphates, carbonates and chlorides).

ANALYTICAL RESULTS FOR GROUNDWATER QUALITY TESTING

The full listing of the soil quality test parameters and results for collected groundwater samples are presented in Table 5-5 below.

Table 5-5 Results of quantitative analyses for groundwater samples taken within the PV plant site

Parameter	Unit	Lower Detection Limit	Sample ID		Maximum Permissible Concentration	WHO potable water standards
			GW01	GW02		
pH	-	1	8.10	8.05	8.50	-
Electrical Conductivity (EC)	µS/cm	10.0000	393.00	407.00	-	-
Total Suspended Solids (TSS)	mg/L	0.4000	6.00	6.00	30.00	-
Ammonium (NH_4)	mg/L	0.0500	<0.05	<0.05	0.50	-
Sulphates (SO_4)	mg/L	2.0000	72.00	69.00	500.00	-
Nitrate (NO_3)	mg/L	0.0010	8.96	12.50	45.00	50.00
Chlorides (Cl)	mg/L	1.0000	12.00	16.00	350.00	-
Cr (total)	mg/L	0.0020	0.01	0.01	0.05	0.05
Arsenic (As)	mg/L	0.0001	0.00	0.00	0.05	0.01
Aluminum (Al)	mg/L	0.0020	0.13	0.17	-	0.20
Cadmium (Cd)	mg/L	0.0001	0.001	0.000	-	0.003
Lead (Pb)	mg/L	0.0002	0.00	0.00	0.03	0.01
Copper (Cu)	mg/L	0.0020	0.00	0.00	1.00	2.00
Nickel (Ni)	mg/L	0.0020	0.00	0.00	0.10	0.07
Zinc (Zn)	mg/L	0.0020	0.00	0.00	3.00	-
Petroleum products	mg/L	0.0100	0.02	0.01	0.10	-
Sodium (Na)	mg/L	N/A	34.78	32.67	-	-
Calcium (Ca)	mg/L	N/A	118.92	122.35	-	-
Magnesium (Mg)	mg/L	N/A	20.48	19.12	-	-

As shown in Table 5-5 above, the groundwater sampling locations within the PV plant site exhibit good groundwater quality, with no recorded exceedances in relation to local and internationally recognized (i.e., WHO) standards for potable water.

5.2.3.6 Surface water quality

The surface bodies identified within the PV plant site and its 300-metre buffer include Chrichik River, the BAF canal, and a feeder canal located on the northern end of the site.

No visual and olfactory indicators of point source pollution were noted in the course of the site walkovers. Soil erosion as well as leaching and runoff from crop farming, livestock rearing, and aquacultural establishments within the upstream riverine corridor north of the site were provisionally considered to be potential diffuse sources of pollution for resident surface water, groundwater, and soils (amongst other cumulative urban discharges).

SURFACE WATER SAMPLING METHODOLOGY

Precautionary surface water sampling was carried out to establish the baseline levels of surface water quality as part of the ESIA study, considering the potential for the legacy contamination around the site and on-site contamination during the Project's construction and operational phases. Surface water sampling was carried out, taking the following into consideration:

- Selection of locations within each channel to establish a baseline frame of reference for future monitoring.
- For Chirchik River, samples were collected at an upstream and downstream location, and one sample drawn from each of the two on-site feeder channels.
- Sampling outside of precipitation events (and stormwater flow).

The sampling of surface water along Chirchik River and two on-site feeder channels was carried out on 1st June 2023. The sampling locations are shown in Figure 5-14 below.

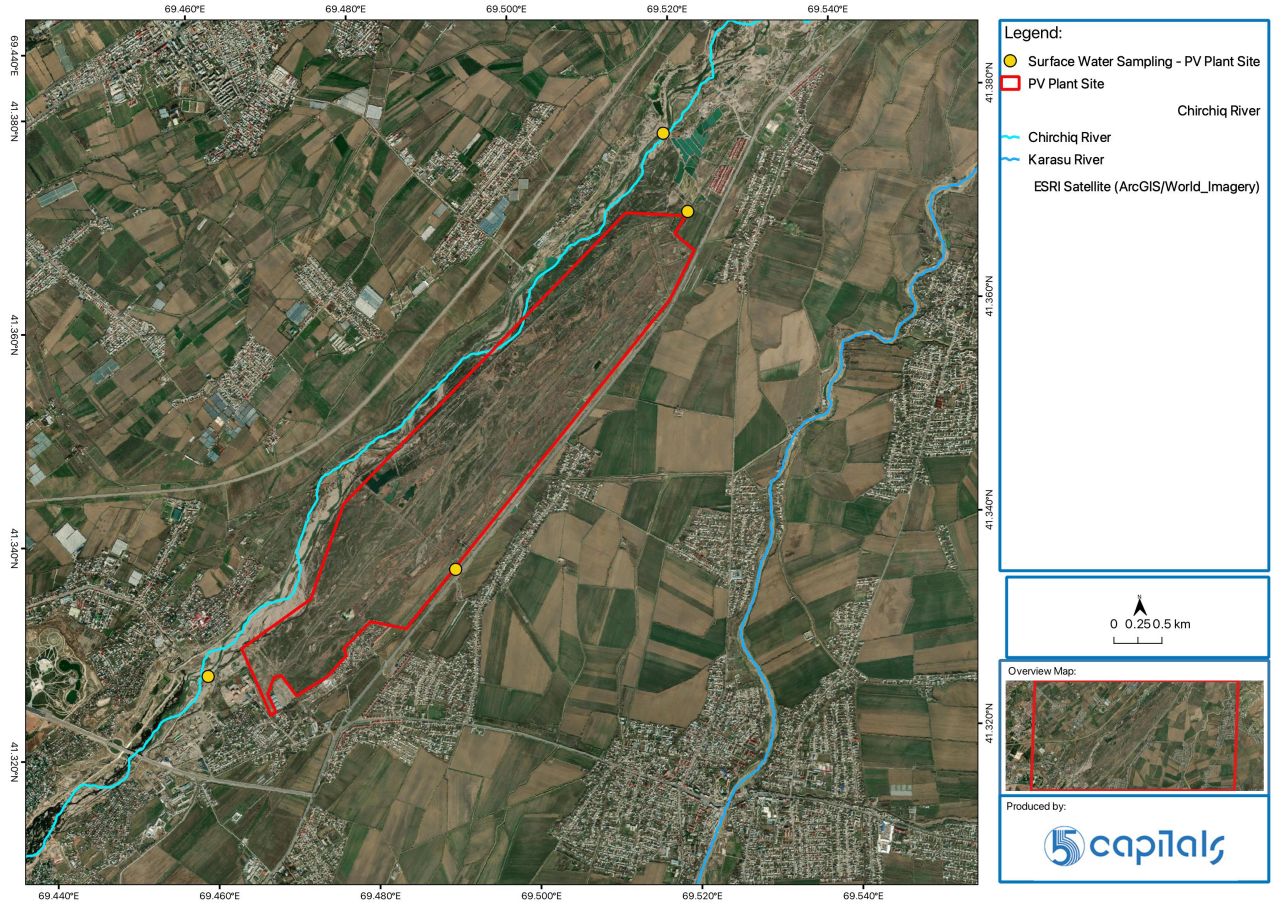


Figure 5-14 Surface water sampling locations within the PV plant site

Surface water samples were extracted from the well-mixed zone of the channels. The samples were collected in one litre HDPE containers, labelled accordingly, and placed in cooler boxes. A chain of custody was observed in the transfer of the samples to a nationally accredited laboratory, with a holding time not exceeding 48 hours.

The suite of parameters selected for water quality testing included (but is not limited to) heavy metals (cadmium, mercury, arsenic etc.), hydrocarbons, microbial agents (coliforms etc.) as well as saline/ alkaline mineral constituents (e.g., sulphates, carbonates and chlorides).

RESULTS FOR SURFACE WATER QUALITY TESTING

The full listing of the soil quality test parameters and results for collected surface water samples are presented in Table 5-6 below.

Table 5-6 Results of quantitative analyses for surface water samples taken within the PV plant site

Parameter	Unit	Lower Detection Limit	Sample ID				Maximum Permissible Concentration	WHO potable water standards
			SW01	SW02	SW03	SW04		
pH	-	1	8.20	8.15	8.25	8.25	8.50	-
Electrical Conductivity (EC)	µS/cm	10.0000	337.00	362.00	360.00	577.00	-	-
Total Suspended Solids (TSS)	mg/L	0.4000	186.00	13.00	1.00	0.40	30.00	-
Ammonium (NH4)	mg/L	0.0500	<0.05	<0.05	<0.05	<0.05	0.50	-
Sulphates (SO4)	mg/L	2.0000	80.00	50.00	66.00	39.00	500.00	-
Nitrate (NO3)	mg/L	0.0010	12.10	12.44	11.60	11.02	45.00	50.00
Chlorides (Cl)	mg/L	1.0000	14.00	16.00	14.00	12.00	350.00	-
Cr (total)	mg/L	0.0020	0.02	0.01	0.01	0.02	0.05	0.05
Arsenic (As)	mg/L	0.0001	0.00	0.00	0.00	0.00	0.05	0.01
Aluminum (Al)	mg/L	0.0020	0.19	0.18	0.19	0.18	-	0.20
Cadmium (Cd)	mg/L	0.0001	<0.0001	0.00	0.00	0.00	-	0.00
Lead (Pb)	mg/L	0.0002	0.00	0.00	0.00	0.00	0.03	0.01
Copper (Cu)	mg/L	0.0020	0.00	0.00	0.00	0.00	1.00	2.00
Nickel (Ni)	mg/L	0.0020	0.01	0.00	0.00	0.00	0.10	0.07
Zinc (Zn)	mg/L	0.0020	0.01	0.00	0.01	0.01	3.00	-
Petroleum products	mg/L	0.0100	0.02	0.03	0.02	0.01	0.10	-
Sodium (Na)	mg/L	N/A	38.66	45.24	43.71	44.09	-	-
Calcium (Ca)	mg/L	N/A	129.05	136.47	178.24	159.52	-	-
Magnesium (Mg)	mg/L	N/A	21.94	24.71	32.11	25.45	-	-

As shown in Table 5-6, above, the surface water sampling locations within the PV plant site exhibit good groundwater quality, with no recorded exceedances in relation to local and internationally recognized (i.e., WHO) standards for potable water, with the exception of one sample.

An exceedance of a local regulatory limit for suspended solids in potable water was noted for the water sample taken at the upstream sampling location along Chirchik River.

5.3 Baseline Conditions – BESS Site

In September 2023, a geotechnical survey of the BESS and interconnection cable sites was undertaken by Uzassystem, to investigate the physical and chemical properties of resident soil deposits and the underlying geological formations for subsequent detailed design of robust civil and electrical works. At the time of writing, an interpretive version of the geotechnical investigation report was not available.

A separate hydrological survey and flood risk assessment was conducted in September 2023, to provide information regarding groundwater levels within the sites, drainage patterns across the sites, and flood potential associated with Karasu River. This information will be incorporated into the detailed design of civil, drainage and electrical works.

The ESIA involved a review of the geotechnical and hydrological survey information, as well as site walkovers and soil sampling. These ESIA-stage studies were aimed at establishing the geological composition of the BESS and interconnection sites, as well as baseline levels of the quality, permeability, compaction potential, stability, erodibility, thermal conductivity and rippability of resident soils.

The following sub-sections elaborate on the existing geological, soil and hydrological context of the BESS site and interconnection route, based on information yielded by technical feasibility studies and ESIA-oriented baseline surveys.

5.3.1 Seismicity of the project location

The BESS site is located within the Pskemsko-Tashkent seismic zone as the PV plant site (i.e., within the same active fault lines). The earthquake potential of the site is estimated to have a magnitude greater than 6.5. An overview of recent seismic events nearby the BESS site is presented in Section 5.2 of this report. As indicated by the geotechnical surveys, there is no significant potential for soil liquefaction due to substantially deep groundwater levels (i.e., beneath 12 metres below ground level).

5.3.2 Geology and soils

5.3.2.1 Geology and soil classification

Drilling and soil logging carried out as part of the geotechnical survey revealed that the bedrock overburden consists of quaternary deposits dominated by Holocene formations with a smaller representation of Middle Section formations. Resident soils can be generally classed as clayey silts or silty clays.

5.3.2.2 Shear strength

In-situ seismic refraction testing, double ring infiltration tests and subsequent sieve analyses indicate that coarse-grained and fine-grained soils account for 1.75% and 96.5% of the formation overburden respectively.

In addition, in-situ standard penetration tests and standard laboratory tests were performed to characterize the mechanical properties of resident soils, particularly shear strength and consolidation (and subsidence) potential. These tests confirmed that the granular characteristics, density, plasticity and permeability of the soil exhibit a moderate to low load bearing capacity, which necessitates shallow foundations on compacted soil layers, surface drainage, and earth retaining walls for construction-phase excavation.

5.3.2.3 Soil aggressivity

As part of the geotechnical survey, electrical resistivity testing was conducted using Vertical Electrical Sounding (VES) equipment at numerous locations. The resistivity values recorded indicated low to high levels of soil aggressiveness across the site. The variable concentration of these mineral constituents poses corrosion potential for planned steel, aluminium and concrete sub-structures, which warrants appropriate protective measures.

5.3.2.4 Soil thermal conductivity

Testing to gauge the thermal conductivity and thermal diffusion of resident soils was carried out, and the maximum depth of soil frost was determined to be 70 cm with a return period of 50 years. The soils exhibit generally high thermal conductivity, which is conducive for optimal operation of underground cables, particularly those with a high current loading.

5.3.2.5 Soil erosion

Observations conducted as part of the hydrological survey did not reveal any evidence of ongoing erosion within the BESS and interconnection cable sites. No rills and gullies were noted, the sites. While the soils are generally highly permeable, the undulating and steeply sloping terrain indicates the potential for soil erosion within disturbed sites.

Additionally, no major streams were observed in close proximity of the BESS site and interconnection cable route.

5.3.2.6 Soil quality

The BESS site and interconnection route are situated within a greenfield landscape. The wider area covers an expanse of meadows and sparse tree cover, which is interspersed with patches of active farmland (i.e., crop farms and orchards). Resident grassland offers pastures for locally bred livestock including cattle and sheep. In addition, two residential facilities are located within 300 metres of the BESS site.

No visual and olfactory indicators of point source pollution were noted in the course of the site walkovers. Leaching and runoff from crop farming, as well as livestock herding were provisionally considered to be potential diffuse sources of pollution for ephemeral surface water streams in the wider landscape, as well as resident groundwater, and soils.

SOIL SAMPLING METHODOLOGY

Precautionary soil sampling was carried out to establish the baseline levels of soil quality as part of the ESIA study, considering the potential for on-site contamination during the Project's construction and operational phases. Soil sampling was conducted within the BESS site from August 29 2023, using the approach and methods discussed in Section 5.2.2.6 of this report. The soil sampling locations within the BESS site are indicated in Figure 5-15 below.

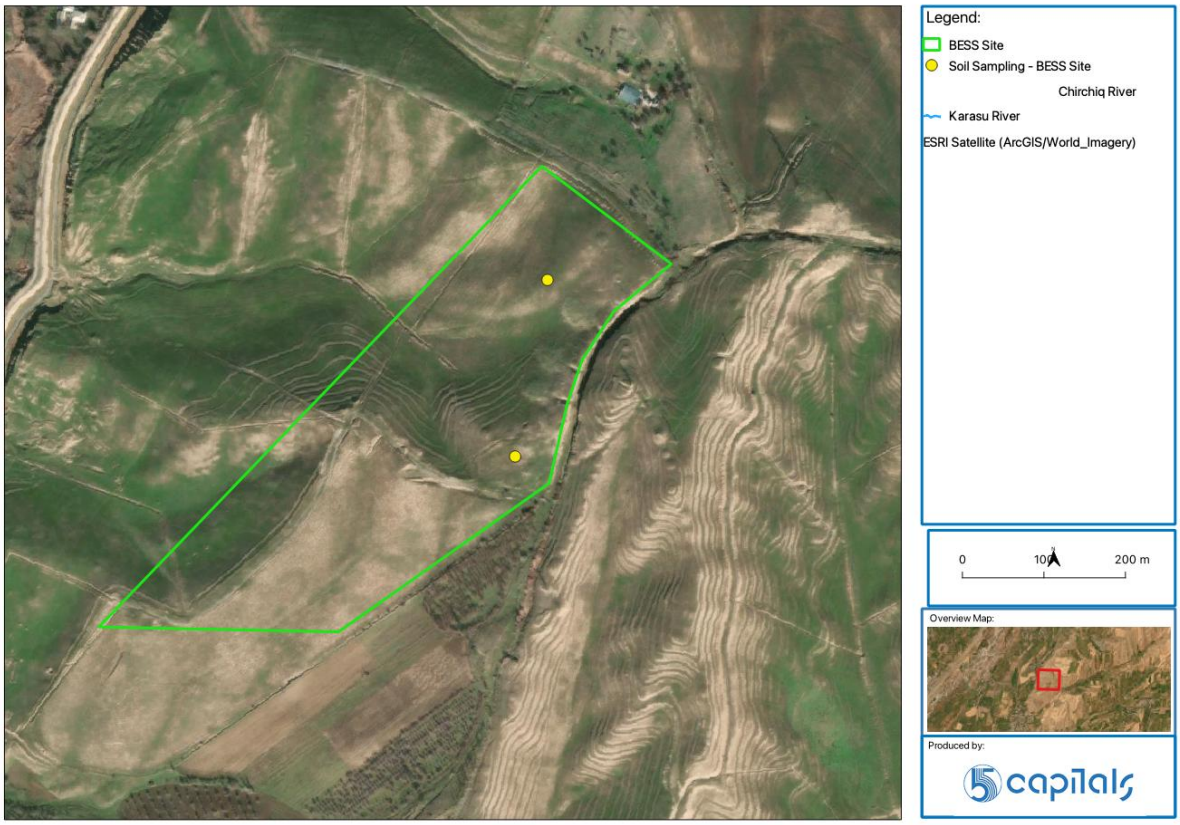


Figure 5-15 Soil sampling locations within the BESS site

The full listing of the soil quality test parameters and results for collected soil samples are presented in Table 5-7.

Table 5-7 Results of quantitative analyses for soil samples taken within the BESS site

Parameter	Unit	Lower Detection Limit	Sample ID		Maximum Permissible Concentration[4]	Dutch Inrevention Target Value
			S09	S10		
pH	-	1	6.3	7.7	-	-
Sodium (Na)	mg/kg	40.0	9,300.0	9,400.0	-	-
Potassium (K)	mg/kg	80.0	18,000.0	17,000.0	-	-
Iron (Fe)	mg/kg	60.0	28,000.0	28,000.0	-	-
Nitrate (NO_3)	mg/kg	0.0	3.0	3.0	130.0	-
Cadmium (Cd)	mg/kg	0.0	0.1	0.1	-	0.8
Chromium (Cr)	mg/kg	1.0	34.0	27.0	6.0	100
Copper (Cu)	mg/kg	1.0	20.0	6.6	3.0	36.0
Lead (Pb)	mg/kg	0.1	15.0	14.0	32.0	85.0
Manganese (Mn)	mg/kg	20.0	690.0	640.0	1,500.0	-
Mercury (Hg)	mg/kg	-	0.0	<0.03	2.1	0.3
Nickel (Ni)	mg/kg	1.0	42.0	39.0	4.0	35.0
Zinc (Zn)	mg/kg	1.0	43.0	40.0	23.0	140.0

[4] Thresholds specified in SanPiN No.0191-05

ANALYTICAL RESULTS FOR SOIL QUALITY TESTING

As shown in Table 5-7 above, soils resident within the PV plant site exhibit generally good quality, with no substantial exceedances of internationally recognized thresholds which would signal ongoing impact from nearby soil and/or groundwater pollution sources. Baseline soil concentrations of Chromium, Copper and Zinc within both sampling locations are in excess of local standards for soil quality but do not exceed the Dutch threshold values.

Baseline soil concentrations of Nickel were found to consistently exceed both local and international standards for soil quality. Elevated concentrations of Nickel and other heavy metals across the site can be attributed to the chemical composition of the local geological formations.

5.3.3 Hydrology

5.3.3.1 Surface water

The BESS and interconnection cable sites are located within the fourth sub-catchment of the Chirchik River basin. Further information on the general hydrology of the Chirchik river basin is presented in Section 5.2 of this report. The maximum elevation of the wider landscape encompassing the project site is 632.4 meters above ground level, while the mean elevations is 583.9 meters. No major water courses are located within the BESS site and the associated interconnection route and within the sites' proximity.

Permanent water bodies within 300 metres of the BESS site and the interconnection route include Karasu River and Khandam Canal. Karasu River, which stems from Chirchik River about six kilometres north of the BESS site, lies 362 metres West of the site. Khandam Canal is an irrigation channel, which branches out of Karasu River about four kilometres north of the site. This channel is situated about 245 metres west of the project areas. A few ephemeral and permanent streams are also present within the wider landscape surrounding the sites.

5.3.3.2 Groundwater

The geotechnical investigation of the BESS site indicated the absence of groundwater at a maximum drilling depth of 15 metres below ground level. Groundwater was not encountered in any of the bores.

5.3.3.3 Flood risk

STORM EVENT FLOODING

A flood risk assessment for the BESS site and the associated interconnection route was carried out as part of the hydrological survey. The assessment involved the (i) construction of a DEM,

(ii) collection of hydrometric information spanning the past two decades, (iv) the derivation of several drainage coefficients, and (v) the modelling of flood events using unsteady flow calculations.

Historical information on the annual maxima of precipitation over the period 2003 – 2022 was obtained from the nearest two meteorological stations. Frequency analyses for extreme precipitation events were carried out using the Generalized Extreme Value (GEV) distribution, considering rainfall magnitudes corresponding to a 100-year return period (i.e., 1% AEP), within 10-minute and 24-hour durations representing flash flood and protracted pluvial durations respectively. The 1% AEP precipitation levels within the meteorological station locations were determined to be 49.16 mm and 97.74 mm.

Pluvial floods resulting from 100-year precipitation extremes were simulated using the Direct Rainfall Method (DRM) and HEC-RAS hydraulic modelling software. The software models stormwater drainage by solving two-dimensional (Saint Venant) equations for unsteady flow. The 30×30 metre Forest and Buildings removed Copernicus Digital Elevation Model (FEBDEM) of the entire catchment and a 1×1 metre DEM limited to the BESS footprint were utilized for flood simulation, along with extreme precipitation predictions based on historical data from the Tashkent Meteorological Station.

The simulation results indicating the depths of accumulated surface water during a 1% AEP storm event, for 10-minute and 24-hour storm durations, are displayed in the figures below. The results indicate that for flash-flood and extended 1% AEP storm events present little to no flood hazard on the site, with runoff accumulation and ponding predicted to range between 0.1 and 0.2 metres.

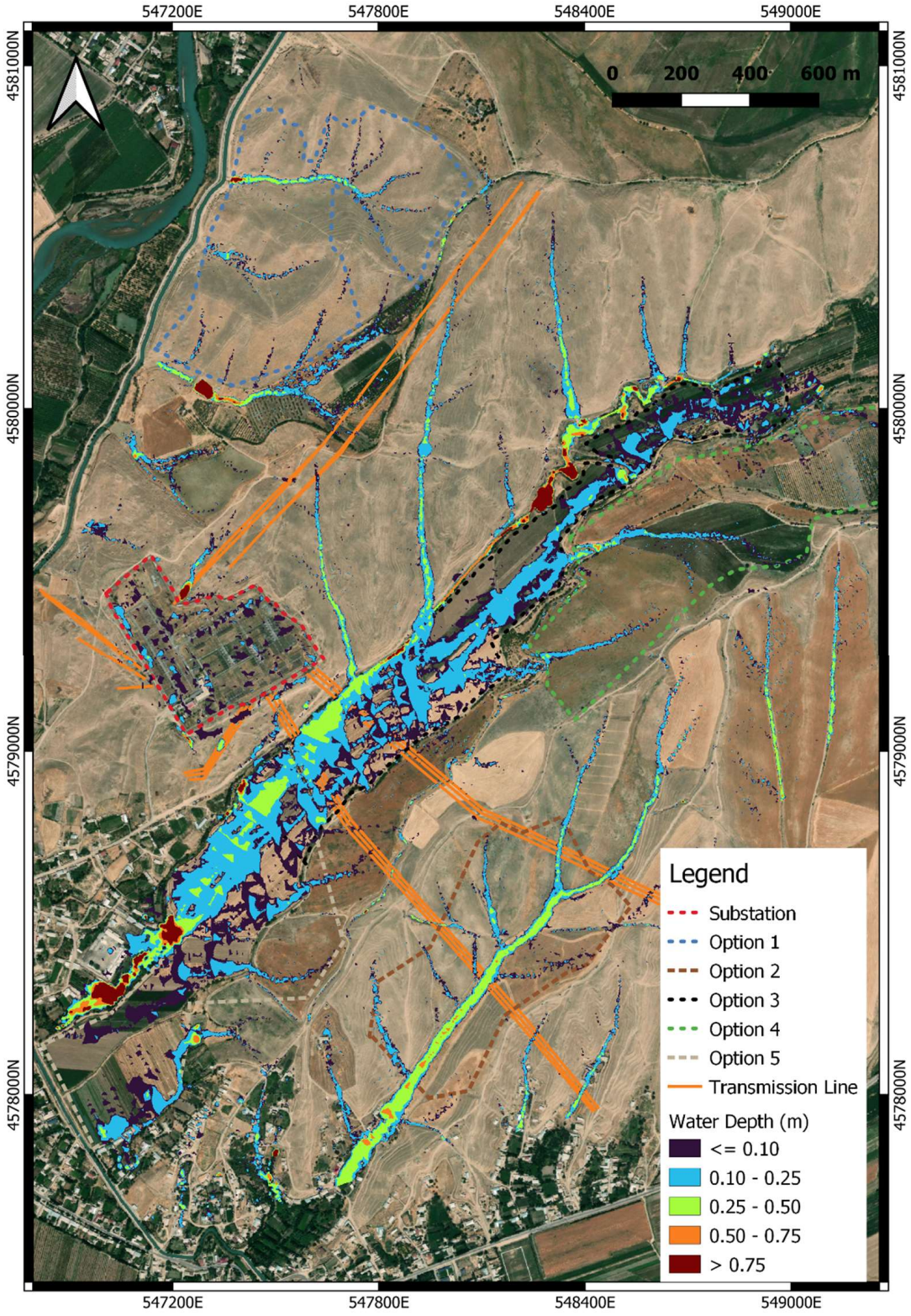


Figure 5-16 Runoff accumulation depth in a 10-minute duration and 1% AEP storm event in and around the BESS area

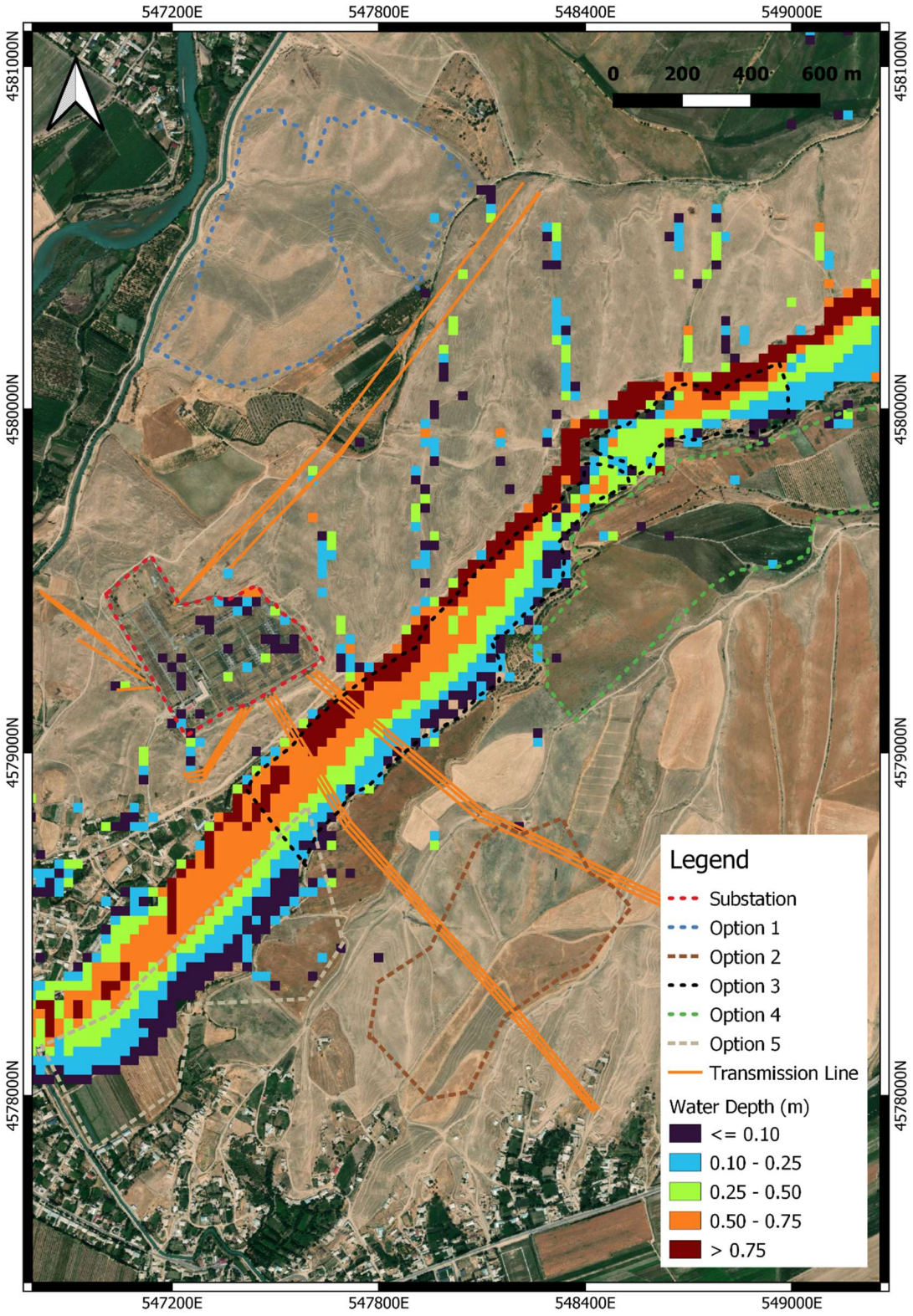


Figure 5-17 Runoff accumulation depth in a 24-hour duration and 1% AEP storm event in and around the BESS area

DAM BREACH FLOODING

Based on the dam break analysis narrated in Section 5.2, the BESS site and interconnection cable sites are not subject to alluvial flooding from Karasu River, in the event of the Kavardan dam failure.

5.4 Receptors

The following table provides an overview of E&S impact receptors in the context of geology, soils and hydrology within the Project's Areas of Influence (AoI). A sensitivity rating and corresponding description is further provided for each relevant receptor.

Table 5-8 E&S impact receptors – Geology, soils and hydrology

RECEPTOR	SENSITIVITY	JUSTIFICATION
Soil	High	Coarse to fine soils with good permeability and considerable susceptibility to erosion, compaction, and contamination. Soils provide ecosystem services that are important for regional water supply and local livelihoods.
Groundwater	Very high	Shallow groundwater aquifer with high-quality groundwater, which is abstracted for domestic and potable usage. The aquifer is utilized for regional water supply, with increasing exploitation and climatic pressures on other groundwater resources within the region and country at large.
Surface water	High	Unprotected surface water sources include Chirchik River, natural streams, irrigation canals, the feeder channel north of the PV plant site, as well as the Uzsuvtaminot-owned infiltration channels and ponds. The river and major watercourses in and around the project footprint drain high-quality surface water which is utilized for local agriculture.

5.5 Potential Impacts and Impact Management Measures

5.5.1 Construction phase

5.5.1.1 Soil erosion and associated sedimentation

The Project's construction phase will involve land clearance, topsoil stripping, as well as earthworks such as site grading, excavation and filling. Excavated and imported stocks of soil and other construction aggregates will also be stockpiled during cut-and-fill operations or excavation for backfilling with more stable aggregates. These earthworks and earth-moving activities will constitute an important part of site preparation and the construction of foundations, service roads, cable trenches, and drainage channels within the project sites.

The disturbance, displacement and exposure of soils potentiates the risk of wind- and water-driven soil erosion within the construction footprint. Silty soils on the uneven terrain within the

BESS sites are particularly prone to erosion during periods of rainfall and little to no vegetative cover. Soil erosion and sediment mobilization may also occur where existing water courses are disturbed and new watercourses are established (i.e., during upgrading or diversion).

The potential for soil erosion poses the risk of subsequent declines in the quality of economically and/or ecologically important surface water bodies (i.e., utility channels and ponds, irrigation channels and potentially Chirchik River) as a result of sediment loading and elevated turbidity. Water sources most vulnerable to such impact include the utility-owned (Uzsuvtaminot) infiltration ponds and channels located within the PV plant site. The deposition and accumulation of sediment within these waterworks may substantially compromise the operability of the utility assets, and thereby lead to a drop in surface water infiltration rates, borehole yields and operational efficiencies.

In the absence of mitigation, the impact significance is potentially moderate, considering the generally considerable erodibility of resident soils and the presence of watercourses and steep slopes within the PV power plant site and the BESS site respectively.

5.5.1.2 Pluvial flooding

Construction activities such as vegetation removal (land clearance), purposive compaction for soil stabilization, and the movement of heavy construction machinery pose the potential for altered drainage patterns, reduced infiltration capacity of resident soils, and increased surface runoff in the event of precipitation. Increased stormwater runoff can in turn result in excessive ponding within construction sites, overflows within unprotected Uzsuvtaminot-owned ponds, and adverse stormwater discharge outside of the project sites.

In addition, haphazard or uncontrolled stockpiling of excavated or imported aggregates may block drainage channels, ephemeral streams and agricultural canals within the project sites, and thereby lead to drainage bottlenecks, overflows and associated soil erosion. Sediment loading within on-site watercourses can also result in congestion and impeded drainage, particularly in the event of extreme stormwater flows.

In the absence of mitigation, the impact significance is potentially minor/moderate, considering the scale of the existing drainage systems and highly permeable soils within the PV plant and BESS sites.

5.5.1.3 Increased groundwater drawdown around utility boreholes

Any deep excavations within the PV plant site may necessitate dewatering. Extended periods of dewatering may contribute to the drawdown around any boreholes located in close proximity to dewatering sites. Depending on recharge rates at the time of dewatering, this may in turn result in reduced borehole yield, however this potential impact is not

considered probable, as relatively deep excavation works will be largely limited to the collector sub-station area. In addition, a total of wells are operational within the wellfield, and aquifer recharge is constantly enhanced by on-site infiltration channels and ponds, which receive water from a feeder canal stemming from Chirchik River.

In the absence of mitigation, this impact significance is potentially minor, considering the high aquifer recharge rates within the site and inflows from Chirchik river.

Contamination of resident soil, groundwater, and surface water

The Project's construction phase will involve the transportation, handling, storage and use of various materials, including hazardous materials with toxic properties. The accidental release of these materials by way of spills and leakages can result in the contamination of resident soils, groundwater and surface water resources. Depending on the scale of such discharges and various pollutant migration factors (i.e., soil permeability, groundwater levels, hydraulic gradient, surface water flows etc.), soil and water contamination can expose human end-receptors to a host of risks, including acute and chronic health impacts. A mass release of toxic substances into soils and water bodies can also have a deleterious effect on ecological receptors (i.e., flora and fauna within areas of impact). Hazardous construction materials potentially include fuel, paints, solvents, hydraulic fluids, and lubricants.

Further, construction activities typically entail the generation of hazardous waste such as used oils, concrete washout water, untreated sewage, hazardous chemical containers, and soiled absorbents. Improper waste handling, storage and transfer facilities and procedures, as well as accidental spills and leakages of liquid waste can likewise result in the uncontrolled contamination of resident soil, groundwater, and surface water resources, with harmful effects on human and ecological end-receptors due to exposure pathways including (but not limited to) direct contaminated water consumption and exterior contact with contaminated water. The release of organic waste into wetlands and nutrient loading within aquatic habitats can also result in eutrophication and deleterious anoxic conditions.

Construction zones with an elevated risk of soil and water contamination typically include material and waste storage, materials pick-up and drop-off areas, concrete batching plants, refuelling areas, and areas around sewage storage and treatment facilities.

In the absence of mitigation, this impact significance is potentially major, considering the shallow groundwater table, highly permeable soils and unprotected canals within the PV plant site. The impact significance is nonetheless potentially moderate within the BESS site, where groundwater and surface water are less proximate.

Table 5-9 Overview of potential impacts relating to geology, soils, groundwater and surface water during construction

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Soil erosion and associated sedimentation	Construction site footprint within the PV plant and BESS sites, and areas immediately downstream of resident sections of irrigation/drainage channels	Minor	Soil	High	**Minor/Moderate**	**Minor**
			Surface water	High	**Minor/Moderate**	**Minor**
Pluvial flooding	Construction zones within the PV plant and BESS sites	Minor	Soil	High	**Minor/Moderate**	**Minor**
Increased groundwater drawdown around utility boreholes	Wellfield with active water intake boreholes within the PV plant site	Negligible	Groundwater	Very high	**Minor**	**Neutral**
Contamination of resident soil, groundwater and surface water	Construction zones within the PV plant and BESS sites, and areas immediately downstream of resident/ nearby river and irrigation channels	Moderate	Soil	High	**Moderate/Major**	**Minor**
		Major	Groundwater	Very high	**Major**	**Minor**
		Moderate	Surface water	High	**Moderate/Major**	**Minor**

Impact avoidance, mitigation and offset measures

Soil erosion and associated sedimentation

- Land clearance and other forms of soil disturbance will be restricted to demarcated construction zones within the project sites and designated transit corridors.
- Any paved areas within the PV power plant site will be avoided to the extent possible during site preparation.
- Erosion-prone locations within the project sites will be identified prior to the commencement of land clearance and earthworks and avoided to the extent feasible. Where avoidance is not feasible, erosion control listed further below will be carried out.
- Land clearance, excavation and intensive earth-moving activities will be avoided, suspended, or otherwise curtailed to the extent feasible during periods of heavy rainfall and/or rapid snowmelt, to the extent feasible.
- Excavation and stockpiling will be sited as far as possible from unprotected drainage channels, infiltration ponds, irrigation canals, natural streams and Chirchik River.

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
• Silt traps fences or curtains will be installed where earthworks must be carried out in close proximity to unprotected drainage channels, infiltration ponds, irrigation canals, natural streams and Chirchik River. • Any earthworks within drainage channels, infiltration ponds and natural streams will be avoided, suspended, or otherwise curtailed to the extent feasible during periods of heavy rainfall and/or rapid snowmelt, to the extent feasible. • The length and slope of excavations and stockpiles will be minimized to the extent feasible. • Shoring and shielding for any deep excavations within unstable soils will be retained up to the time of backfilling, to minimize soil erosion and subsequent sedimentation with nearby water courses. • Excavated soil that is fit for backfilling purposes will be segregated during excavation and stockpiling, such that the original soil profile is maintained during backfilling. • Excavations including trenches will be backfilled as quickly as practicable, with efforts to re-establish the original soil profile (i.e., layering sub-soil beneath topsoil). • Wetting-down and construction of berms will be carried out for stockpiles to minimize soil erosion and subsequent sedimentation within nearby water courses during periods of heavy rainfall and/or strong winds. • The development of on-site service roads for the Project will involve design and grading efforts to minimize roadway gradients, surface compaction and appropriate drainage for constructed or upgraded roads. • Site rehabilitation will be implemented following the completion of construction activities, with complete backfilling of on-site excavations, removal of remnant soil stockpiles and re-establishment of vegetative cover in residual areas within the project sites (i.e., those located outside of permanent clearance zones for the operation and maintenance of project facilities). • Site rehabilitation will include ad-hoc erosion and sedimentation control measures for any disturbed erosion-prone locations located within 100 metres of sensitive water courses. These measures will include grading, as well as vegetative contouring for steeply-sloping terrain and the establishment of vegetative swales where feasible. • Local communities based around the project sites and relevant technical departments at Uzsuvtaminot will be familiarized with the Project's community GRM, to enable the collection of grievances pertaining to soil erosion and adverse sedimentation on platforms that are accessible to all local constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. • An Erosion Control Plan and Reinstatement and Landscape Management Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented. **Pluvial flooding**						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
• Early works will entail the upgrading of the on-site drainage system through the development of four major infiltration channels and an additional two infiltration ponds. • Land clearance and other forms of soil disturbance will be restricted to demarcated construction zones within the project sites and designated transit corridors. • The movement of heavy vehicles and mass storage of construction materials will be restricted to on-site service roads and laydown areas respectively, to minimize the compaction of undisturbed soils. • Excavation and stockpiling will be sited as far as possible from unprotected drainage channels, infiltration ponds, irrigation canals, natural streams and Chirchik River. • Any earthworks within drainage channels, infiltration ponds and natural streams will be avoided, suspended, or otherwise curtailed to the extent feasible during periods of heavy rainfall and/or rapid snowmelt, to the extent feasible. • Existing drainage channels will not be blocked or constricted without ensuring the diversion of affected watercourses through the establishment or use of alternative drainage channels with sufficient drainage capacity. • Haphazard dumping of solid and liquid waste into waterbodies in and around the project sites will be strictly prohibited. The discharge of liquid construction waste (e.g., sewage, concrete washout, used/waste oils) into water bodies will be proscribed. • Site rehabilitation will be implemented following the completion of construction activities, with complete backfilling of on-site excavations, removal of remnant soil stockpiles and re-establishment of vegetative cover in residual areas within the project sites (i.e., those located outside of permanent clearance zones for the operation and maintenance of project facilities). • Site rehabilitation will include ad-hoc erosion and sedimentation control measures for any disturbed erosion-prone locations located within 60 metres of sensitive water courses. These measures will include grading, as well as vegetative contouring for steeply-sloping terrain and the establishment of vegetative swales where feasible. • Local communities based around the project sites and relevant technical departments of Uzsuvtaminot will be familiarized with the Project's community GRM, to enable the collection of grievances pertaining to pluvial flooding on platforms that are accessible to all local constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. • An Erosion Control Plan, Water Management Plan and Reinstatement and Landscape Management Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented. **<u>Increased groundwater drawdown around utility boreholes</u>** • Any deep excavation and construction works requiring dewatering will be completed in the shortest practicable duration, to minimize groundwater abstraction volumes and any associated drawdown impacts on proximate boreholes.						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance

- The capacity of existing infiltration ponds and channels (operated by Uzsuvtaminot) will be maintained and improved to the extent feasible, to maximize groundwater recharge from feeder canals and precipitation.
- The EPC Contractor will coordinate with Uzsuvtaminot on dewatering procedures and timetable for any deep excavations below the water table.
- Relevant technical departments of Uzsuvtaminot will be familiarized with the Project's community GRM, to enable the collection of grievances pertaining to construction-related drawdown and declining groundwater yield.
- A Water Management Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented.

Contamination of resident soil, groundwater and surface water

PV plant site measures

The following management measures will be implemented for the PV plant site exclusively, where a water supply system is operated by Uzsuvtaminot:

- The establishment of fuel storage, refuelling facilities, machinery washing and equipment maintenance facilities within the site will be strictly prohibited. All defunct heavy machinery will be serviced within service centres outside of the project site.
- Mobile toilets and ablution facilities for construction-phase sanitation will be located as far as possible from operational boreholes, infiltration ponds and water courses.
- Laydown areas and any facilities for temporary and limited storage of hazardous materials will be located as far as possible from operational boreholes, infiltration ponds and water courses.
- Any hazardous waste generated on site (e.g., electronic refuse, waste oils, sewage) will be collected and transferred to designated waste management facilities by licensed waste collection contractors as soon as possible (i.e., on site storage to not exceed one week).
- The sanitary and erosion control buffers prescribed by Uzsuvtaminot will be observed for all construction activities and facilities.
- In the event of accidental spills of hazardous liquid chemicals or waste, the EPC Contractor's emergency spill response team and Uzsuvtaminot technical departments will be notified immediately for coordinated and adequate clean-up and monitoring for ad-hoc remediation in case of residual contamination impact.

General measures

The following management measures will be implemented for the project facilities in general:

- Regular and specialized hazard assessments will be carried out for any construction activities and contingencies involving the use, generation

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
and/or potential release of hazardous materials and waste. • Robust, non-defective, fully sealed/ closed and inert (or product-compatible) containers and/or vessels will be used for the transfer of any hazardous materials and waste in and out of the project sites, using safe transportation means. • Regular maintenance will be carried out for vehicles, equipment and devices used for the transportation, loading and discharge of hazardous materials and waste during construction. Fuel transport vehicles and equipment to be maintained and routinely inspected to ensure the tank, pumps, pipe work and other vehicle components are fit for purpose, with no signs of leakage. Vehicles with any identified defects (e.g., compromised fluid vessels) will be withdrawn from service for immediate maintenance. • Connection points for the discharge of hazardous materials and waste from one containment structure to another will be positioned above drip trays and/or impervious bases that are isolated from stormwater drainage systems. • Washing of equipment and machinery (including vehicles) will only be permitted in designated areas, with impermeable surfaces and isolated drainage systems that lead to dedicated sumps, treatment facilities including oil/water separators and/or lined evaporation ponds. • Refuelling of equipment and machinery (including vehicles) will be permitted only in designated areas with impermeable surfaces and isolated drainage systems that lead to dedicated sumps, treatment facilities including oil/water separators and/or lined evaporation ponds. • Oil-containing construction equipment (with the exception of vehicles) will be placed on bunded impermeable hard-standings or drip trays. • Bunded septic tanks will be established for the collection of sewage throughout construction. • Dedicated equipment and resources for emergency response to hazardous materials spills and leakages will be stationed at suitable locations (e.g., materials/waste storage facilities and pick-up/unloading sites), with regular maintenance checks and re-stocking. Sufficient and readily accessible spill kits will be provided for on-site hazardous material/ waste storage facilities. • Emergency response measures for spills on land will include the deployment of spill kits, berming, excavation and dewatering. • Soil, sediment, water, and materials contaminated by spills of hazardous materials and spill response measures will be handled and stored as hazardous waste and handed over to licensed hazardous waste management contractors for appropriate off-site treatment and/or disposal. • Emergency response measures for spills within water bodies will include the deployment of floating booms, absorbent pads and oil skimmers. • Emergency response will be implemented for spills and leakages of hazardous materials immediately after the identification of any such incidents. Remedial measures will involve best efforts to stop or otherwise minimize the spread of soil, groundwater and surface water contamination (and off-site pollutant migration) and recover accidentally released product and contaminated soil and water for specialized treatment and/or disposal. • Response to all incidents of spills and leakages of hazardous materials, subsequent root-cause investigation and corrective actions will be recorded on environmental incident logs. • Designated facilities with an impermeable base (flooring), roofing, and facilities for temperature control, lighting protection, and fire detection						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
and suppression will be established for the storage of hazardous materials and waste. These facilities will be sheltered to prevent exposure of chemical/waste stock to direct sunlight, precipitation, humid external conditions, and wind. • On-site storage of hazardous materials and waste will be physically segregated to avoid the commingling of incompatible materials and potentially hazardous chemical reactions and/or products. Incompatible pairings with potential for violent and flammable reactions include acids and bases, oxidizing and flammable/explosive substances, etc.). • Designated facilities for the storage of hazardous materials and waste will be sited as far as possible from main working areas, water sources, stormwater drainage systems, and sources of ignition. A protective buffer of at least 100 metres will be maintained from water sources. • Storage of liquid hazardous materials and waste will include impervious and chemically resistant structures for secondary containment, which will feature berms, dikes or retaining walls. The capacity of secondary containment structures will amount to 110% of the capacity of the largest primary containment structure (e.g., tank or vessel) or 25% of the combined capacity of co-located primary containment structures, whichever is larger. • All containers and vessels for temporary on-site storage of hazardous construction materials and waste will be labelled accordingly, with signage and descriptions in Uzbek, Russian, Chinese and English. Prominent precautionary signage and multilingual descriptions will be included on labels and placards. • On-site storage of hazardous materials will be carried out in accordance with instructions on Material Safety Data Sheets (MSDSs) and/or other guides from the product manufacturers. • A Hazardous Materials Register will be maintained to record and track the import and on-site inventory of hazardous materials, with details on relevant suppliers, chain of custody, transportation routes for delivery to the project sites. • A Waste transfer log will be maintained to record and track the generation, storage and segregation of various construction waste streams, as well as the dispatch of waste consignments for off-site treatment and/or disposal, with details on waste management contractors, chain of custody, transportation route to the designated waste management facilities. • Regular coordination will be made with relevant authorities on permitting requirements and H&S measures for any instances of on-site storage and project-related transportation of hazardous materials and waste in quantities that exceed regulatory thresholds. • Where connection to an existing sewerage system is not feasible for the disposal of sewage, mobile toilets will be used prior to the completion of construction of an on-site sewage treatment system for the Project's operational phase (e.g., septic tank). • Frequent servicing will be carried out for mobile toilets stationed within the project sites by licensed waste collection contractors, with safeguards for spills and leakages. • Oil/grease traps will be installed within any kitchen facilities established within the project sites. • In the event that a concrete batching plant is installed on the BESS site, any on-site structures for containment of concrete washout water will be						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
designed with sufficient capacity and located at a sufficient distance from stormwater drainage systems. • Washout of concrete trucks will be performed in designated areas only at the batching plant or any other approved concrete washout areas at the site. • Haphazard dumping of solid and liquid waste into waterbodies in and around the project sites will be strictly prohibited. • Any containers and implements used for the storage and handling of hazardous materials and waste, will be managed as hazardous waste and not used for any other applications. • Soils and aggregates for on-site construction works will be procured from accredited suppliers with licensed operational quarries and certificate of quality. • Any legacy contamination identified as part of the ESIA-stage soil and groundwater baseline survey during the ESIA (and any follow-up contaminated site investigation) will be demarcated for clean-up and remediation, prior to the start of construction within any such sites. • Any contaminated land within the site will not otherwise be disturbed to prevent the mobilization of contaminants into ambient water resources, and off-site migration of impacted groundwater (and surface water). • Induction and refresher trainings for all direct and contracted construction workers will cover hygiene, housekeeping and sanitation, the waste management hierarchy, construction-related waste streams, relevant categories of hazardous materials and waste, the impacts of hazardous materials and waste on human health and ecosystems, as well as requirements and safeguards for the handling, storage and transposition of various hazardous and non-hazardous construction materials and waste streams. • Periodic refresher trainings and daily tool-box talks will be provided updated or reiterated information on emergency response for spills and leakages of hazardous materials, and periodic drills will be carried out for spill emergency preparedness. • Regular environmental monitoring will be carried out by the Project Company's and EPC Contractor's relevant HSSE staff. This line of monitoring will include (i) inspections to ensure the implementation of relevant safeguards in work procedures/ activities, and (ii) maintenance inspections and testing to ensure the structural integrity, mechanical integrity and overall operability of construction equipment and engineering controls for the prevention of accidental release of hazardous materials, and (iii) monitoring of ambient soil, water and air quality. • A Waste Management Plan, Hazardous Materials and Waste Management Plan, Occupational Health and Safety Plan, Spill Preparedness and Response Procedure integrating into a broader Emergency Preparedness and Response Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented.						

5.5.2 Operations phase

5.5.2.1 Contamination of resident soil, groundwater, and surface water

The Project's operational phase will entail operation and maintenance (O&M) activities which will generate limited amounts of hazardous waste. Such activities include the replacement of defective electronic equipment, transformer servicing and oil draining, and the generation of black and grey wastewater (sewage). In addition, spills and leakages can also occur during the servicing of mechanical and electrical equipment constituting the PV plant and BESS facilities, on-site operation of vehicles, and overflow or failure of facilities for sewage collection and treatment (e.g., septic tanks).

Specific operational zones with an elevated risk of soil and water contamination potentially include on-site warehouses, waste storage facilities, materials pick-up and drop-off locations, and areas around sewage storage and treatment facilities.

In the absence of mitigation, this impact significance is potentially major, considering the shallow groundwater table, highly permeable soils and unprotected canals within the PV plant site. The impact significance is nonetheless potentially moderate within the BESS site, where groundwater and surface water are less proximate.

Table 5-10 Overview of potential impacts relating to geology, soils, groundwater and surface water during operations

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Contamination of resident soil, groundwater and surface water	Construction zones within the PV plant and BESS sites, and areas immediately downstream of resident/ nearby river and irrigation channels	Moderate	Soil	High	**Moderate/Major**	**Minor**
		Moderate	Groundwater	Very high	**Major**	**Minor**
		Moderate	Surface water	High	**Moderate/Major**	**Minor**

Impact avoidance, mitigation and offset measures

<u>Contamination of resident soil, groundwater and surface water</u>

The following management measures will be implemented for the PV plant site exclusively, where a water supply system is operated by Uzsuvtaminot:

- The establishment of fuel storage, refuelling facilities, machinery washing and equipment maintenance facilities within the site will be strictly prohibited. All defunct heavy machinery will be serviced within service centres outside of the project site.
- Any facilities for temporary and limited storage of hazardous materials will be located as far as possible from operational boreholes, infiltration ponds and water courses.
- Any hazardous waste generated on site (e.g., electronic refuse, waste oils, sewage) will be collected and transferred to designated waste management facilities by licensed waste collection contractors as soon as possible (i.e., on site storage to not exceed one week).
- The sanitary and erosion control buffers prescribed by Uzsuvtaminot will be observed for all construction activities and facilities.
- In the event of accidental spills of hazardous liquid chemicals or waste, the O&M Contractor's emergency spill response team and Uzsuvtaminot technical departments will be notified immediately for coordinated and adequate clean-up and monitoring for ad-hoc remediation in case of residual contamination impact.

General measures

The following management measures will be implemented for the project facilities in general:

- Operator to develop and implement an Emergency Preparedness and Response Plan (ERP) to include or link to a Spill Response and Contingency Plan.
- Conformance with ERP procedures (preventative and response) will be monitored through routine inspections.
- Appropriate training of staff in regard to the handling and response to spill/leak events.

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
• Availability of complete spill kits in all hazardous material storage areas. • Availability of MSDS on-site for any chemicals in use (to be made available at the chemical storage area). • Availability of a chemical register for all the hazardous chemicals on site. • Storage of all hazardous materials such as fuels and chemicals on an impermeable base with liners and/or secondary containment bund with enough capacity to hold 110% of the bulk storage container and 25% of the total volume of the multiple containers. • The chemical storage area will have proper ventilation and cover from the elements (i.e. rain, sun) and different storage areas to allow for segregation of incompatible chemicals. • O&M Company to ensure that sanitation facilities have effective leak tight plumbing systems and the manholes will be inspected regularly for any blockage. • If used in landscaped areas, the application of fertilisers and pesticides must be limited and monitored. • Use of any toxic/non-biodegradable pesticides will be prohibited in accordance with the Stockholm Convention on banned chemicals. • Only organic, chloride free and environmentally friendly fertilizers will be applied. • O&M will obtain relevant permits to transport and dispose any hazardous waste from operational processes. • Regular environmental monitoring will be carried out by the Project Company's and O&M Contractor's relevant HSSE staff. This line of monitoring will include (i) inspections to ensure the implementation of relevant safeguards in work procedures/ activities, and (ii) maintenance inspections and testing to ensure the structural integrity, mechanical integrity and overall operability of construction equipment and engineering controls for the prevention of accidental release of hazardous materials, and (iii) monitoring of ambient soil, water and air quality. • A Waste Management Plan, Hazardous Materials and Waste Management Plan, Occupational Health and Safety Plan, Spill Preparedness and Response Procedure integrating into a broader Emergency Preparedness and Response Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented.					

5.5.3 Decommissioning phase

Project decommissioning will entail the deconstruction of project facilities, demobilization of related equipment and materials, as well as potential repurposing and/or rehabilitation works. At this stage, potential impacts on resident soils, groundwater and surface water will be similar to the above-described construction-phase impacts. Specifically, this set of impacts potentially includes:

- Soil erosion and associated sedimentation
- Pluvial flooding
- Contamination of resident soil, groundwater and surface water

For the avoidance and mitigation of these impacts, relevant impact management measures specified in Section 5.5.1 will be implemented. Accordingly, the same pre-management and residual significance ratings are provisionally assigned to mutually relevant impacts on soils and water resources.

5.6 Monitoring Requirements

Table 5-11 provides an overview of the key monitoring arrangements for evaluating performance against applicable standards relating to geology, soils, groundwater and surface water, in the Project's construction and operational phases. A more elaborate and comprehensive coverage of these requirements will be provided in the Construction- and Operations-phase Environmental and Social Management Plans (C-ESMP, O-ESMP) and Environmental and Social Monitoring Plans (ESMoPs).

Table 5-11 Monitoring arrangements for impacts and preventative and mitigation measures relating to geology, soils, groundwater and surface water

E&S Impact	Key Performance Indicator/ Parameter	Targets and Standards	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
Soil erosion and associated sedimentation	Gully erosion	- No evidence of gully erosion (i.e., observations or community grievances)	- All construction zones on steep slopes	Daily during wet season	- EPC Contractor Environmental Officer
	Grievances concerning siltation within third party drainage channels and ponds	- All related grievances are closed out within the shortest practicable duration	- Community Grievance Log	Ongoing	- EPC Contractor CLOs
Pluvial flooding	Grievances concerning flooding	- All related grievances are closed out within the shortest practicable duration	- Community Grievance Log	Ongoing	- EPC Contractor CLOs
Contamination of resident soil, groundwater and surface water	Percentage of chemical spills investigated and addressed through remedial and preventative actions within the shortest practicable duration	- 100% of chemical spills investigated and addressed through remedial and preventative actions within the shortest practicable duration	- Chemical and waste storage areas	Daily	- EPC Contractor Environmental Officer
	Soil and groundwater quality	- Uzbekistan Ecological Guidelines – Maximum Allowable Concentrations of Pollutants in Surface Water Bodies - SanPiN No.0191-05 - ESIA-stage groundwater quality baseline results	- Soil and groundwater sampling locations targeted for ESIA baseline survey	Upon the occurrence of a spill exceeding 25 Litres	- EPC Contractor Environmental Officer

E&S Impact	Key Performance Indicator/ Parameter	targets and standards	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
Operations Phase					
Contamination of resident soil, groundwater and surface water	Frequency of drills for spill response preparedness	- One annual drill for spill response preparedness has been delivered to relevant O&M workers	- HSSE Training report	Annually	- O&M Contractor HSSE Trainer - O&M Contractor Environmental/HSSE Officer
	Percentage of significant environmental incidents (i.e., a spill exceeding 25 Litres) investigated and addressed through remedial and preventative actions within the shortest practicable duration	- 100% of significant environmental incidents have been investigated and addressed through corrective (remedial and preventative) actions within the shortest practicable duration	- Environmental Incidents Log	Daily	- O&M Contractor Environmental/ HSSE Officer
	Soil and groundwater quality	- Uzbekistan Ecological Guidelines – Maximum Allowable Concentrations of Pollutants in Surface Water Bodies - SanPiN No.0191-05 - ESIA-stage groundwater quality baseline results	- Soil and groundwater sampling locations targeted for ESIA baseline survey - Environmental Monitoring Log	Upon the occurrence of a spill exceeding 25 Litres	- O&M Contractor Environmental/ HSSE Officer

6 SOLID WASTE AND WASTEWATER MANAGEMENT

6.1 Legal Requirements and standards

6.1.1 National laws and regulations

THE LAW OF THE REPUBLIC OF UZBEKISTAN "ON WASTES" (2002) AMENDED IN 2019

The principle objective of this law is to prevent the negative impacts of solid wastes on human lives and health as well as the environment, reduce waste generation and encourage rational use of waste reduction techniques.

Article 19 Provided generated waste is subject to export and import operations, or hazardous waste is subject to transportation, an environmental certification procedure shall be completed by the Project to confirm compliance with sanitary and environmental norms and standards associated with waste management.

Article 20 states that transportation of hazardous waste shall be in specially designated types of vehicles with a waste certificate and permit. The responsibility for safe transportation of hazardous waste shall be with the transporting organisation.

Article 22 of the Law on Wastes specifies the general requirements for waste storage and disposal. Waste disposal of recyclable waste is prohibited in Uzbekistan. In addition, storage and disposal of waste in the environment including in nature conservation and protected areas, settlements, health and recreational areas or historical and cultural facilities is prohibited.

SANPIN NO 0127-02 – "SANITARY PROCEDURES FOR INVENTORY, CLASSIFICATION, STORAGE AND DISPOSAL OF INDUSTRIAL WASTE"

This regulation and norm ensure optimal hygienic accounting and inventory of industrial wastes, determination of toxicity index and classification of industrial waste by hazard classes with optimal selection of ways to neutralise and utilise them.

SanPiN of the Republic of Uzbekistan dated 29/7/2002 No 0128-02 – "Hygienic classifier of toxic industrial wastes in the Republic of Uzbekistan. Hazardous waste is classified into four groups known as "hazard classes". Waste hazards are assessed based on this law. Hygienic classifier of industrial hazardous waste and SanPiN No 0127-02-Sanitary procedures for industrial waste inventory, classification, storage and disposal. Waste hazard classes include:

- Class I: Extremely hazardous waste;
- Class II: Highly hazardous waste;
- Class III: Moderately hazardous waste;

- Class IV: Low hazardous waste; and

Other relevant regulations and standards include:

OTHER RELEVANT REGULATIONS AND STANDARDS ARE LISTED BELOW AND THEIR REQUIREMENTS WILL BE INCORPORATED INTO THE ESIA ASSESSMENT:

- SanPiN № 0157-04 "Sanitary requirements to the storage and neutralization of solid domestic waste on special grounds in Uzbekistan"
- SanPiN of the Republic of Uzbekistan dated 16/11/2011 No 0300-11 "Sanitary Rules and Standards for managing collection, inventory, classification, treatment, storage and disposal of industrial waste in the context of Uzbekistan
- Regulation "On the Procedure for the Disposal, Collection, Pay Settlement, Storage and Removal of Waste Industrial Oils" annexed to the Decree of the Cabinet of Ministers dated 04/09/2012 No.258
- Regulation on the Procedure for Handling Coloured and Black Metal Scrap" annexed to the Decree of Cabinet of Ministers dated 06/06/2018 No. 425
- SanPiN No. 0158-04 - Sanitarian Rules and Norms on collection, transportation and disposal of wastes containing asbestos in Uzbekistan.

6.1.2 Lender requirements

6.1.2.1 EBRD

EBRD PR3 on Resource Efficiency and Pollution Prevention and Control establishes general requirements with regards to waste management as follows:

- The Project must strive to avoid the generation of hazardous and non-hazardous waste materials and reduce their harmfulness as far as practicable. Where waste generation cannot be avoided, the waste must be reused, recycled or recovered, or used it as a source of energy. Where waste cannot be recovered or reused, the waste must be treated and disposed of it in an environmentally sound manner;
- The Project must identify technically and financially feasible alternatives for the environmentally sound disposal of any hazardous waste considering the limitations applicable to trans boundary movement; and
- When waste disposal is transferred offsite and/or conducted by third parties, chain of custody documentation to the final destination must be obtained and only contractors that are reputable and legitimate enterprises licensed by the relevant regulatory agencies must be commissioned. The Project must ascertain whether licensed disposal sites are being operated to acceptable standards. Where this is not the case, alternative disposal options must be considered, including the possibility of the Project developing its own recovery and disposal facilities at the project site.

6.1.2.2 EPFIs

The World Bank General EHS Guidelines (2007) establish general requirements for direct or indirect discharge of wastewater from utility operations or storm water to the environment.

'Projects with the potential to generate process wastewater, sanitary (domestic) sewage, or storm water should incorporate the necessary precautions to avoid, minimize, and control adverse impacts to human health, safety, or the environment'.

However, wastewater effluent pollutant limits are only established for sanitary wastewater for discharge to the sanitary sewer systems. World Bank General EHS Guidelines (2007) (ref. Table 1.3.1 of IFC EHS Guidelines), provides indicative values for treated sanitary wastewater effluent.

6.2 Baseline Conditions

The current land-use within the project-affected districts of Yukorichirchik and Parkent include residential, commercial, industrial, and agricultural establishments. The Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC) was consulted with regard to the availability and capacity of various waste treatment facilities and service providers within the districts and the wider Tashkent region.

According to the Ministry, the state enterprise Toza Hudud no longer provides waste collection and transfer service within Yukorichirchik and Parkent District, and commercial waste management entities are contracted for the collection and treatment, recycling and/or disposal of industrial waste. The nearest available facilities for the treatment of residential waste from the Project's construction and operational phases include:

- Bulokboshi Landfill (2.95 ha) located in Yukorichirchik District
- Samsarak Landfill (3 ha) located in Parkent District
- Chotkal Landfill (10 ha) located in Maydontol

For the management of the Project's industrial and hazardous waste streams, the Ministry recommended the following existing engineered landfills:

- Tuzel Landfill located in Kibray District
- Yegizbulok Landfill (dedicated to hazardous waste) located in Forish District of Jizzakh Region

In addition, the Ministry noted the absence of any wastewater treatment plants within the project-affected districts. Nevertheless, the existing wastewater treatment plants in Tashkent Region, which are utilized by the municipal contractor Toza Hudud will be utilized during the Project's construction and operational phases. These facilities include:

- Southern Wastewater Treatment Plant (WWTP).
- Chirchik WWTP.

- Angren WWP.
- Almalyk WWTP.
- Bekabad WWTP.

6.3 Receptors

The following table provides an overview of E&S impact receptors in the context of potential air quality impacts within the Project's Areas of Influence (AoI). A sensitivity rating and corresponding description is further provided for each relevant receptor.

Table 6-1 E&S impact receptors – Solid waste and wastewater

RECEPTOR	SENSITIVITY	JUSTIFICATION
Municipal and commercial waste management contractors within the project-affected districts and region	High	Existing waste management facilities with Yukorichirchik District, Parkent District and the wider Tashkent region have a potentially high sensitivity to an overwhelming cumulative demand for services, due to the limited availability and capacity of these facilities.

6.4 Potential Impacts and Impact Management Measures

6.4.1 Construction phase

6.4.1.1 Solid waste

During the Project's construction stage, waste will be generated from earthworks, civil works, electro-mechanical works, electrical installations, among other activities.

Typical construction wastes include concrete, asphalt, scrap metal, glass, plastic, wood, packaging materials, excess cables, and domestic waste from construction workers. Concrete may be found in two forms on the construction site; structural elements containing reinforced concrete, and non-reinforced concrete found in foundations (such as surface level concrete slabs).

Solid waste generated from construction activities on the project sites will include the following:

Non-hazardous waste such as;

- Waste related to construction processes, including earthworks (such as rubble, soils and potentially rock), installation (such as bolts, rebars, etc);
- Paper/cardboard, plastics, packaging, plastic bottles, glass, scrap metal, excess fill materials, sand, gravel, excess construction materials, concrete, subsoil and rock (not contaminated)

- Domestic waste generated by the construction workforce (e.g. food/organic waste, paper trash, cardboard, aluminium, plastic)

Hazardous waste such as;

- Batteries (unused), chemical drums, aerosol cans, contaminated metals, empty containers, expired and unused chemicals, adhesives, machinery lubricants, clean-up materials such as rags, containers and tins with remains of hazardous substances, used spill kits and clean-up materials.
- Replacement parts from vehicles, plant and equipment such as tyres.
- Residual materials from electrical equipment installation such as Waste Electrical Equipment (WEE)

A substantial amount of waste will be generated in the Project's construction phase. Inappropriate handling, storage, transport and/or disposal of solid waste streams during construction poses the potential for pollution of the surrounding environment (i.e. soil and groundwater resources), odour and visual nuisances, pest infestation and related occupational health and safety risks.

Given that the construction of the BESS will involve the assembly of prefabricated components, the amount of solid waste that will be generated on the BESS site will be lower. However, Inappropriate handling, storage, transport and/or disposal of these solid wastes might also pose the potential for pollution of the surrounding environment.

Note: Maintenance of construction machinery and vehicles will not be carried out within the project sites, as such the generation of associated vehicle related waste such as oil filters, spent filtration cartridges, machinery lubricants is not expected.

NON-HAZARDOUS SOLID WASTE

Non-hazardous construction waste is typically inert and does not pose a threat to human health or the environment. However, proper management is required in order to reduce associated secondary impacts such as unnecessary resource use, dust emissions, etc. Non-hazardous waste generated by the Project will be collected by a licensed waste contractor and transported to a licensed waste management facility.

HAZARDOUS SOLID WASTE

Due to the nature of the project and the construction works being undertaken, there will be a few hazardous materials used. Such materials potentially include oily residues, paints, paint cans, wastes from chemical cleaning products and containers used for the storage of these materials.

Although the hazardous fraction of construction waste is expected to represent a relatively small portion of the total amount of construction waste likely to be generated, its management requires careful consideration as the impacts associated with hazardous

waste can potentially result in contamination to soils and potentially groundwater, as assessed in Section 0 of this Report.

Inappropriate management, storage, handling, transfer or transportation of waste and the lack of personnel training on site may lead to accidental spills or leaks to the soil or groundwater resulting in environmental impacts and potential health risk to workers. Contamination events may also arise as a result of transportation by unlicensed waste contractors or disposal to unlicensed/unauthorised landfills. Waste management strategy and planning is therefore critical in order to minimise potential significant effects on sensitive receptors such as soil and groundwater.

There are no licensed hazardous waste disposal facilities currently available in Tashkent Region. Therefore, waste generated by the Project will most likely be transported by road vehicles to a licensed hazardous waste facility outside the region. Therefore, it will be particularly important to properly store the waste in designated and secured hazardous waste storage areas at the site until collection to final disposal. These areas will include bunds to contain spillages, secure fencing to control access, proper safety signage, a roof structure to prevent rainwater entering etc.

In addition, the EPC Contractor will be required to coordinate with the local government to identify licensed waste disposal sites and licensed waste collectors.

Solid waste streams likely to be associated with the construction phase of the project are listed in the table below.

Table 6-2 Anticipated Solid Waste Types Associated with the Construction Phase

TYPE	WASTE STREAM
Inert	Subsoil and rock
	Glass
Non-Hazardous	Concrete and cement
	Asphalt
	Scrap metal
	Wood
	Plastic
	Packaging
	Domestic waste from construction workers
Hazardous	Contaminated soil/asphalt
	Resins and paints
	Waste oils
	Waste solvents and thinners
	Waste fuel and chemicals.
	Batteries

Type	Waste Stream
	Used spill kits and clean up materials.
	Waste Electrical Equipment (WEE)

6.4.1.2 Liquid Waste/Wastewater

Wastewater generated from the Project's construction activities will include the following:

- Sanitary and domestic wastewater generation;
- Wastewater from any vehicles or equipment washing/cleaning
- Liquid hazardous waste such as fuels, chemicals, paints, lubricants, solvents, waste oil, hydraulic fluid, resins, waste solvents and thinners, etc.; and.
- Concrete washout, in the event that a concrete batching plant is installed at the BESS site.

For sanitary and domestic wastewater, it is anticipated that there will be a significant number of workers at the peak period of construction. The total amount of sanitary and domestic wastewater during construction will total about 169,000 litres. Improper handling, storage and transportation of sanitary and domestic wastewater could potentially cause contamination to soil or groundwater resources as assessed in Section 0 of this Report.

A number of municipal and commercial waste management contractors will be engaged for the collection, transportation and disposal of wastes generated at the site. At this stage, the licensed facilities where solid and liquid waste will be disposed of by licensed contractor during construction has not yet been determined. This will be determined by the EPC Contractor prior to commencement of construction activities.

6.4.2 Operational Phase

The Project's operational phase will result in the production of few waste streams from O&M activities, with the vast majority of these streams being non-hazardous. Nevertheless, if these waste streams are not managed and disposed of effectively they could result in significant impacts upon the surrounding environment (i.e. soil and groundwater resources).

6.4.2.1 Solid Waste

Solid waste is not expected to be generated in significant quantities during the Project's operational phase, besides maintenance for transformers, and general day-to-day maintenance activities of administration facilities.

NON-HAZARDOUS SOLID WASTE

The operation of the proposed Project will generate small amounts of non-hazardous domestic waste from the operation of the administration facilities and from activities of the employees.

This waste can be classified as both recyclable and non-recyclable. Recyclable waste includes paper, tin cans, plastics, cartons, rubber, and glass, while non-recyclables will consist mainly of food residues and other organic wastes. The quantity of domestic waste will be small given the few anticipated personnel required to operate the BESS and PV plant facilities. Other solid non-hazardous waste generated during operation will be landscaping waste and uncontaminated replacement parts and packaging. Replacement of electric and electronic components (i.e., defective solar modules, exhausted BESS batteries) in the event of major failure. However, such components are expected to be given to the relevant suppliers for repair and recycling.

The type of non-hazardous solid waste that will be generated by O&M personnel include packaging waste (plastics, cardboard) and domestic wastes mainly food residues and other organic wastes.

HAZARDOUS SOLID WASTE

This fraction of the waste streams can potentially cause significant adverse impacts on human health and the environment if inadequately managed. However, only very small quantities of hazardous materials (and waste) are expected during the operational phase of the Project.

Examples of possible hazardous waste streams that may arise during the operation of the Project include the following:

- Used chemical containers and drums;
- Soil contaminated by potential spills and leaks of hazardous materials/liquids and used spill kits and clean up materials;
- Miscellaneous wastes such as waste cables, oily rags, etc.;
- General clean-up materials and solvents from general maintenance of on-site plant and machinery and;
- Electrical waste (defective and exhausted PV modules, battery units, fuses etc.,)

Inappropriate handling of hazardous waste streams through lack of personnel training on site may lead to accidental release of hazardous waste contaminating soil or groundwater. Contamination may also arise as a result of poor-quality waste transporters and waste management facilities, or lacking capacity of these services locally. These risks may consequently result in illicit waste disposals (e.g. fly-tipping, or waste disposal at unlicensed locations), or the engagement of unlicensed contractors/facilities.

6.4.2.2 Liquid Waste/ Wastewater

Liquid waste generated from O&M activities within the PV plant and BESS sites will include the following:

- Sanitary and domestic wastewater generation from O&M staff offices.
- Oily water (to collect spills/leaks from transformer areas) will be generated in very small quantities; and
- Liquid hazardous waste (if any) such as fuels, chemicals, paints, lubricants, solvents, waste oil, hydraulic fluid, resins, waste solvents and thinners, etc.

Sanitary and domestic wastewater will be generated directly from site toilets and kitchen facilities. All sanitary streams will be directed to the septic tank for collection and disposal by a licensed contractor.

Any oily wastes from the transformer area, or other floor drains in oily areas, will collect oily water in a sump and will be treated in an oil separator for settlement of solids. The residual oil and solids will be collected for recycling and/or disposal by a licensed contractor.

The improper handling, transport and disposal of hazardous wastes could lead to potential localised contamination of soil and groundwater resources, which have been assessed for significance in Section 0 of this Report.

6.4.3 Decommissioning phase

The Project's decommissioning activities are likely to generate inert demolition waste and materials such as steel reinforced bars, broken concrete, cabling, transformer oils etc. to contaminate soils.

Prior to decommissioning, it is expected that all oils will be drained. This will minimize the risk for accidental spills and leaks during removal from equipment from the site. As transformer oil and other oils are classified as hazardous liquid waste and will therefore be collected for recycling and/or disposal by a licensed contractor.

The decommissioning of the PV plant and BESS provides significant opportunity for resource efficiency and material re-use/recycling. All demolition work will be carried out with reference to IFC EHS Guidelines 1.6 Waste Management, IFC EHS Guidelines 1.5 Hazardous Materials Management, IFC PS3 on Resource Efficiency and Pollution Prevention and EBRD PR3 on Resource Efficiency and Pollution Prevention and Control.

The O&M Contractor will be engaged in the management of recyclable and re-usable operational and decommissioning waste, using specialized internal and/or third-party facilities. Any local waste management facilities appropriate for the recycling of such waste will be prioritized. Where capacity for the re-use and recycling of operational and

decommissioning waste (and electronic refuse) in particular is not available, waste management facilities designated by local authorities will be utilized whilst ensuring that hazardous waste is disposed solely within facilities specialized (engineered) for this waste stream.

6.5 Mitigation and Management Measures

6.5.1 Waste Characterization

Waste can exhibit certain characteristics according to the process stream from which it is generated and any pre-treatment processes that are undertaken. Different types of waste require different management and disposal techniques according to the potential risk that the material poses to human health or the environment. For this Project, waste has been classified into three (3) main categories below.

Table 6-3 Waste Characterization

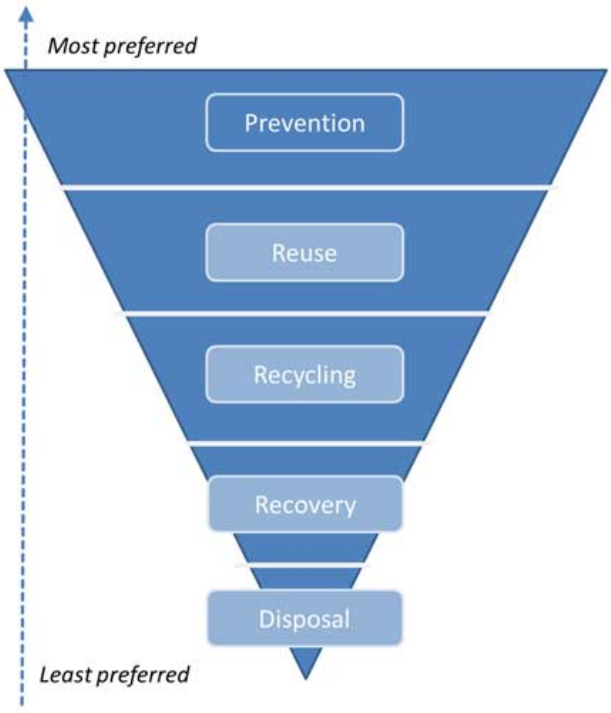
WASTE CLASSIFICATION	DESCRIPTION
Domestic Waste	Household, commercial, agricultural, governmental, industrial and institutional wastes, which have chemical and physical characteristics similar to those of household such as garbage, paper, cardboard, plastic, cans, etc. Disposal of such waste can generally be routed to municipal recycling or disposal facilities
Industrial Waste	Non-hazardous wastes that have physical and chemical characteristics that are different from domestic wastes such as construction waste, glass, scrap metal, wood, used containers, tyres etc. This waste generally poses little risk to the environment and can be disposed to normal municipal facilities after waste minimisation options are exhausted and before obtaining approval
Hazardous Waste	Waste is classified as being hazardous because of its concentration; physical, chemical or infectious characteristics, which may pose a present or potential threat to human health or the environment and/or may cause an increase in serious irreversible or incapacitating reversible illness or contribute to an increase in mortality. Under DM guidelines and the Basel Convention, hazardous waste is as any waste (i.e. solid, liquid or gaseous) having the following properties: Explosive; Radioactive (which includes NORM (LSA) scale); Ignitable or flammable substances; Poisons with acute and chronic (delayed) toxicity; or Substances that by interaction with water might become spontaneously flammable or give off flammable gases. Hazardous waste must be segregated, stored, transported and ultimately treated and disposed of by an approved waste services provider.

6.5.2 Waste Management Hierarchy

The waste hierarchy illustrates good practice for waste management considerations by ensuring consideration of the most sustainable available application for waste management in preference of disposal and eventual contribution to adverse environmental and

economic impacts associated with landfill. The hierarchy as illustrated below should form a key element of any waste management strategy and if implemented effectively will achieve maximum reductions on waste quantities combined with the limited use of resources and fill space. The waste management hierarchy also has the potential to reduce costs that may be incurred by the main contractor or the proponent for handling, transportation and the disposal of waste.

Figure 6-1 Waste Hierarchy



Source: *United Nations Environment Programme*

Initially, options to prevent or reduce waste should be considered. Where waste generation cannot be avoided or further reduced at source, opportunities for reuse of materials should be explored, either for use for the same or a different purpose. Disposal to landfill is the least favoured option in the waste hierarchy and is the last resort after all other options have been considered.

Such an approach is also used in other areas of the world. US-EPA's Waste Minimisation Program presents the following objectives:

- Complete elimination of, or substitution for priority chemicals, wherever possible;
- Minimising the number of priority chemicals used whenever elimination or substitution is not possible;
- Maximising recycling whenever elimination, substitution, or minimisation is not possible, creating closed-loop materials management systems that eliminate or constrict release pathways;
- Promoting cradle-to-cradle waste management instead of cradle-to-grave waste management

6.5.3 Construction Phase

Table 6-4 Waste & Wastewater Mitigation and Management Measures - Construction

IMPACT/SOURCE	MITIGATION AND MANAGEMENT MEASURES
Inappropriate handling, storage, transport and disposal of solid non-hazardous waste	• The project will develop and implement a Project specific Construction Waste Management Plan (CWMP) in line with committed mitigation measures in this ESIA report and the provisions of the CESMP. • Domestic solid wastes to be segregated and identified from the other waste streams into separate waste containers/skips clearly to facilitate recycling and reuse. • Waste containers/skips will be clearly labeled and placed in designated waste storage locations. Labels will be waterproof, securely attached, and written in English and other languages (such as Uzbek and Russian) as required for the workforce. • For litter (food waste, domestic waste), an adequate number of covered bins will be strategically placed throughout the site at locations where construction workers and staff consume food. These will be regularly collected and taken to the main waste storage area. • Food waste must be stored within a sealed metal or plastic skip or bin, in order to prevent pests gaining access. • On-going housekeeping training will be provided to all staff on the importance of the need to avoid littering. • Heavy waste may be contained within an open skip, provided that segregation occurs effectively enough to remove all lightweight material that could be blown away. • Waste generated during construction will be recycled and reused until reduced to as low as practicable prior to collection for disposal by an appropriately licensed waste contractor. • Only licensed waste transporters and waste management facilities will be engaged. • Develop and maintain a waste inventory to document and track domestic solid wastes generated, segregated, reused and consignments • Completed waste manifests are required to show the chain of custody of the waste generated on site, its transportation and treatment/disposal. All records will be maintained on site. • Mandatory training program for employees to increase their awareness of waste management protocols including proper handling and storage of waste, recycling waste, reusing plastics, rebar, wood & other reusable non-hazardous materials. • EPC Contractor will identify recycling companies in Tashkent Region and nearby regions (as relevant) in order to promote the recycling of waste especially packaging materials, wood and metal waste etc. • Engineered landfills will be used for all hazardous waste generated during construction and used for the disposal of non-recyclable general waste on a priority basis.
Inappropriate/uncontrolled handling, storage, transport and/or disposal of solid hazardous waste	• Develop and maintain a hazardous waste inventory to document and track hazardous wastes generated, segregated, reused and consignments. • Segregate and identify hazardous waste from the other waste streams into separate signed and labeled waste containers/skips. • Store hazardous waste in allocated impervious hard standing areas in sealed containers stored with impermeable bases, sufficient containment and separation capacity, sun/rain shelter, separate drainage system, good ventilation and equipped with spill kits & spill

Impact/Source	Mitigation and Management Measures
	response procedures. This area must be placed away from any sources of ignition. • Hazardous waste storage area will be constructed away from drainage system and a rain shelter will be provided to avoid any potential instance of runoff, or leakage of runoff. • Waste containers will be clearly marked with appropriate warning labels to accurately describe their contents and detailed safety precautions. Labels will be waterproof, securely attached, and written in English and other languages as required for the workforce (such as Uzbek and Russian). Wherever possible, chemicals will be kept in their original container. • Hazardous waste storage areas will be located away from any ignition sources or fire hazards. • Used face masks will be stored in designated bins and disposed of as medical waste. • A Hazardous Materials and Waste Management Plan will be developed and implemented for the Project's construction phase. The Plan will include arrangements and provisions (i.e., storage area/capacity, frequency of collection, distance of nearest disposal facilities) for various streams of waste, in consideration of the location of their respective management/ disposal facilities.
Inappropriate/uncontrolled handling, storage, transport and/or disposal of sanitary wastewater	• Contractor to develop and implement a Project Specific Construction Waste Management Plan (CWMP) in accordance with committed mitigations measures in this ESIA report and provisions of the CESMP. • Develop and maintain a hazardous waste inventory to document and track sanitary waste generated and segregated. • Sanitary wastewater tanks will be placed in allocated impervious hard standing areas with bonding capacity to hold 110% volume of the maximum volume stored. • Sanitary wastewater tanks to be properly maintained and inspected to ensure tanks do not overflow. • Site inspections will be carried out regularly by the EPC contractor to ensure that all wastewater generated is properly managed, and no leakages or spill occur. In the event of a spill or overflow, immediate action will be taken in accordance with spill containment procedures and clean up procedures (to be developed in line with the CESMP). • Engage a licensed waste contractor for the periodic removal of septic tanks. • In common with the IFC EHS Guidelines, effort will be made in training construction personnel to minimize water consumption for ablutions and to ensure an understanding of water resource and wastewater issues.
Inappropriate handling and disposal of contaminated soil from clearing and excavation works causing cross-contamination of soils	• In-situ testing of soil to ensure it is not contaminated and can be re-used or disposed into land. • Training –Contractor staff to be able to identify signs of potential contamination (smell of hydrocarbons, staining). • If contamination is found, develop and implement a Contaminated Soil Management Plan for appropriate handling, treatment and disposal of soil.
Inappropriate handling of concrete washout	• In case a concrete batching plant will be installed within the BESS construction site, concrete washout will only be undertaken in designated and signed areas to prevent leaks or spread of wastewater. • The concrete washout area will be constructed and maintained in

Impact/Source	Mitigation and Management Measures
	sufficient quantity and size to contain all liquid and concrete waste generated by washout operations. • The concrete washout area will have an impermeable surface with dedicated drainage systems that lead to separate sumps or treatment facility. • The removal of any sludge residues as solid hazardous waste will be undertaken by a licensed waste contractor and handled as a hazardous waste. • Concrete batching plants will not be installed on the PV plant site.
Medical Waste	• Any generated medical waste (i.e. form on-site clinics) will be stored in appropriate medical waste containers. • All medical waste will only be handled by trained personnel. • Removal of any medical waste from the site for appropriate treatment, disposal/incineration will only be conducted by a licensed contractor.

6.5.4 Operation Phase

Table 6-5 Waste & Wastewater Mitigation and Management Measures- Operations

Source	Mitigation and Management Measures
Inappropriate handling, storage, transport and disposal of non-hazardous solid waste	• Contractor to develop and implement a Project specific Operational Waste Management Plan (OWMP) in line with committed mitigation measures in this ESIA report and the provisions of the OESMP. • Domestic solid wastes to be segregated and identified from the other waste streams into separate waste containers/skips clearly to facilitate recycling. • Waste containers/skips will be clearly labeled and placed in designated waste storage locations. Labels will be waterproof, securely attached, and written in English and other languages as required for the workforce such as Uzbek and Russian. • For litter (food waste, domestic waste), an adequate number of covered bins will be strategically placed throughout the site at locations where construction workers and staff consume food. These will be regularly collected and taken to the main waste storage area. • Food waste must be stored within a sealed metal or plastic skip or bin, in order to prevent pests gaining access. • Heavy waste may be contained within an open skip, provided that segregation occurs effectively enough to remove all lightweight material that could be blown away. • Paper cardboard, metal cans, plastic, glass to be collected for recycling by a licensed waste contractor. • Only licensed waste transporters and waste management facilities will be engaged. • The Contractor will maintain copies of the waste management licensed on site. • Develop and maintain a waste inventory to document and track domestic solid wastes generated, segregated, reused and consignments • Completed waste manifests are required to show the chain of custody of the waste generated on site, its transportation and treatment/disposal. All records will be maintained on site. • Engineered landfills will be used for all hazardous waste generated during construction and used for the disposal of non-recyclable general waste

Source	Mitigation and Management Measures
	on a priority basis.
Inappropriate/uncontrolled handling, storage, transport and/or disposal of sanitary wastewater	• Sanitary facilities will be provided with adequately designed underground storage tanks. • Sanitary wastewater tanks to be properly maintained and inspected to ensure tanks do not overflow. • Sanitary wastewater tanks in allocated impervious hard standing areas with bunding capacity of 110% volume of the maximum volume stored. • Sanitary wastewater treated at the onsite sewage treatment plant must meet established limit for landscaping. • Where there are no onsite sewage treatment plants/ septic ta, a licensed waste contractor will be engaged for the periodic removal of tank.
Inappropriate/uncontrolled handling, storage, transport and/or disposal of solid hazardous waste	• Develop and maintain a hazardous waste inventory to document and track hazardous wastes generated, segregated, reused and consignments. • Segregate and identify hazardous waste from the other waste streams into separate waste containers/skips clearly signed and labelled. • Store hazardous waste in allocated impervious hard standing areas in sealed containers stored with impermeable bases, sufficient containment and separation capacity, sun/rain shelter, separate drainage system, good ventilation and equipped with spill kits & spill response procedures. This area must be placed away from any sources of ignition. • Waste containers will be clearly marked with appropriate warning labels to accurately describe their contents and detailed safety precautions. Labels will be waterproof, securely attached, and written in English and other languages as required by the workforce such Uzbek & Russian. Wherever possible, chemicals will be kept in their original container. • Used face masks will be stored in designated bins and disposed of as medical waste. • A Hazardous Materials and Waste Management Plan will be developed and implemented for the Project's construction phase. The Plan will include arrangements and provisions (i.e., storage area/capacity, frequency of collection, distance of nearest disposal facilities) for various streams of waste, in consideration of the location of their respective management/ disposal facilities.

6.6 Monitoring

Table 6-6 provides an overview of the key monitoring arrangements for evaluating performance against applicable standards relating to geology, soils, groundwater and surface water, in the Project's construction and operational phases. A more elaborate and comprehensive coverage of these requirements will be provided in the Construction- and Operations-phase Environmental and Social Management Plans (C-ESMP, O-ESMP) and Environmental and Social Monitoring Plans (ESMoPs).

Table 6-6 Monitoring arrangements for impacts and preventative and mitigation measures relating to the management of waste (including wastewater)

E&S Impact	Key Performance Indicator/ Parameter	Target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
Contamination of resident soil, groundwater, and surface water	All waste to be collected by contractors with valid licenses/permits	- No collection of waste by contractors without valid licenses/ permits	- Permit register - Waste transfer log	Prior to waste transfer/ export	- EPC Contractor Environmental Officer
	Inspection and monitoring of handling and storage of waste materials	- Inspection and monitoring of waste management according to CESMP/OESMP procedures	- Inspection log	Weekly	- EPC Contractor Environmental Officer
	Records for waste transfers	- Consistent record keeping of waste transfer notes	- Waste transfer log	Monthly	- EPC Contractor Environmental Officer

7 TERRESTRIAL ECOLOGY

7.1 Legal Requirements and Standards

7.1.1 National laws and regulations

THE LAW OF THE REPUBLIC OF UZBEKISTAN "ON NATURE PROTECTION" (1992) AS AMENDED IN 2021

This law is the key national environmental law for the protection of the environment and the sustainable use of resources and the right for the population to a clean healthy environment. This law states legal, economic, and organisational basis for the conservation of the environment and the rational use of natural resources. Article 25 of this law states that the State Environmental Expertise (SEE) is a mandatory measure for environmental protection, preceded to decision making process. In addition, the law prohibits the implementation of any Project without approval from SEE.

THE LAW OF THE REPUBLIC OF UZBEKISTAN "ON PROTECTED NATURAL RESERVES" (2004) AS AMENDED IN 2020

This law regulates the use and protection of protected natural territories. The main aim is to ensure preservation of typical, unique, genetic banks of plants and animals, prevent negative impact of human activities on nature, promote the study of natural processes and monitoring of the environment including promotion of environmental education.

THE LAW OF THE REPUBLIC OF UZBEKISTAN "ON PROTECTION AND USE OF THE WILDLIFE" (1997) AS AMENDED IN 2016

This law regulates the use, protection, reproduction and restoration of wildlife in order to promote conservation and ensure diversity of species in their natural habitat.

Other laws and regulations include:

- The Law of the Republic of Uzbekistan "On Protection and Use of Vegetation" (1997) as amended in 2021.
- Decree of the Cabinet of Ministers "Regulation on the procedure for using plant world objects and passing licensing procedures in the field of using plant world objects" No. 290 of 10.10.2014 as amended in 2020. The law sets out the requirements to obtain permission to cut wood and shrub plantations that are in the zone of the construction site.

DECREE OF THE PRESIDENT OF THE REPUBLIC OF UZBEKISTAN, DATED DECEMBER 30, 2021, NO. UP-46 ON MEASURES TO ACCELERATE GREENING WORKS AND FURTHER EFFECTIVE ORGANIZATION OF TREE PROTECTION IN THE REPUBLIC

The Decree prohibits the following:

- Acceptance of applications for tree cutting through tcenters of state services and the Unified Portal of Interactive Government Services.
- Issuance of conclusions on tree and shrub cutting by territorial environmental protection authorities.
- Issuance of permits by district and city administrations for the cutting of trees and shrubs not included in the state forest fund, for which a moratorium has been introduced.
- Pruning and cutting of trees and shrubs damaged by natural factors, plant diseases, and those posing a threat to human life and health, according to the document, can only be carried out by the landscaping authorities.

Where trees not included in the forest fund have to be cleared for development and construction purposes, compensatory replanting must be carried out at a ratio of 10 young trees for one tree cut.

7.1.2 Lender Requirements

EBRD

EBRD PR6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources establishes general requirements for the conservation of biodiversity and sustainable management of living natural resources covering aspects such as the assessment of issues and impacts relating to biodiversity.

Where applicable, the Project will intend to follow the targets set out by the EU Biodiversity Strategy including the Habitats Directive 92/43/EEC, the Birds Directive 2009/147/EC and the EU Regulation 1143/2014 on Invasive Alien Species. It is noted however that the targets are unlikely to be triggered by the Project due to the nature and scale of the Project and the existing ecological conditions within the Project site (primarily modified habitat due to farming and groundwater exploitation).

EPFIs

The assessment of impacts upon terrestrial ecology is required to meet the requirements set out in the IFC Performance Standard 6 on Biodiversity Conservation and Sustainable Natural Resource Management. The IFCPS6 establishes requirements for protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources.

7.2 Critical Habitat

The concept of Critical Habitat is widely utilized and the principles for protection of critical habitat widely applied by DFIs. A specific screening and assessment process is undertaken to identify if any CH criteria are triggered by the project. This requires scoping to assess potential

species candidates for triggering CH, and subsequently using information obtained from surveys, secondary sources, and stakeholders to extrapolate a population estimate for the individual species/species group's "Ecologically Appropriate Area of Analysis" which may in many cases be overlapping but not 100% aligned with a project impacts' Area of Influence. If any extrapolated population estimates (extrapolated from existing information across the qualified EAAA) meet the appropriate CH thresholds, then CH will have been triggered.

There are several international lending organizations that have produced varying criterion for which critical habitat is defined by; however, they are generally aligned with the EBRD PR6 criterion. The below provides an overview of all applicable criteria as per EBRD, IFC and ADB:

- EBRD PR6 Criterion(i): Highly threatened or unique ecosystems /// IFC PS6 Criterion 4: Highly Threatened or Unique Ecosystems
- EBRD PR6 Criterion (ii): Habitats of significant importance to endangered or critically endangered species /// IFC PS6 Criterion 1: Critically Endangered and Endangered Species /// ADB criterion "habitat required for the survival of critically endangered or endangered species";
- EBRD PR6 Criterion (iii) Habitats of significant importance to endemic or geographically restricted species and sub-species /// IFC PS6 Criterion 2: Endemic and Restricted-range Species /// ADB criterion "areas with special significance for endemic or restricted-range species";
- EBRD PR6 Criterion (iv) Habitats supporting globally significant concentrations of migratory or congregatory species /// IFC PS6 Criterion 3: Migratory and Congregatory Species /// ADB criteria "sites that are critical for the survival of migratory species" and "areas supporting globally significant concentrations or numbers of individuals of congregatory species";
- EBRD PR6 Criterion (v) Areas associated with key evolutionary processes /// IFC PS6 Criterion 5: Key Evolutionary Processes /// ADB criterion "areas with unique assemblages of species that are associated with key evolutionary processes or provide key ecosystem services";
- ADB criterion "areas with biodiversity that has significant social, cultural or economic importance to local communities"

Even if they do not meet any of the CH criteria, some sensitive ecological features of the study area that may be affected by the project may be considered "Priority Biodiversity Features," defined by EBRD as biodiversity features that are vulnerable, but not as sensitive as CH features. PBFs trigger a No Net Loss mitigation standard under EBRD PR6, and hence require careful consideration during project assessment and mitigation planning. Therefore, the scope of the present analysis was to identify not only any biodiversity features triggering criticality under any of the pertinent CH criteria, but also to identify all PBF potentially impacted by the Project as well.

EBRD have outlined the following criteria for the classification of PBF:

- PBF Criterion (i): Threatened habitats
- PBF Criterion (ii): Vulnerable species
- PBF Criterion (iii): Significant biodiversity features identified by a broad set of stakeholders or governments (such as KBA or IBA)
- PBF Criterion (iv): Ecological structure and functions needed to maintain the viability of priority biodiversity features.

The equivalence of PBFs in IFC P.S. 6 is termed Significant Biodiversity Values (SBVs) which are similarly, species of elevated concern but that do not trigger CH. SBVs, particularly any species listed as endangered or critically endangered, requires NNL. Further, IFC P.S. 6 requires the designation of habitats into Natural and Modified habitat typologies, for which Natural Habitat requires a No Net Loss residual impact.

It is important to note that No Net Loss does not translate to zero loss. The definition of No Net Loss for species and habitats should be taken on a spatially and temporally broad view, meaning that the regional population / ecosystem function is not diminished in any significant way in the long term even if there are individual losses / quantifiable habitat loss. Thus a regional population of a species achieving NNL may see incremental losses or gains but overall remains stable or in a similar dynamic as if the project did not exist. (For example if non-project impacts are causing population decline, this would not be counted against the NNL target of the project). Similarly a specific habitat typology may lose acreage from the project but if the overall ecosystem function and carrying capacity does not change and is able to retain the same biodiversity value as if the project did not exist, this can similarly be considered as NNL.

7.2.1 CH Criteria and Thresholds

Some of the CH criteria listed above have quantitative thresholds associated with them, defined in lender policy, while others can only be assessed using more qualitative evaluation of the criterion. In the present section, biodiversity features potentially affected by the Project are assessed against the quantitative thresholds associated with some of the CH criteria. The specific criteria and associated quantitative thresholds evaluated (where applicable) consist of the following:

Thresholds for EBRD CH Criterion i (Highly threatened or unique ecosystems) are the following:

a) EAAA that is ≥5% of global extent of an ecosystem type with IUCN status of Endangered (EN) or Critically Endangered (CR); and
b) EAAA that is an ecosystem determined to be of high priority for conservation by national or regional systematic conservation planning.

Thresholds for EBRD CH Criterion ii (Habitats of significant importance to endangered or critically endangered species) are the following:

a) Areas that support globally important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population AND ≥ 5 reproductive units of a CR or EN species);

b) Areas that support globally significant population of an IUCN Red-listed Vulnerable (VU) species, the loss of which would result in the change of the IUCN Red List status to EN or CR, meets the threshold (a) above; and

c) EAAA that contains important concentrations of a nationally or regionally listed EN or CR species.

Thresholds for EBRD CH Criterion iii (Habitats of significant importance to endemic or geographically restricted species and sub-species) is the following:

d) EAAA that regularly holds ≥ 10% of global population AND ≥ 10 reproductive units of a species.

Thresholds for Criterion iv (Habitats supporting globally significant concentrations of migratory or congregatory species) are the following:

e) EAAA that sustains, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population at any point of the species' lifecycle; and

f) EAAA that predictably supports ≥10 percent of global population during periods of environmental stress.

EBRD CH Criterion v (Areas associated with key evolutionary processes) does not have a set of associated quantitative thresholds. The qualitative (expert-based) basis for evaluating this criterion is the following:

g) Areas with landscape features that might be associated with particular evolutionary processes evolutionary processes or populations of species that are especially distinct and may be of special conservation concern given their distinct evolutionary history. For example:

- Isolated lakes or mountaintops
- Populations of species listed as priorities by the Edge of Existence Programme.

EBRD CH Criterion vi (Ecological functions that are vital to maintaining the viability of biodiversity features) also does not have a set of associated quantitative thresholds. The qualitative (expert-based) basis for evaluating this criterion is the following:

h) Ecological functions without which critical biodiversity features could not exist. For example:

- Riparian zones and rivers
- Dispersal or migration corridors
- Hydrological regimes
- Seasonal refuges or food sources
- Keystone or habitat-forming species

7.2.2 PBF Criteria and Thresholds

A biodiversity feature will be determined to be a PBF if the minimum thresholds of any single criterion are met. The below are as per EBRD PR 6 and associated Guidance Note 6.

Thresholds for PBF criterion i (Threatened habitats) are the following:

a) EAAA that is < 5% of the global extent of an ecosystem type with IUCN status of CR or EN

Thresholds for PBF criterion ii (Vulnerable species) are the following:

- EAAA that supports < 0.5% of global population OR < 5 reproductive units of a CR or EN species.
- EAAA supports a VU species
- EAAA that supports regularly occurring nationally or regionally listed EN or CR species
- EAAA that holds regularly occurring range-restricted species
- EAAA identified as recognized national or international process as important for migratory birds (esp. wetlands)

PBF Criterion iii and iv do not have quantitative thresholds. As per EBRD PR6 GN6, the assessment for these criteria must rely upon expert judgement.

7.2.3 Project CHA Recap

A CHA Screening exercise was undertaken to inform the Scoping process of the project. A number of species of concern were identified that warranted further investigation. Refer to the CHA Screening Table for a comprehensive database.

Subsequently, literature review, stakeholder engagement and analysis was undertaken culminating in the CHA Report. In particular, the following three species were investigated: Saker Falcon, European Turtle Dove, and all recorded bat species (microptera) to date.

- Saker Falcon is a migrant and winter visitor. Autumn surveys did not record any presence of Saker Falcon. It is considered unlikely that a minimum of 61 Saker Falcon individuals are regularly utilizing the site on an annual basis, thus CH is not triggered.
- European Turtle Dove – some evidence of breeding in forested pockets was observed during a rapid one-day visit. However, even if a breeding population exists, the global numbers of European Turtle Dove are staggering and it would not be possible for the area to support a significant enough population that would warrant uplisting from VU – hence, this species is also considered not triggering CH.
- All bats are LC and information that exists shows generally widespread distribution across the region. Although bats are considered highly important as they provide ecosystem services, it is not considered likely that any of these species would be congregating in large enough numbers to trigger CH. One species, the Bukhara Whiskered Bat, is potentially present, but the acoustic calls collected cannot be verified.

If CH is identified, this triggers the project to provide proof that a number of requirements are met, including a net impact of Net Gain for the affected species/habitats. As per the CHA Report for the project, the CH screening and assessment process identified potential species of concern, but ultimately found that no species triggers CH. However, some species have been deemed as "Priority Biodiversity Features", PBFs, (aka SBVs in IFC lingo) for which No Net Loss must be achieved. Impacts and mitigation for these receptors, as well as other ecological sensitive receptors, have been covered in the subsequent sections of the ESIA.

Baseline Conditions

The following sections and sub-sections provide an overview of the surveys undertaken to establish baseline terrestrial ecological conditions of the PV site.

7.3 Ecosystems, Habitats and Plant Communities

7.3.1 Survey Methodology

The field studies were conducted in 2023/06/01 for the PV site and at 2023/07/22 for the BESS site; and these were conducted with traditional methods of botanical survey commonly used for sampling and mapping of native non-forest vegetation, recognition of floristic composition and spatial patterns of plant communities (Field geobotany, 1959–1976; Granitov, 1980; Kent, 2011).

7.3.2 Results - Habitats

PV SITE

The following habitats and land covers/uses were identified throughout the PV site:

- Riparian scrub
- Natural riverine habitat and modified wetlands
- Fallow lands, wastelands, roadsides and boundary-strips
- Gardens and woodland belts
- Irrigation / Drainage Channels
- Buildings and roads

The following figure showcases the habitat map for the PV site.

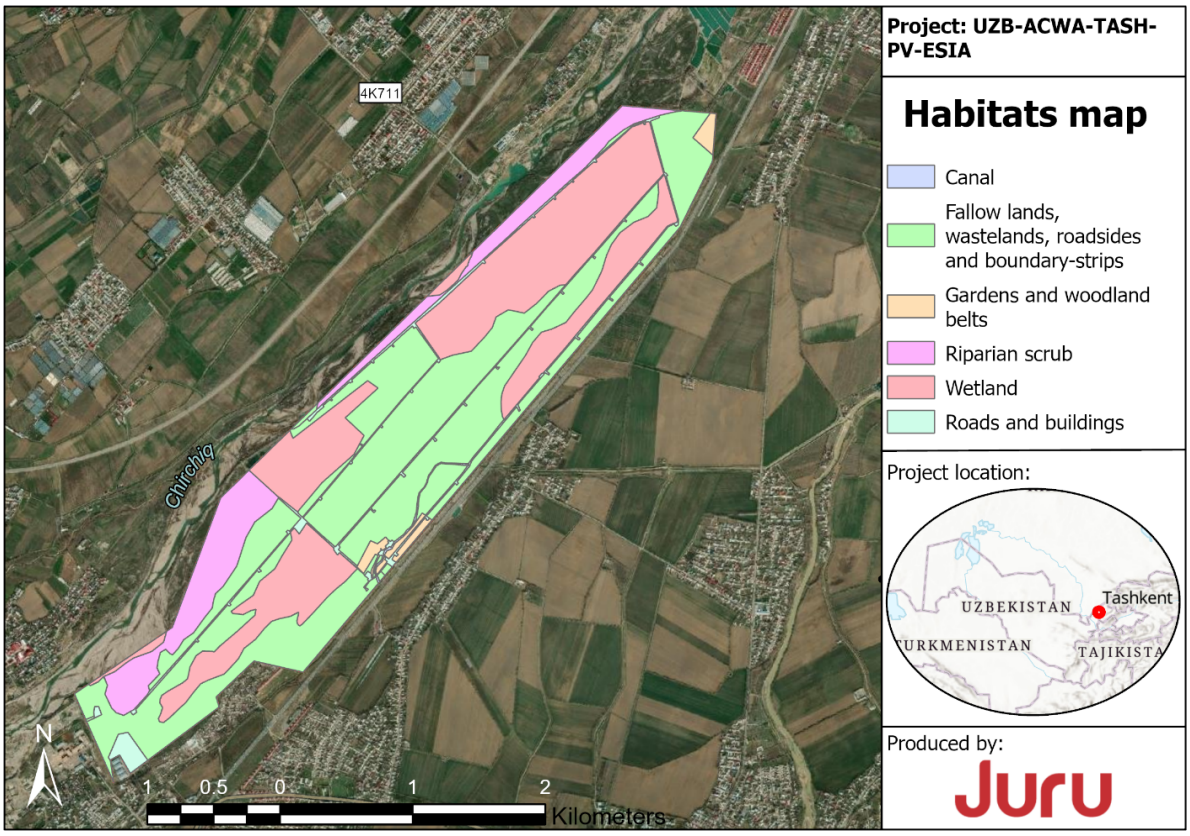


Figure 7-1 Habitat Map for PV Site

1.1.1.1 BESS Site

The following habitats were identified throughout the BESS site:

- Dry grassland
- Fallow land
- Gardens

The following figure showcases the habitat map for the BESS site (& underground cabling corridor).

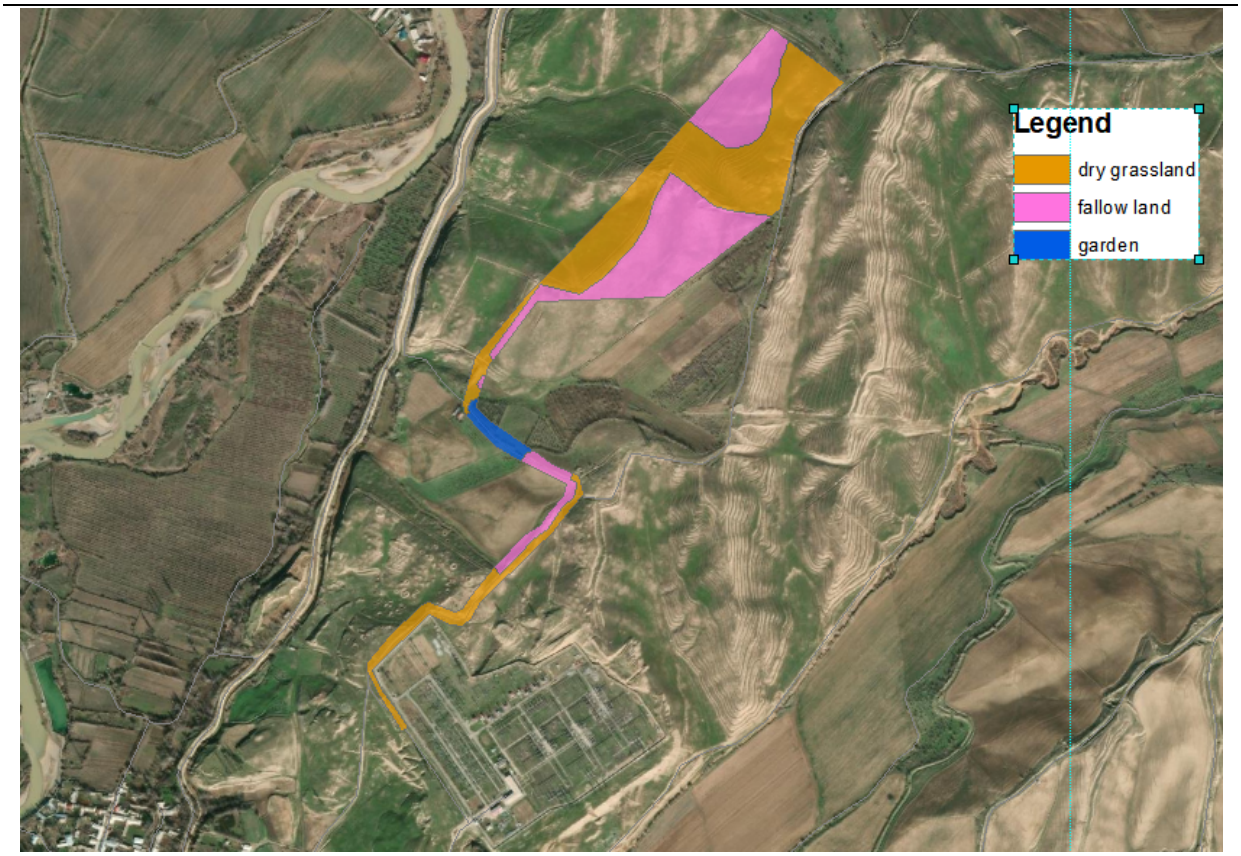


Figure 7-2 Habitat Map for BESS site

7.3.3 Flora

PV SITE

In total, 90 plant species of 27 families (77 native, 10 alien and 4 introduced agricultural crops or ornamental trees) were recorded during the field surveys.

There were no restricted-range endemics or threatened plants included in the IUCN Red List (CR, EN, VU categories) or Red Data Book of Uzbekistan found. Generally, the flora of the project area is composed with plant species more or less common and typical for river valleys and foothills of Uzbekistan.

BESS SITE

In total, 57 plant species of 17 families (47 native, 7 alien, and 3 introduced cultivated species) were recorded during the field surveys within BESS site and along the underground cable line.

One species is included in the national check-list of quarantine weeds and pests (*Rhaponticum (Acroptilon) repens*).

There were no restricted-range endemics or threatened plants included in the IUCN Red List (CR, EN, VU categories) or Red Data Book of Uzbekistan found. Generally, the flora of the

project area is composed with plant species more or less common and typical for foothills and rural areas of Uzbekistan.

ADDITIONAL INFORMATION

Additional botanical information and context was provided by engaging relevant stakeholders. A separate local botany specialist was engaged to assess the PV site's as part of a mandatory pre-construction Tree Inventory, which was led by experts from the Ministry of Ecology. The tree inventory and related habitat mapping confirmed that there were no species of elevated conservation concern.

7.3.4 Birds

REGIONAL CONTEXT

In order to analyse the potential impacts on avifauna, the spatial context around the project site was assessed including Important Bird Areas (IBAs).

IMPORTANT BIRD AREAS

A review of the Database on BirdLife.org shows that four Important Bird Areas are located within an estimated 100km radius the closest of which is 35km from the project in the montane habitat towards the east and the farthest of these is a large reservoir that lies 110 km to the west of the project site.

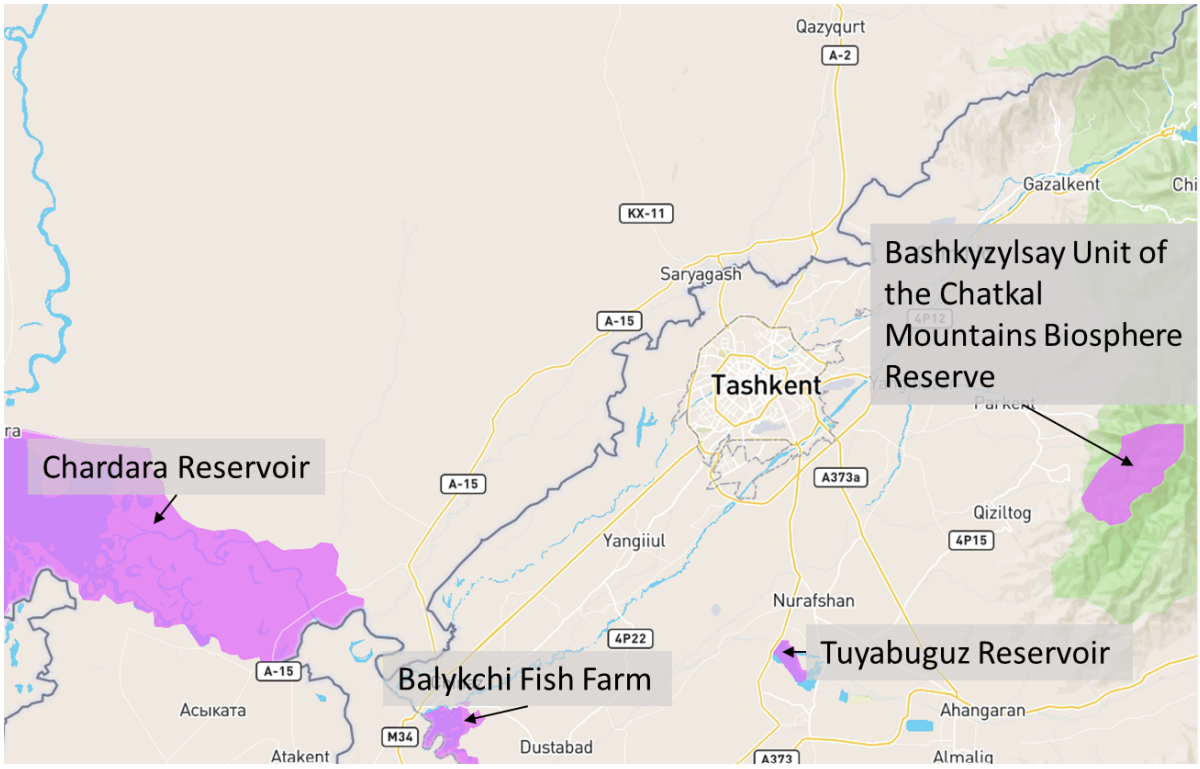


Figure 7-3 IBAs within 100km of the Project site

The BASHKYZYLSAY UNIT OF THE CHATKAL MOUNTAINS BIOSPHERE RESERVE IBA includes the following species that are part of the criterion triggers for the IBA:

- Saker Falcon (EN)
- Cinereous Vulture (NT)
- Water Pipit
- White-winged Grosbeak
- Sulphur-bellied Warbler
- Alpine Accentor
- Rufous-streaked Accentor
- Fire-fronted Serin
- Himalayan Snowcock
- Wallcreeper

The TUYABUGUZ RESERVOIR IBA includes the following species that are part of the criterion triggers for the IBA:

- Mallard
- Greylag Goose
- White Stork
- Pallas's Gull
- Great Cormorant
- Great Crested Grebe

BALYKCHI FISH FARM IBA includes the following species that are part of the criterion triggers for the IBA:

- Ferruginous Duck (NT)
- Grey Heron
- White Stork
- Black-headed Gull
- Pygmy Cormorant
- Great Cormorant
- Eurasian Spoonbill
- Great Crested Grebe

CHARDARA RESERVOIR IBA includes the following species that are part of the criterion triggers for the IBA:

- Dalmatian Pelican (VU)
- Common Teal
- Mallard
- Greylag Goose
- Tufted Duck
- Smew
- Goosander
- Pygmy Cormorant

MIGRATORY FLIGHT PATHS

The project site is also located within the convergence of two major migratory flyways; the Central Asian Flyway and the West Asian/East African Flyway.

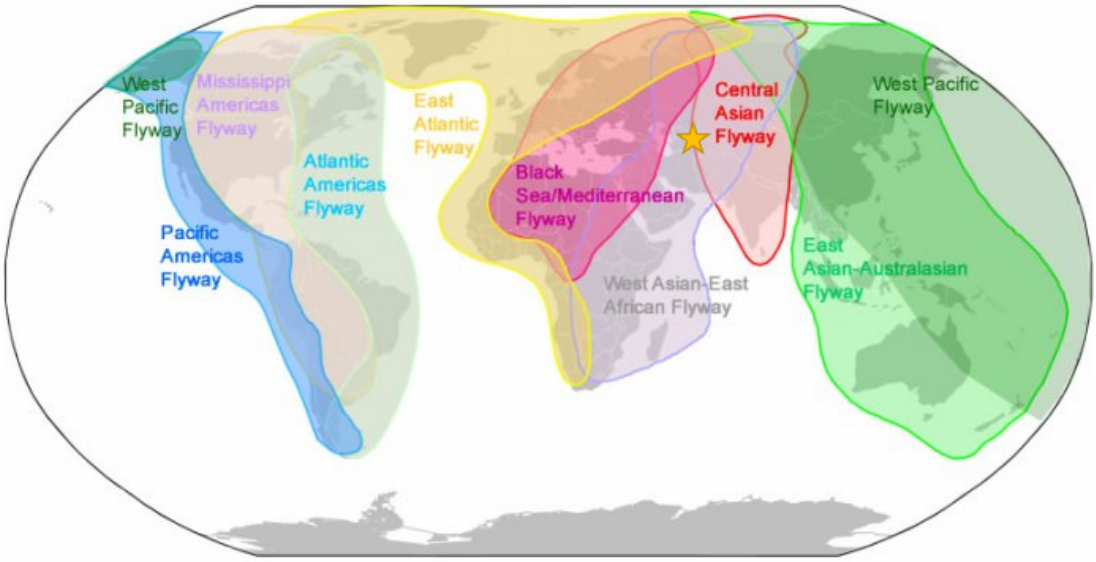


Figure 7-4 Project Location in Relation to Global Migratory Bird Flyways

Although prediction of bird migration is an imperfect science, it can be stated based on historical data as well as current understanding of migratory behaviour that there could be moderate migratory bird activity along the Chirchik river corridor.

ANTICIPATED SPECIES

Among the anticipated species, three species with an Endangered (EN) status in IUCN Red list could visit both sites during migrations: the Steppe Eagle, Saker Falcon, and Egyptian

Vulture. Three other VU species, the Common Pochard, Greater Spotted Eagle, and Eastern Imperial Eagle, are migrants, while one VU species, the Velvet Scoter, is a vagrant.

Within the territory of the PV, four ornithocomplexes are distinguished, each characterized by a specific composition of birds:

Synanthropic complex: The synanthropic complex, dominated by synanthropic species, is associated with the anthropogenic environment. It includes the Common Myna, Magpie, Indian Sparrow, Laughing Dove, Rock Pigeons, and others. These species are widely distributed across survey points and have successfully adapted to human-altered habitats.

Waterbirds: This complex is linked to aquatic habitats. Species such as the Little and Common Terns, Eurasian Oystercatcher, and Marsh Harrier have been observed. Many waders nest on the gravel banks of the Chirchik River. White Storks nest on various structures, Marsh Harriers in dense reeds, and Night Herons in trees.

Riparian (Tugai) complex: This complex is represented by birds inhabiting riparian tugai vegetation. Species include Common Pheasant, Turtle dove, Hobby, Common cuckoo, Carrion crows, Reed warblers. The pheasant, which is widespread in the area, is particularly abundant.

Steppe complex: includes species nesting in woody-shrub and grasslands. It encompasses the Roller, larks and other bird species.

Within the territory of the BESS, 2 ornithocomplexes are distinguished:

Synanthropic complex: This group includes Common Myna, Magpie, Indian sparrow, Laugthing dove and Rock pigeons and others. They nests in adjacent settlements.

Steppe complex: This group includes species nesting in grasslands. It encompasses the Crested Lark, Eurasian Skylark, Isabelline Wheatear. Other species as Common Swift, Barn Swallow and Red-rumped Swallow, European Bee-eater use this habitat for foraging.

The majority of the avifauna is likely to be present during migration movements rather than year-long residents. The site is positioned along the migration flyway for raptors, cranes, waders and ducks, which follows the Ugam and Chirchik rivers, as well as the western foothills of the Chatkal ridge.

The Tashkent area, particularly within the Chirchik river corridor, has been surveyed regularly by the Uzbek Society for the Protection of Birds. Regional experts involved in these surveys previously have been consulted to obtain clarity and context on the likelihood of specific species presence as well as guide the scoping of the bird surveying methodology. The resultant methods determined to be appropriate are outlined in the following segment.

SURVEY METHODOLOGY

Two separate surveys were performed at the PV site. Mixed transect method with point observations was used for these survey. Regular point observations along transect were particularly useful for capturing specific bird species and their behaviours.

For the PV site, a total of 10 Vantage Points (VPs) as well as transects were surveyed to collect data on species, numbers, physical characteristics, and flight behaviour. And for the BESS site, transects and three VP points were performed.

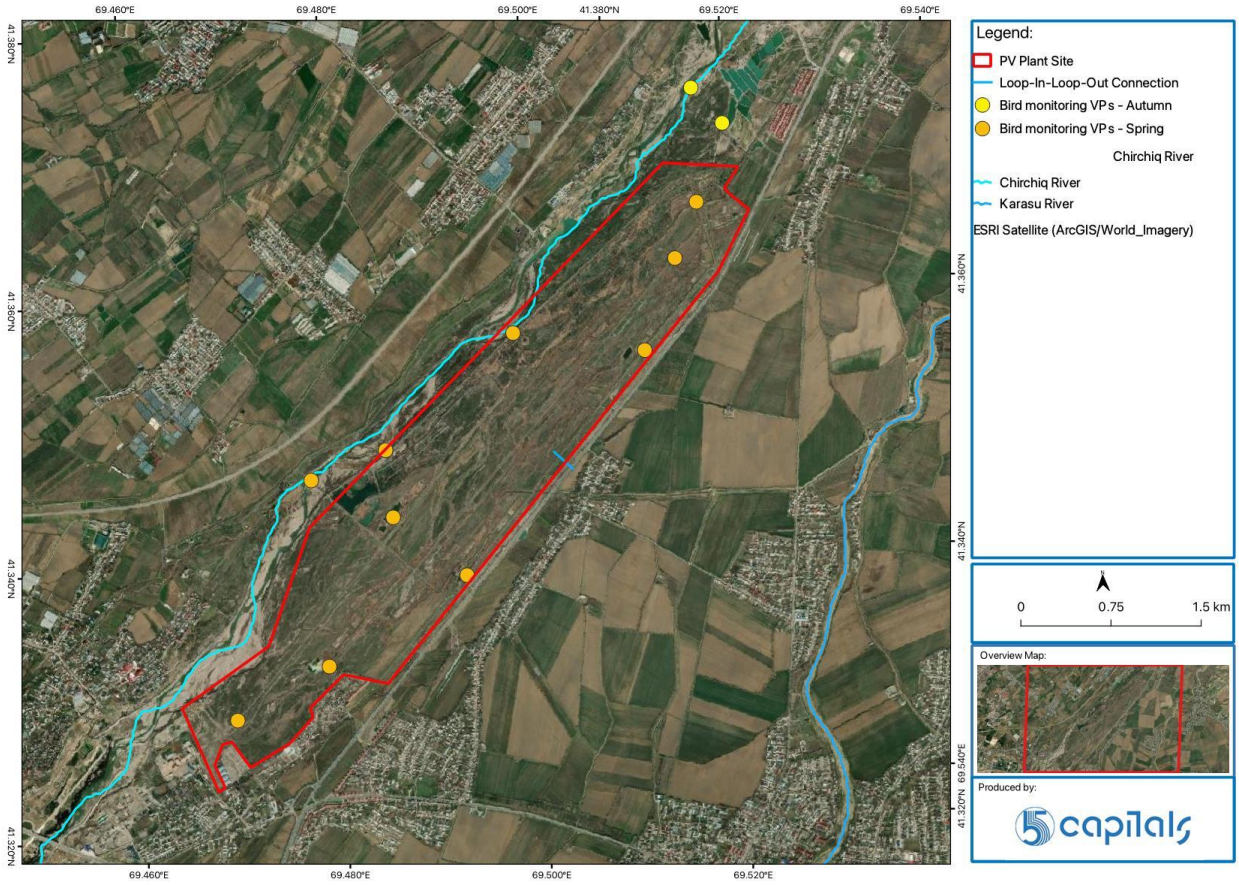


Figure 7-5 Bird survey VP and transects within the BESS site

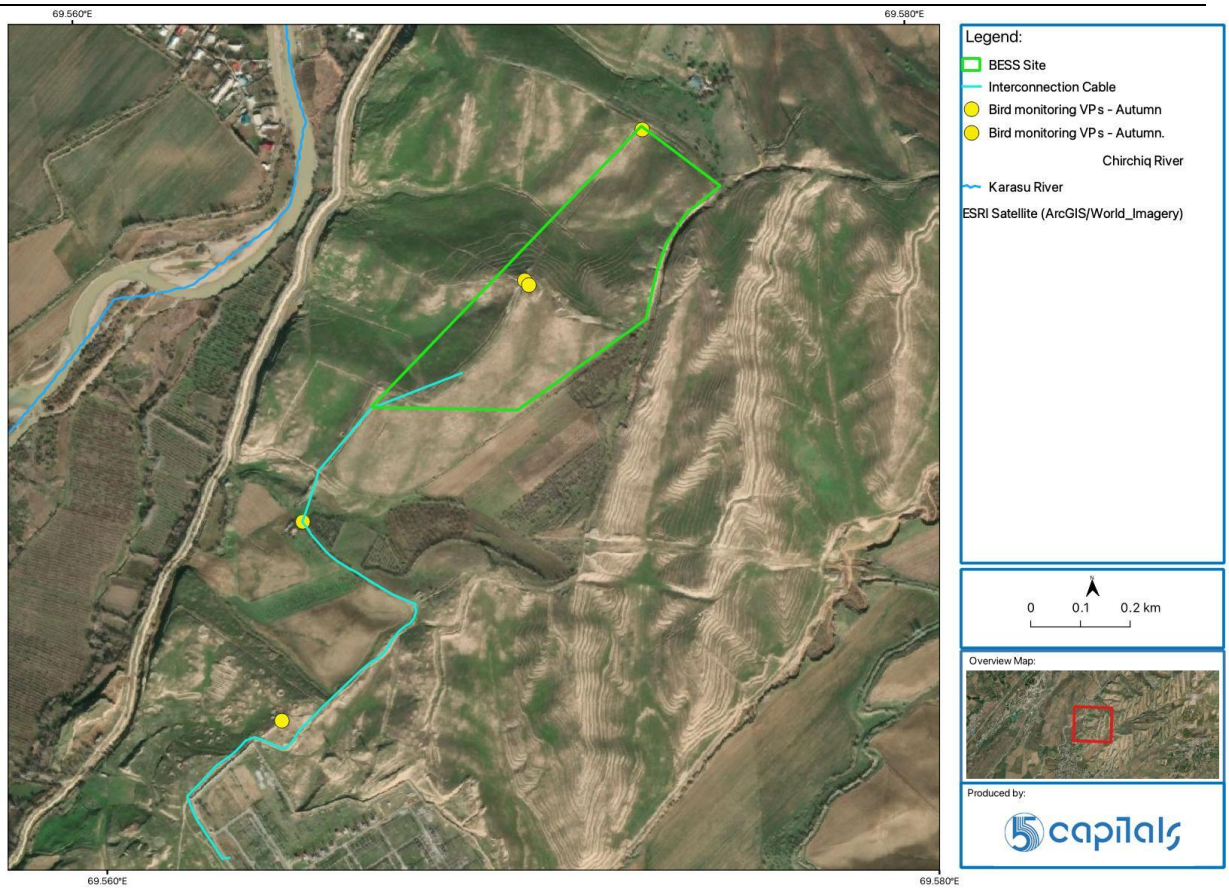


Figure 7-6 Bird survey VP and transects within the BESS site

COVERAGE AND TIMING/DATE

The PV site survey was conducted May 26 and June 1, 2023, while the BESS site was surveyed on 26th August, 2023.

ONGOING SURVEYING

In order to ensure sufficient validation and verification, additional surveys were undertaken to collect more data on the migratory seasons for the PV and BESS site (2 vantage points each).

Autumn Migration VP – from September 1 until October 15, 2023:

- Minimum 56 hrs for the site (28 hours per VP) for Tashkent PV
- Minimum 56 hrs for the site (28 hours per VP) for Tashkent BESS

Since some activity has commenced at the southern part of the PV site, the selected VPs were positioned in order to be sufficiently away from disturbance areas, but within the same habitat complex as the site, to ensure representative results were obtained.

These autumn migration surveys were performed to supplement the existing primary and secondary data already collated on the bird communities and activity in the project area.

In particular, Saker Falcon activity was of concern due to the potential for this species to trigger Critical Habitat, if it were to be found that sufficient numbers (minimum 61 individuals per year) are utilizing the project area as stopover habitat during passage.

Additionally, the surveys were undertaken to provide information on the presence and abundance of the following birds, if they are found on site: Steppe Eagle, Egyptian Vulture, Common Pochard, Greater Spotted Eagle, and Eastern Imperial Eagle .

SURVEY RESULTS

7.3.4.1 PV Site

The results for the surveying efforts for the PV site and the BESS sites respectively are reported below. The PV site survey was conducted May 26 and June 1, 2023, while the BESS site was surveyed on 26th August, 2023.

Table 7 – 1 Data on birds recorded on the PV site (May/June 2023)

SPECIES NAMES		IUCN RL STATUS	UZBEKISTAN RED DATA BOOK 2019	26 MAY 2023	1 JUNE 2023	NOTES
ENGLISH	SPECIES					
Black-crowned Night Heron	*Nycticorax nycticorax*			voice		
White stork	*Ciconia ciconia*		NT	1 nest near project site	2 birds flying over project area	
Common Pheasant	*Phasianus colchicus*			Voice	Voice	Several broods were observed during bat survey in 1-4 August 2023.
Rock dove	*Columba livia*			Several groups		
European Turtle-dove	*Streptopelia turtur*	VU	VU		1 bird on wires on TL	
Common tern	*Sterna hirundo*			3 pairs		
Little tern	*Sterna albifrons*			1 pair		

Species names		IUCN RL status	Uzbekistan Red data book 2019	26 May 2023	1 June 2023	Notes
English	Species					
Common Myna	*Acridotheres tristis*			16		
Magpie	*Pica Pica*			2		
Indian Sparrow	*Passer indicus*			6		
Carrion Crow	*Corvus corone*			1		
Roller	*Coracias garrulus*			18 (9 pairs)	5-8 pairs	
Masked Wagtail	*Motacilla personata*			2		
Turkestan Warbler	*Acrocephalus stentoreus*			1 voice	Voice	
Common Cuckoo	*Cuculus canorus*			1		
Marsh Harrier	*Circus aeruginosus*			1 pair		

Only two species identified are of elevated conservation concern, the European Turtle-dove and the White Stork.

7.3.4.2 BESS Site

A total of 11 bird species were recorded during the survey period on BESS site.

Common resident bird species such as Common myna, Magpie, Collared Dove, and Rock Pigeon were frequently observed within the project area. These species present the synanthropic group.

Migratory species: Among migratory species we observed included Tree Pipit and European Bee-eater, although more migratory season surveying is planned and will supplement this information.

No rare or threatened species were recorded during field observations.

Table 7-1 Data on birds recorded on the BESS site (August 2023)

Species names		# Observed	Notes
English	Species		
Crested Lark	*Galerida cristata*	2	

Species names		# Observed	Notes
English	Species		
Barn Swallow	*Hirundo rustica*	6	
European Bee-eater	*Merops apiaster*	15	
Roller	*Coracias garrulus*	3	
Common Myna	*Acridotheres tristis*	8	
Magpie	*Pica Pica*	2	
Indian Sparrow	*Passer indicus*	7	
Rock pigeon	*Columba livia*	12	
Tree Pipit	*Anthus trivialis*	1	
Striped Flycatcher	*Muscicapa striata*	2	
Pallid Martin	*Riparia dulita*	6	

No species of elevated conservation concern were recorded during these initial surveys at this site.

Autumn Migration Surveying

A review of preliminary data covering the month of September 2023 includes records of a few species of conservation concern.

Steppe Eagle (IUCN EN) was recorded twice on September 28th; two separate individuals were observed passing overhead on southbound migration, at VPs associated with both the PV power plant and BESS sites.

Eastern Imperial Eagle (IUCN VU) was recorded twice; once on Sept 16th, and Sept 28th. Both times 1 individual was observed passing overhead on southbound migration, at VPs associated with both the PV power plant and BESS sites.

A total of 6 Cinereous Vulture (IUCN NT) have been recorded on Sept 23rd and 28th; all individuals were observed passing overhead on southbound migration.

A single juvenile Pallid Harrier (IUCN NT) was recorded on Sept 5th, passing overhead on southbound migration.

It is worth noting that the above listed species were observed passing through the airspace on migration and did not interact with the site. To date, no Saker Falcon records have been made.

Additionally, some species on the Uzbekistan Red Data Book with national status were recorded:

- Uzbek RDB – Listed as VU, IUCN listed as LC: Black Stork, Booted Eagle, Little Egret, Osprey, Short-toed Snake Eagle
- Uzbek RDB – Listed as NT, IUCN listed as LC: Pygmy Cormorant, White Stork

Some of the above species were recorded interacting with the site; i.e. feeding/foraging, local movements, and perched/hunting. However, these species would not be termed as PBFs/SBVs as these are generally limited to species designated as IUCN VU and above and/or nationally listed EN and above.

7.3.5 Bats

LITERATURE REVIEW

Below is a list of bats indicated in literature sources as inhabiting mostly adjacent areas near the project site. The list contains 18 bats species that potentially can be recorded (roosts, echolocations) in the project area with references to the information source: :

Table 7-2 List and status of bats species potentially inhabiting the project area

SPECIES	IUCN RED LIST	RED BOOK OF THE REPUBLIC OF UZBEKISTAN (2019)	PARAMETERS OF ULTRASOUND CALLS (REFERENCES)
Rhinolophus bocharicus	LC	absent	no data (CF-type calls)
Rhinolophus ferrumequinum	LC	absent	Benda et al. (2012)
Rhinolophus hipposideros	LC	Vulnerable, declining 2(VU:D)	Benda et al. (2012)
Eptesicus bottae	LC	absent	Benda et al. (2012); Hackett et al. (2016)
Eptesicus serotinus	LC	absent	Benda et al. (2012)
Hypsugo savii	LC	absent	Benda et al. (2012)
Myotis davidii	LC	absent	no data
Myotis emarginatus	LC	absent	Barataud (2015)
Myotis blythii	LC	absent	Benda et al. (2012)
Myotis bucharensis	DD (data deficient)	Critically Endangered 1(CR)	no data
Nyctalus noctula	LC	absent	Barataud (2015)
Pipistrellus pipistrellus	LC	absent	Benda et al. (2012)
Vespertilio murinus	LC	absent	Barataud (2015)
Plecotus sp. (Gritsina et al., 2013)	?	absent	Barataud (2015), Benda et al. (2012)
Barbastella caspica (Barbastella leucomelas)	LC	absent	Benda et al. (2012); Hackett et al. (2016)
Pipistrellus kuhlii	LC	absent	Benda et al. (2012)
Otonycteris leucophaea	DD	Vulnerable, naturally rare 2(VU:R)	no data
Tadarida teniotis	LC	Vulnerable, naturally rare 2(VU:R)	Benda et al. (2012)

Thus, the area planned for construction may potentially be a habitat, feeding or migratory site of up to 18 species of bats. There are three species included in the IUCN Red List and Red Data Book of the Republic of Uzbekistan. One species – Bukhara Horseshoe Bat is listed as Critically Endangered due to a severe lack of records. All other species are widespread .

7.3.5.1 Myotis bucharensis

The Bokhara Whiskered Bat (BWB), *Myotis bucharensis*, is a species of mouse-eared bat in the family Vespertilionidae.

Myotis bucharensis is listed as CR in the Uzbek RDB, but this is based on the extremely limited records for the species. The species is listed as DD on the IUCN Global Red List; it is generally not well studied and even its call parameters are not published at the time of writing.

The extent of existing published literature in English has been reviewed. The following subsections contain extracted pertinent facts related to this species.

Phylogenetic History

- Originally, BWB was described as a new subspecies of Myotis longicaudatus in 1950 by Alexander Petrovitch Kuzyakin, based on a holotype collected near Kurgan-Tjubinskaja in Tajikistan.
- Myotis longicaudus was later recognized as a synonym of Myotis frater, after which BWB was referred to as a subspecies, Myotis frater bucharensis.
- Publications in 2000 and 2001 asserted that Myotis bucharensis should be considered a full separate species based on genetic analysis; however acknowledging that there are close taxonomic relationship ties to M. longicaudatus/frater.
- The long-tailed myotis (M. longicaudatus) was again split as a distinct species from M. frater by a 2015 study based on genomic molecular evidence.
- The same study proposed a phylogenetic clade including M. frater, M. soror, M. daubentoniid, and M. bucharensis as sister species.

Records of Presence

- As mentioned, the first specimen documented of Myotis bucharensis was in 1950 by Alexander Petrovitch Kuzyakin, collected near Kurgan-Tjubinskaja in Tajikistan.
- Between 1959 and 1963, four individuals were documented and collected in Taskhkent, Uzbekistan and Samarkand, Uzbekistan. Three were collected from Samarkand while a single female individual was collected from Tashkent.
- Bogdanov reported finding a large maternity colony in a mine in Samarkand, Uzbekistan in 1960. It has since been reported (in 1974, and 1992) that this colony roost was destroyed.
- Additionally, an indirect publication on a bat fly in 1962 also confirmed the presence of Myotis bucharensis in Tashkent.

- Since surveyors failed to locate the species during regional field trips in the 1970s and 1980s, it was suggested that Myotis bucharensis was potentially extinct.
- In 2019, a male Myotis bucharensis was captured near the Zeravshan river in Tajikistan, confirming that the species is still present there.
- It's range is speculated to potentially cover parts of Kyrgyzstan and Afghanistan as well. Based on the 4 known locations where records were made, the minimum Extent of Occurrence (EOO) is circa 75,000km2.

Ecology

Little is published on the specific ecology of the species, however, it might be inferred based on existing records that this species typically inhabits riverine valley ecosystems and, at least during the maternity period, roosts in large congregation in caves. The rarity of records of the species could indicate that the population density and abundance is low, but it could also be an artefact of limited historical regional bat surveying work, and potential behavioural traits (such as high flight altitudes) that make capturing individuals via survey (acoustic or mist netting) challenging.

SURVEY METHODOLOGY

Active acoustic detectors (Wildlife Acoustics Echo Meter Touch) were deployed to capture echolocation data over time. Bat calls parameters known for European bat populations (Barataud, 2015) and bat species from neighbouring countries for Uzbekistan (Benda et al., 2012) were used for identification and analysis.

Further, the possible location of bat roosts, which would be used by residential bats, maternity colonies, hibernating, bats and for mating, is of importance to understand. Specialized bat roost searches were undertaken within the PV project boundaries and area of influence.

Bat surveying was only performed at the PV site and not for the BESS site. Acoustic activity at the BESS site is not of significance for the operational BESS phase as there are no significant anticipated impacts to insectivorous bats from the BESS when in operation (in contrast to the PV array). Additionally, no suitable roosting features are found within the BESS site, and therefore roost searches were not deemed necessary for the site.

COVERAGE AND TIMING/DATES

The detectors were deployed on 31/07/2023 and then 01-02/008/2023. The methods of deployment consisted of one transect. The transects passed along the route of the boundary of the PV site, with stops at every 500 m. Each stop included 5 minutes of active recording for bats. The recorders was not kept on between stops, and in total it recorded between the hours of 21:00 and 23:30. The layout of the transect allowed for the PV site to be recorded in

one direction as well as from the other direction to neutralise the influence of random factors.

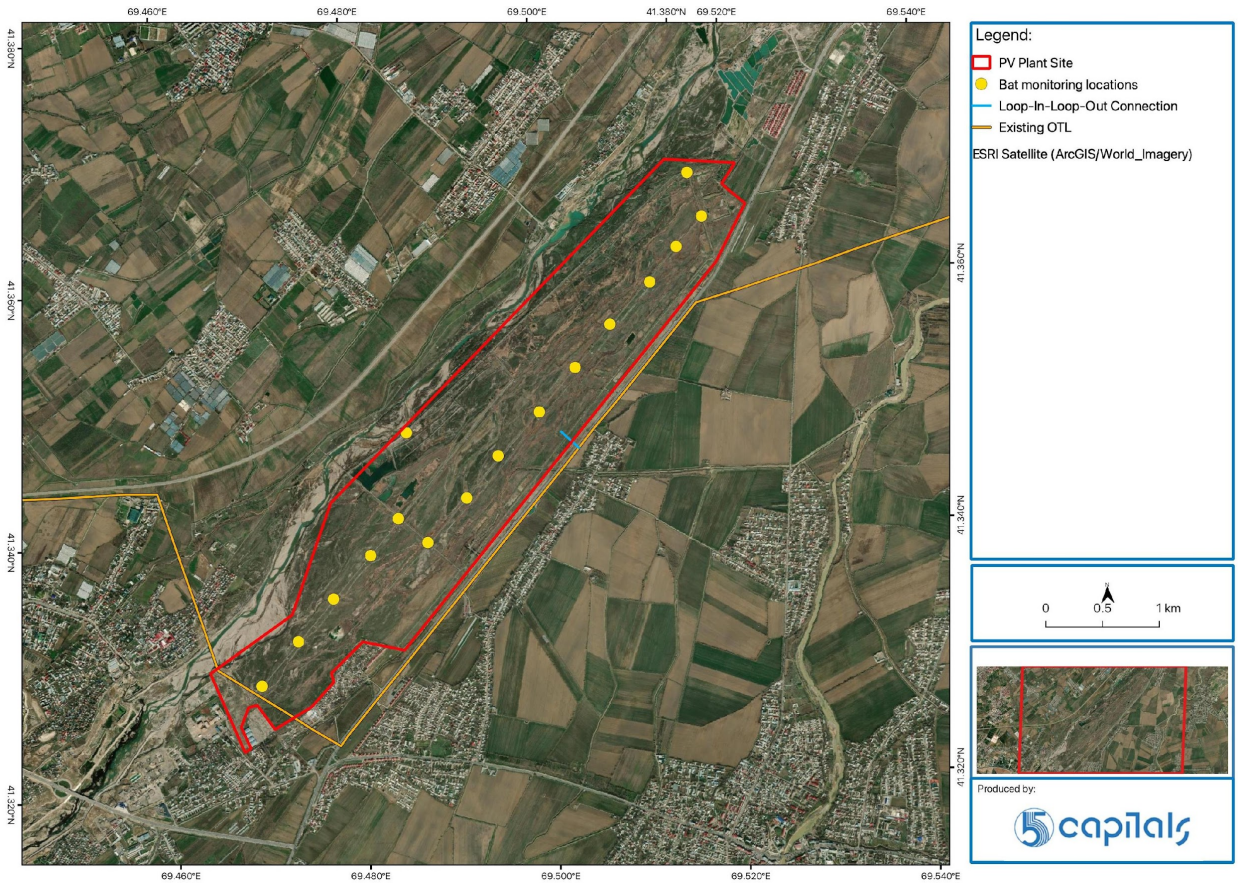


Figure 7-7 Acoustic (static) bat survey locations

Bat roost search surveys were undertaken in July 26, 2023. Field work included a survey of potential roosts identified during the desktop stage. When a roost was found, it was thoroughly examined, both for the presence of bats themselves, and for signs of their presence – excrement, food remains (insect wings, legs, etc.). All suitable bat habitat has been surveyed. Near the project area there are settlements with residential houses, which were not surveyed. Each surveyed object was mapped, photographed; its brief description was made, including notes on the suitability of the objects for bats.

RESULTS

The acoustic monitoring surveys ultimately found a number of bat species utilizing the site, but generally recorded a low density of bats.

Table 7-3 PV site – Bat Acoustic Surveys Results

SPECIES	№ LOCATIONS																TOTAL	ABUNDANCE OF SPECIES, %
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		

Species	№ locations																Total	Abundance of species, %
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
Eptesicus serotinus	0	0	0	0	0	0	2	1	2	4	0	2	0	0	0	4	**15**	3,8
Myotis cf. bucharensis	0	0	0	0	0	0	0	**2**	0	0	0	0	0	0	0	0	**2**	0,5
Myotis cf. davidii	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	**5**	1,3
Nyctalus noctula	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	2	**6**	1,5
Pipistrellus pipistrellus	12	17	48	20	23	4	14	9	11	13	16	21	36	29	41	52	**366**	92,2
Vespertilio murinus	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	**3**	0,8
Total:	**12**	**17**	**50**	**20**	**23**	**6**	**18**	**12**	**13**	**17**	**16**	**23**	**36**	**34**	**42**	**58**	**397**	100,0
%, activity bats on location	3	4	13	5	6	2	5	3	3	4	4	6	9	9	11	15	100	

The calls of 6 bat species were recorded in the site. Tentatively, *Myotis cf. bucharensis* – which is a Red Book species – was also identified although only two total calls were recorded, and published call parameters are not available for the species[5]. The calls of *Pipistrellus pipistrellus* are dominant in the datasets (92%) with the second most common species being *Eptesicus* serotinus (3.8%).

The distribution of bat activity over the territory was uneven and depended on the species. The most numerous species, P. pipistrellus, was most active in the southwestern part (point 3) and in the northeast (point 15). The second most active species, E. serotinus, was the most active in the central part of the plot (points 7-10). Point 16 stands alone. The highest activity of bats was recorded there (for both P. pipistrellus and E. serotinus), but this reference point is located on the border of the site near the Chirchik River.

Potential bat roosts in the studied region are anthropogenic. There are no grottoes, caves, and large trees with hollows or other natural roost types. Five anthropogenic types of potential bats roost are present in the area:

- Wells up to 6-8 meters deep, with stairs leading inside. The wells are concrete, in some places with brickwork, the available crevices are shallow and narrow, clearly unsuitable for breeding colonies, but could potentially provide temporary roosts;

[5] Unusual calls (fig. 2), which are not similar to any known bat species of Uzbekistan, are most similar to one of *Myotis daubentonii* call types (Barataud, 2015). However, the range of *Myotis daubentonii* is far from Uzbekistan. *Myotis bucharensis* (Benda et al., 2011) is the most phylogenetically close bat species known from Uzbekistan (Kazakov et al., 2021) which these calls may belong to. Until more information is obtained, we propose to consider this type of calls as belonging to *Myotis bucharensis*.

- Wells ranging from 1.5 - 3 meters deep were entirely concrete. Most had narrow crevices at the joints of concrete slabs, not suitable for breeding colonies, but potentially providing temporary roosts;
- Wells 1.5-3 meters deep were concrete, and partially or entirely with brickwork inside. Crevices are not suitable for colonies, but can be used as temporary roosts;
- Abandoned small buildings are huts about 2 meters high, maximum 3 meters wide, most buildings have no roof. The buildings are either of solid concrete or concrete cinder blocks. Only one building is made of brick. The width of the walls of all buildings is small, about 20 cm. These buildings have many crevices of different sizes, but most of them are through. The crevices are not suitable for colonies, but can be used as temporary shelters;
- Concrete buildings (huts) containing water wells (63) that are locked. The buildings have open windows, crevices under the roof and holes. Potentially could be shelters.

It is possible that bats may occasionally use concrete structures that contain water wells (the buildings have small windows) as temporary roosts. However, the staff inspecting them on a regular basis have not seen bats inside the structures. They have noted bats presence in the evening and at night (flying around the area). In the vicinity of the project area there are settlements, private houses, which are more likely are bats habitats (breeding sites and roosts).

The project area is a good feeding area due to the presence of water sources (channel, river) and the presence of thickets of reeds. This indicates a high concentration of insects, which makes the area attractive as a feeding site. There are also several locations within the project area with calm flowing water, above which bats may find it convenient to hunt for insects.

7.3.6 Mammals (Non-volant)

SURVEY METHODOLOGY

The baseline conditions of mammal fauna of the PV and BESS site project area was made on the basis of literature data, existing secondary data, interview data of people familiar with the area, and visual inspection of the sites.

COVERAGE AND TIMING/DATES

Rapid survey assessment was undertaken via visual inspection of the PV site on 1st June 2023 and the BESS site (including the underground cable route) on August 26, 2023.

RESULTS

7.3.6.1 PV Site

The following table summarizes the findings of the mammal surveying effort for PV site.

Table 7-4 site – Mammal Survey Results – PV Site

№	LATIN TITLES	ENGLISH TITLES	ENVIRONMENTAL STATUS	ABUNDANCE OF SPECIES
~~1~~	*Hemiechinus auritus*	Long-eared hedgehog	IUCN: LC	Regularly at dusk
~~2~~	*Suncus etruscus*	Etruscan shrew	IUCN: LC	Single
~~3~~	*Crocidura suaveolens*	Lesser white-toothed shrew	IUCN: LC	Ordinary
4	*Nyctalus noctule**	Common noctule	IUCN: LC	Singularly by the water
5	*Pipistrellus pipistrellus**	Common pipistrelle	IUCN: LC	Numerous, as all asphalt roads are equipped with lampposts
6	*Vespertilio murinus**	Particoloured bat	IUCN: LC	Rare
7	*Citellus fulvus*	Yellow suslik	IUCN: LC	Regularly around the perimeter of the area
8	*Cricetulus migratorius*	Grey hamster	IUCN: LC	Ordinary
9	*Ellobius tancrei*	Zaisan mole vole	IUCN: LC	Extremely few, 0-1 camps per hectare around the perimeter of the area
10	*Ondatra zibethicus*	Muskrat	IUCN: LC	Single on Bolt Canal
11	*Microtus ilaetus*	Tien Shan vole	IUCN: LC	Numerous
12	*Mus musculus*	House mouse	IUCN: LC	Numerous
13	*Rattus norvegicus*	Brown rat	IUCN: LC	Single, as sanitation is monitored
14	*Mustella nivalis*	Least weasel	IUCN: LC	Occasionally along the Chirchik River bed (about 3-5 individuals)
15	*Vulpes vulpes*	Red fox	IUCN: LC	Regularly, but no burrows observed (no more than 6-8 individuals)
16	*Canis aureus*	Golden jackal	IUCN: LC	Regularly 2-3 families (up to 15-20 individuals)
17	*Felis lybica*	African wildcat	IUCN: LC; CITES II	Regularly 2-3 families (up to 8-10 individuals)

*Although these are volant mammals (insectivorous bats) these incidental observations by the mammologist during field survey have also been included here for reference.

The mammal fauna of the Chirchik River project area and its surroundings consists mainly of small insectivores and rodents (Minin, 1938; Ayupov, 1975; Mitropolsky, Mitropolsky, 2009; Zaitsev et al., 2014). All of these species are fallow and anthropogenically adapted, do not establish large colonies and are closely associated with human structures (Bykova, 1994). The muskrat, dispersed along watercourses in the plain part of Tashkent region, inhabits canals with reeds along the banks (Ostapenko, 1963). The brown rat inhabits the Chirchik River valley extensively, selecting sites with dumps (Mitropolsky et al., 2007), however strict sanitary controls at the project site almost entirely deprive the project territory of this species' presence.

The site itself is very abundantly covered with shrub-grass vegetation, which makes it of little use to rodents. Only in open areas, settlements of yellow suslik were noted. In hayfields there are burrows of the Tien Shan vole and Zaisan mole vole.

No rare or threatened species are known on the site or in its immediate vicinity (Bykova, 2017).

The presence of predators — fox, steppe cat and jackal — is associated with good sheltering conditions in dense vegetation and the abundance of pheasant as a food item. It would be anticipated that the presence of these species would be mostly in the riparian rather than anthropogenic habitats.

BESS Site

The following table summarizes the findings of the mammal surveying effort for BESS site.

Table 7-4 site – Mammal Survey Results – BESS Site

№	LATIN NAMES	ENGLISH NAMES	CONSERVATION STATUS	THE ABUNDANCE OF THE SPECIES
1	*Hemiechinus auritus*	Long-eared hedgehog	IUCN: LC	Several families in the gardens
2	*Suncus etruscus*	Etruscan shrew	IUCN: LC	Singularly
3	*Crocidura suaveolens*	Lesser white-toothed shrew	IUCN: LC	Usual
4	*Pipistrellus pipistrellus**	Common pipistrelle	IUCN: LC	over the hills and under the loess cliffs
5	*Lepus tolai*	Tolai Hare	IUCN: LC	Single, no more than 2-3 individuals
6	*Citellus fulvus*	Yellow ground squirrel	IUCN: LC	Regularly in the spring and summer, 2-3 os/ha
7	*Cricetulus migratorius*	Gray dwarf hamster	IUCN: LC	Normal, 3-4 os/ha

№	Latin names	English names	Conservation status	The abundance of the species
8	*Ellobius tancrei*	Oriental mole vole	IUCN: LC	The density of towns is 2-3 per hectare on the hills of the site
9	*Microtus ilaeus*	Tian shan vole	IUCN: LC	Normal, 3-4 os/ha
10	*Mus musculus*	House mouse	IUCN: LC	Regularly, 2-4 wf/ha
11	*Vulpes vulpes*	Red fox	IUCN: LC	Single, no more than 2-4 individuals
12	*Felis lybica*	Wildcat	IUCN: LC; CITES II	Single, no more than 1-2 individuals

The study area is a transformed area of the adyrs of the southern foothills of the Chatkal Range, where grapes were grown in the past, and now there are preserved areas of rainfed agriculture and grazing of small cattle (sheep and goats). The fauna of mammals is represented by typical species, there are no rare species. No conservation measures are required for the typical and most widespread species.

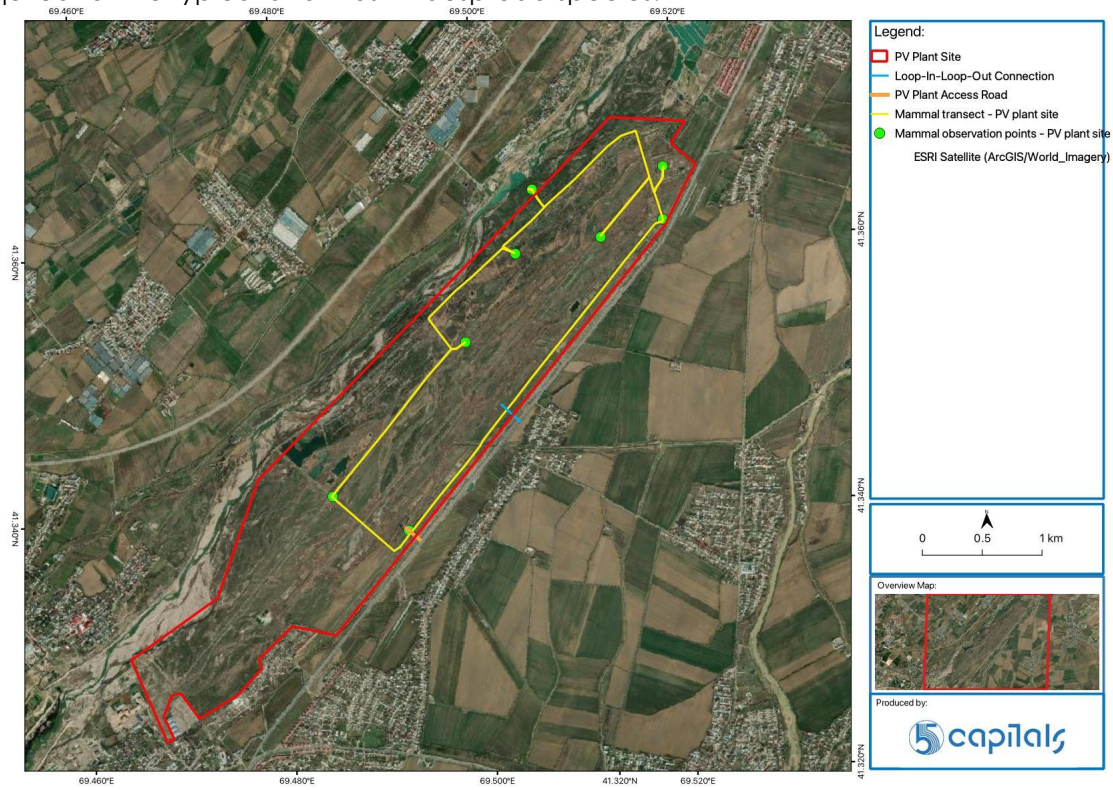


Figure 7-8 Mammal survey transects and observation points in the PV plant site

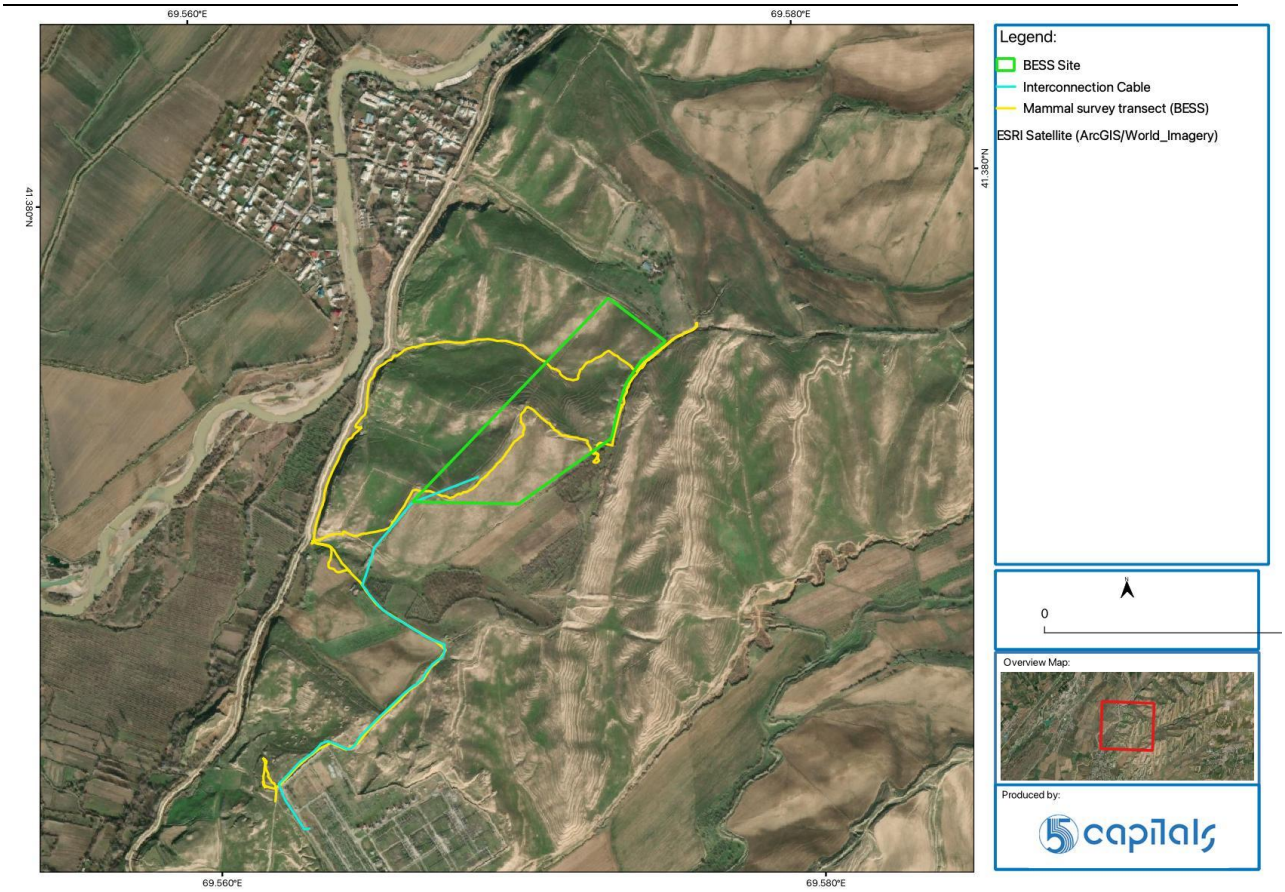


Figure 7-9 Mammal survey transects in and around the BESS site

7.3.7 Herptiles

SURVEY METHODOLOGY

Transect surveying was undertaken with the aim to identify herpetofauna and record abundances and density across the project site.

The main research method used was mixed stationary and transect survey. Points and transects for conducting research were outlined at the project monitoring stations in accordance with different types of habitats. The results from this methodology reflect the species composition in the study area and the distribution across habitats.

COVERAGE AND TIMING/DATES

Surveying for the PV site was undertaken on 07/06/2023, and surveying for the BESS site was undertaken 26/08/2023.

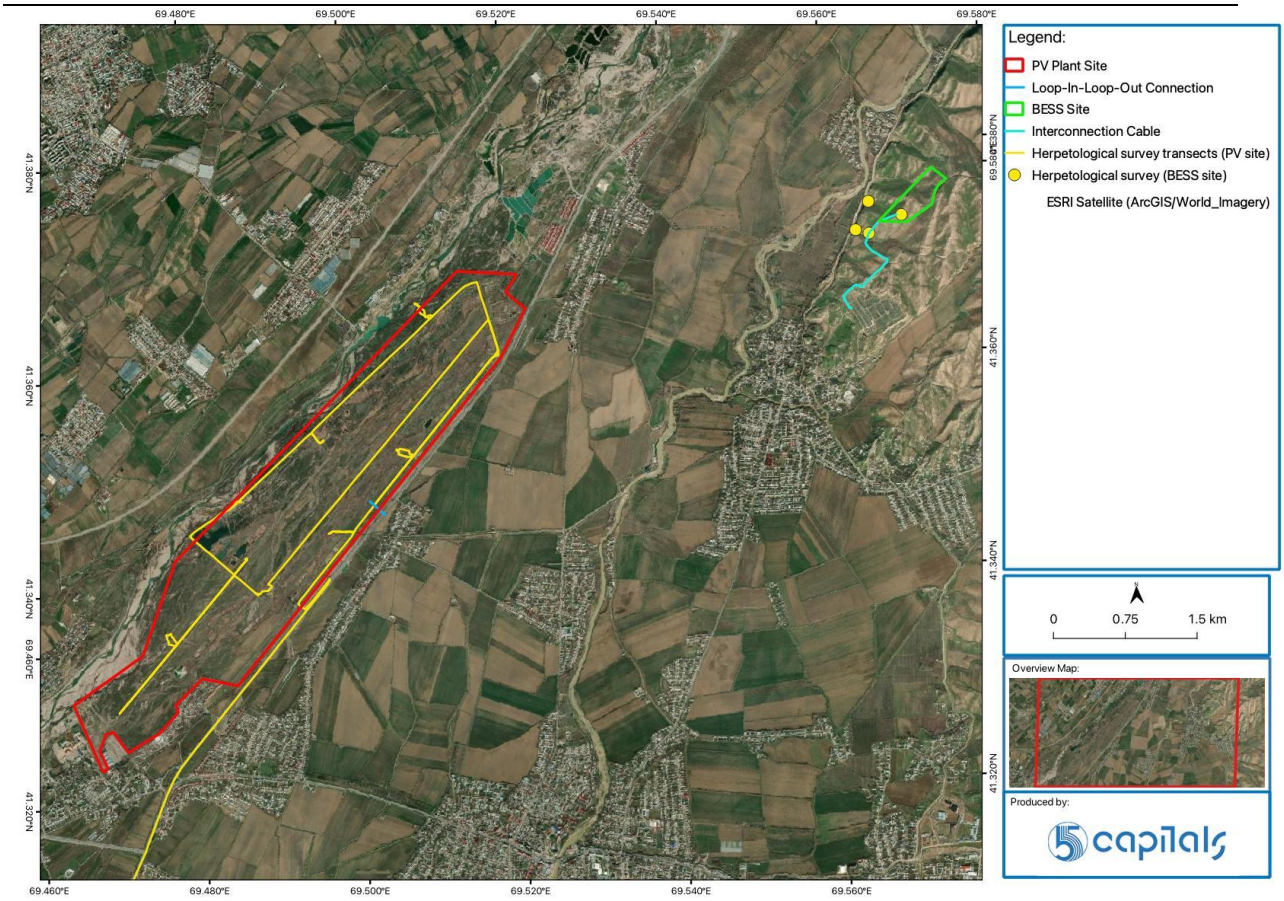


Figure 7-10 Herpetological survey transects and points within the PV plant and BESS sites

Results

In general, there was minimal levels of herpetofauna diversity encountered at both sites.

Table 7-4 Herpetofauna Survey Results for PV Site & Underground TL

Name of species		IUCN /RDB Status	Total No. Observed	
Latin	English		PV site	BESS site
Ablepharus deserti	Desert snake-eyed skink	LC	2	1

Table 7-5 Herpetofauna Survey Results for BESS Site

No	Species	Data	No. of recorded animals	Notes
1	Xinjiang Toad *Bufotes pewzowi*	26.08.2023	38	Juveniles: BESS_5
2	Desert snake-eyed skink *Ablepharus deserti*	26.08.2023	4	BESS_4, BESS_5, BESS_7
3	Transcaspian bent-toed gecko *Mediodactylus russowi*	26.08.2023	6	BESS_5, BESS_7

7.3.8 Aquatic Ecology

SURVEY METHODOLOGY

A protection buffer of 60 meters will be in place to protect the riverank and river ecosystem; and a protection buffer of 10 meters will be in place for all irrigation channels that run throughout the site.

No water will be withdrawn from the river or abstracted from the groundwater; and no drainage will be allowed to runoff into the river catchment or the irrigation channels that run through the site.

However, as a precaution, a rapid aquatic assessment including fish surveying of the river as well as the channels running through the site was undertaken.

Ichthyological samples were collected using a set of stake nets with a length of 70 meters and a mesh size of 10 millimetres, gillnets (10 meters in length and 1.5 meters in height), as well as fish traps that were set up in the Chirchik River and its channels

COVERAGE AND TIMING/DATES

Fieldwork for collecting biological material was conducted in the Chirchik River and its channels during the period of October 7-8, 2023.

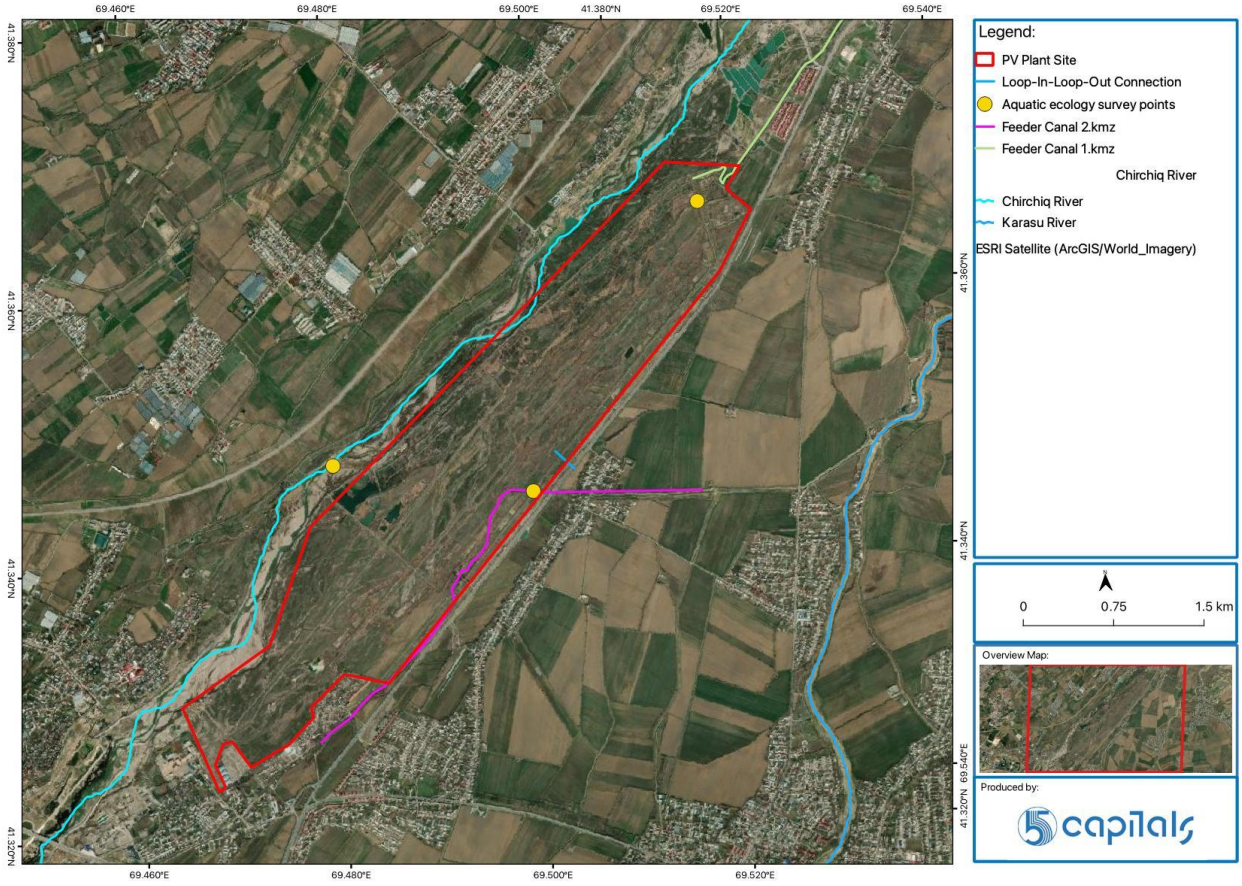


Figure 7-11 Aquatic ecology (Ichthyological) survey points

RESULTS

A number of fish species were captured during the river survey. The majority are accidental introductions and not native species. None are of elevated conservation concern.

Table 7-6 Aquatic Survey Results – Chichik River

FISH SPECIES	FAMILY	REMARKS	POINT
Carassius gibelio - Silver Prussian carp	Cyprinidae	Inhabited the lower reaches of the Amu Darya and Syr Darya in the Aral Sea basin.	Chirchik river
Opsariichthys bidens - Chinese hooksnout carp	Cyprinidae	Accidentally introduced into Uzbekistan's water bodies during the acclimatization of Chinese herbivorous fish.	Chirchik river
Pseudorasbora parva - Stone moroko	Cyprinidae	Accidentally introduced into Uzbekistan's water bodies during the	Chirchik river

		acclimatization of Chinese herbivorous fish.	
Rhodeus ocellatus - Rosy bitterling	Cyprinidae	Accidentally introduced into Uzbekistan's water bodies during the acclimatization of Chinese herbivorous fish.	Chirchik river
Iskandaria kuschakewitschi - Kushakevich's loach	Cobitidae	An endemic species of the Aral Sea with no commercial value.	Chirchik river

A protected species identified in "canal-1" has been included in the Red Book of the Republic of Uzbekistan (2019). Alburnus oblongus (Bulgakov, 1923) - currently listed in the Red Book of the Republic of Uzbekistan (2019) as 2 (VU:D): Vulnerable, declining, locally distributed Syr Darya endemic species.

Table 7-7 Aquatic Survey Results – Channels

Fish Species	Family	Remarks	Point
Alburnus oblongus - Tashkent riffle bleak	Cyprinidae	Endemic to the Syr Darya River, Listed in the Red Book of the Republic of Uzbekistan.	Canal 1
Gobio lepidolaemus - Turkestan gudgeon	Cyprinidae	An endemic species of the Aral Sea, a small, common fish.	Baf canal

7.4 Receptors

7.4.1 Area of Influence

The area of influence is the area within which project activities may affect receptors. As different aspects carry differing spatial extents, the AoI varies considerably. The below provide the AoI that was considered for each type of predicted potential impact.

Determining Area of Influence (AoI) is based on **subjective prediction** of the likely direct and secondary impacts that could occur from the associated project activity; based on professional opinion informed by experience with the local ecosystem conditions, likely methodology used to carry out project activities, and knowledge of the general biodiversity elements anticipated on site.

- The area of influence for Habitat Loss impacts is inclusive of the full project construction and operation footprint, including associated facilities, laydown areas, and any existing or new roads utilized for incoming and outbound transport. The construction buffer around the physical project footprint is considered to be up to 50m bounding all project elements as well as temporary construction facilities.

- The area of influence for Direct Mortality impacts from clearing/excavation during construction is inclusive of the full project construction footprint and buffer. The construction buffer around the physical project footprint is considered to be up to 50m bounding all project elements as well as temporary construction facilities.
- The AoI for vehicular collision during construction includes all temporary and permanent roadways, corridors, including both new and existing roads that will be used by construction vehicles, with a 50m buffer either side of the road – any fauna regularly using this habitat and/or crossing these areas are at risk.
- The AoI for 'take' during construction extends to a 1km buffer around the construction footprint due to the potential for workers to wander away from the construction footprint to engage in 'take' activities – if not controlled.
- The AoI for littering during construction extends to a 500m buffer around the construction footprint, although windblown litter may possibly travel further, the assessment will focus on the immediate vicinity and species that may be impacted.
- The AoI for general disturbance during construction (leading to lowered survivorship and reproductive success) extends to a 1km buffer around the construction footprint.
- The AoI for displacement extends beyond the footprint of the project inclusive of up to a 10km buffer depending upon the receptor, to account for the secondary impacts of displaced wildlife into adjacent territories.
- Similarly the AoI for proliferation of generalist and/or invasive species due to disturbance and subsequent displacement of native fauna extends beyond the footprint of the project inclusive of up to a 10km buffer.
- The AoI for biosecurity risks from accidental construction introduction is at the time considered to include the footprint of the project inclusive of up to a 10km buffer. Although conceivably on a long-term temporal scale invasive spread can be much more than 10km, for the purposes of the types of potential invasives (namely weed/flora species) we assume that spread would not be able to go beyond 10km before rectification action is commenced.
- The AoI for environmental quality aspects such as air quality, noise and vibration, light pollution, contamination, soil compaction and erosion, and hydrological change are considered as per the individual AoIs treated elsewhere in the respective chapters of the ESIA.
- The AoI for Habitat Fragmentation and Disturbance impacts extends beyond the footprint of the project inclusive of a 5 km buffer, to account for the phenomenon of barrier effect.
- The AoI for collision impacts from birds or bats colliding with the PV panels are restricted to the entirety of the PV array footprint.
- The area of influence for permanent displacement impacts extends beyond the footprint of the project inclusive of a 1km buffer, to account for the phenomenon of edge effect.

It should be noted that the Ecologically Appropriate Area of Analysis (EAAA) is a separate designation which is utilized in the Critical Habitat Assessment methodology and is not

directly relevant to the impact assessment process which instead focuses on activity-specific impact areas. Refer to the stand-alone CHA Report for EAAA designations.

In this connection, it is noted that no construction- and operations-phase impacts are expected to occur within the water courses and wetlands in and around the PV plant and BESS sites.

For the PV plant specifically, a mandatory riparian buffer of 60 metres has been enforced as a key pre-condition for the approval of the Project's national EIA. Specific protective buffers have also been prescribed for on-site water works (including operational infiltration ponds and channels), alongside mandatory third-party oversight and coordinated monitoring requirements. Further, given the topography of the site and the extensive engineered drainage system established within the site to aid aquifer recharge with inflows from Chirchik River, there is potentially no likelihood of stormwater overflows large enough to result in discharge/ flow towards Chirchik river, and other nearby sensitivities. Moreover, construction will entail the rehabilitation and extension of the drainage system, to further increase the infiltration capacity of these surface water sinks.

Littering and the haphazard disposal of waste into resident and nearby watercourse is also strictly prohibited by Uzsuvtaminot and other regulating authorities.

Nevertheless, a precautionary, rapid survey of the nearby aquatic ecology has been conducted with a view to providing confirmatory information with regard to relevant secondary information incorporated into the Critical Habitat Assessment (CHA) report. The results of this survey will be reflected in the subsequent version of this Report and with separate elaboration in the CHA report.

7.4.2 Sensitive Receptors

The following overview table groups the conservation value of ecological receptors that may be impacted by project works. It includes species registered during the surveys as well as sensitive species that are anticipated to possibly occur within the relative Area of Influences.

Table 7-8 Sensitive Ecological Receptors

Grouping	Receptors & CHA Status	Justification	Value
Natural Habitats	Riparian scrub (PV site)	This habitat occupies a strip of 100-200 m along the bank of the river Chirchik. This habitat generally includes fringing riverine reedbeds and sparse stands/ hedgerows of native trees and shrubs (Salix alba, Populus alba, Elaeagnus angustifolia, Tamarix arceuthoides) forming so-called tugay (riparian) vegetation belonging to the type Potamophyta in accordance with the classification of the vegetation of Uzbekistan. The density of stands is up to 70-80%. The herbage is composed of reeds (Phragmites australis), liquorice (Glycyrrhiza glabra) and other mesophytic and hydrophytic plants typical for this vegetation type (Euphorbia esula, Lycopus europaeus, Mentha longifolia var. asiatica), as well as annual and perennial grasses (Aegilops triuncialis, Bromus tectorum, Cynodon dactylon, Lolium temulentum, Poa bulbosa, Taeniatherum caput-medusae, etc.). Although threatened plants included in the global or national Red lists were not found during the field survey, the riparian woodlands in Central Asia are relict and considered as threatened and sensitive habitats.	High
Modified Habitats	Wetland-type habitat (PV site)	Landscape is modified, due to historical and ongoing anthropogenic land-use within the site. Evident/ recorded degarding processes include legacy disturbance from paddy cultivation and the development of utility-owned waterworks, including a network of extensive inflitration ponds, feeder/ infiltration channels, wellfield and pump stations aross the resident hydraulic capture zone. Herbaceous vegetation composed of reeds (*Phragmites australis, Typha angustifolia*), liquorice (*Glycyrrhiza glabra*) and other mesophytic and hydrophytic plants typical for natural wetlands (*Clematis orientalis, Cynanchum sibiricum, Mentha longifolia var. asiatica, Persicaria lapathifolia*, etc.), on some areas with local abundance of mesophytic weeds (*Artemisia vulgaris, Cynodon dactylon, Lolium temulentum, Imperata cylindrica, etc.*) and with sparse shrubs of tamarisk and oleaster (*Elaeagnus angustifolia, Tamarix arceuthoides*). Threatened plants included in the	Medium

Grouping	Receptors & CHA Status	Justification	Value
		global or national Red lists were not found during the field survey.	
	Fallow lands, wastelands, roadsides and boundary-strips (PV site)	Type 14 Artificial – Terrestrial, subtype 14.1 Arable Land. This IUCN habitat type corresponds with EUNIS habitat type V – Vegetated man-made habitats, and represented with a complex of subtypes V37 Annual anthropogenic herbaceous vegetation, V38 Dry perennial anthropogenic herbaceous vegetation and V39 Mesic perennial anthropogenic herbaceous vegetation. This is modified habitat. Threatened plants included in the global or national Red lists were not found during the field survey.	Low
	Gardens and hedgerows (PV site)	IUCN habitat type 14 Artificial – Terrestrial, subtype 14.4 Rural Gardens. According EUNIS classification, it belongs to V6 Tree dominated man-made habitats, subtype V614 Fruit orchards, combined with V64 Lines of planted trees. The vegetation is represented with planted native and introduced fruit and ornamental trees, as apple (Malus domestica), apricot (Prunus armeniaca), mulberry (Morus alba), poplar (Populus alba), arbor-vitae (Platycladus orientalis), redcedar (Juniperus virginiana) Herbs are represented with planted alfaalfa (Medicago sativa) and wild annual and perennial grasses, forbs and weeds (Achillea filipendulina, Artemisia vulgaris, Glycyrrhiza glabra, Aegilops triuncialis, Bromus japonicus, Cynodon dactylon, Lolium temulentum, Poa bulbosa, etc.). This is modified habitat. Threatened plants included in the global or national Red lists were not found during the field survey.	Low
	Irrigation / Drainage Channels (PV site)	IUCN habitat type 15 Artificial – Aguatic, subtype 15.9 Canals and Drainage Channels, Ditches. According EUNIS classification, it belongs to the type C – Inland surface waters. The vegetation is represented with reeds (Phragmites australis,Typha angustifolia), other hydrophytes and mesophytes, and algae. This is modified habitat.	Low
	Dry grassland (BESS site)	The abundance and diversity of spiny forbs and weeds (Capparis spinosa, species of Carthamus and Centaurea, Eryngium caeruleum, Rhaponticum repens, Cynodon dactylon, Hordeum murinum subsp. leporinum, etc.) indicates that the level of degradation of this habitat is rather high, which is connected with overgrazing and other disturbance factors (ditches, old	Low

Grouping		Receptors & CHA Status	Justification	Value
			terraces).	
		Fallow land (BESS site)	The vegetation is represented with camel thorn-caper-forb-grass communities (Hordeum murinum subsp. leporinum, Poa bulbosa, Alhagi pseudalhagi subsp. kirghisorum, Capparis spinosa, Carthamus oxyacanthus) with almost the same species composition that on unplowed slope.	Low
Flora		Over 90 species typical of the region and habitat - No CH or PBFs	There were no restricted-range endemics or threatened plants included in the IUCN Red List (CR, EN, VU categories) or Red Data Book of Uzbekistan found.	Medium
Endangered Birds	**Raptors**	Saker Falcon (PBF) Egyptian Vulture (PBF) Steppe Eagle (PBF)	Listed as critically endangered or endangered on IUCN Red List. Possible to occur on migration. Steppe Eagle migratory observations have been recorded, but no stopover behaviour to date.	Very High
Threatened Birds	**Raptors**	Greater Spotted Eagle (PBF) Eastern Imperial Eagle (PBF)	Listed as vulnerable or near threatened on IUCN Red List, or listed as Critically Endangered or Endangered on the Uzbekistan Red Data Book. Possible to occur on migration.	High
	Waterbirds	Common Pochard (PBF)		
	Breeding Birds	European Turtle-dove (PBF)	Listed as vulnerable or near threatened on IUCN Red List, or listed as Critically Endangered or Endangered on the Uzbekistan Red Data Book. Possibly breeds in trees in the area.	
Non-threatened Birds	**Raptors**	No PBFs / CH	Listed as Least Concern on the IUCN Red List, not of national importance. A mix of resident, migrants and breeders are present in all categories.	Low
	Waterbirds	No PBFs / CH		
	All other birds	No PBFs / CH		
Bats		*Eptesicus serotinus* *Myotis cf. bucharensis* *Myotis cf. davidii* *Nyctalus noctula* *Pipistrellus pipistrellus* *Vespertilio murinus*	The majority of species are not threatened, and generally common and widespread. Bats however are important for ecosystem function and are generally understudied, with many global populations thought to be on the decline; classified as Medium value. Although Myotis cf. bucharensis is listed as CR in the Uzbek RDB, this	Medium

Grouping		Receptors & CHA Status	Justification	Value
			is primarily due to a lack of data and limited records rather than IUCN typical criteria such as verified population decline or emergent/ongoing threats. Further, only 2 calls were recorded which are potentially attributed to this species but not confirmed.	
Non-threatened Mammals	**Carnivores**	Red Fox *Vulpes vulpes*	This carnivore acts as top-down control on prey populations and help control disease. However, these species are not threatened or endemic and are common and widespread. As a generalist species, population increase near anthropogenic areas is typical.	Low
		African wildcat *Felis lybica*	This carnivore acts as top-down control on prey populations and help control disease. Further as a shy and secretive species, populations near anthropogenic areas tend to decline. However this species is not threatened or endemic.	Medium
		Golden jackal *Canis aureus*	This carnivore acts as top-down control on prey populations and help control disease. However this species is not threatened or endemic.	Medium
	Insectivores	Long-eared Hedgehog *Hemiechinus auratus* Etruscan shrew *Suncus etruscus* Lesser white-toothed shrew *Crocidura suaveolens*	Hedgehogs and shrews are an important top-down control for various invertebrate populations. However, these species are not threatened or endemic and are common and widespread.	Low
	Mustelids	Least weasel *Mustella nivalis*	Mustelids act as top-down control on prey populations and help control disease. However, this species is not threatened or endemic and are common and widespread.	Low
	Herbivorous Rodents & Small Mammals	Yellow suslik *Citellus fulvus* Grey hamster *Cricetulus migratorius* Zaisan Mole Vole *Ellobius tancrei* Tien Shan vole *Microtus ilaetus* House Mouse *Mus musculus* Brown rat *Rattus norvegicus*	Rodents are an important prey species and also contribute to soil health via burrow aeration and vegetation spread via seed banking. However these species are not threatened or endemic and are common and widespread.	Low

Grouping		Receptors & CHA Status	Justification	Value
Nationally important Herptiles	**Snakes**	Barred Wolf Snake Meadow Viper	These species are listed as Vulnerable in the Uzbekistan Red Data Book. Presence has not been confirmed but based on habitat and distribution they may occur.	Medium
Non-threatened Herptiles	**Amphibians**	Xinjiang Toad *Bufotes pewzowi*	This species is not threatened and are common and widespread.	Low
	Geckos and Lizards	Desert snake-eyed skink *Ablepharus deserti* Transcaspian bent-toed gecko *Mediodactylus russowi*	These species are not threatened and are common and widespread.	Low

7.5 Potential Impacts, Proposed Mitigation, Residual Impacts

The following sections will be updated following the completion of the final rounds of biodiversity baseline field surveys (i.e., bird migration and supplementary aquatic ecology surveys).

7.5.1 Construction Phase

7.5.1.1 Ecosystem Function Degradation

HABITAT LOSS

Clearing, grading, excavation and other earthworks during early construction stages results in habitat loss over the full construction footprint of the project, including temporary structures, lay-down areas, and new and existing roads used for incoming and outbound traffic.

Habitat loss affects both vegetation and wildlife species that currently use the affected areas as well as overarching ecosystem function on a wider regional scale. Vegetation cannot re-establish in impermeable paving or compacted soils, and wildlife dependent upon natural features and resources cannot utilize the converted land which restricts available habitat regionally. Ecosystem function will be degraded as a result.

Construction footprint typically involves some degree of buffer. However, maintaining strict requirements to minimize the construction buffer as much as practicable will reduce the magnitude of habitat loss impact.

Habitat loss within the footprint of the structures will be permanent or at least until the project is eventually decommissioned. Habitat loss is certain to occur; the extent of which is presented in the following table. The Magnitude of loss of each type of habitat has been based on the overall amount of loss, as calculated in the previous table.

Table 7-9 Significance of Unmitigated Habitat Loss

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Natural Habitat - Riparian scrub (PV site)	High	Minor	**Minor to moderate**
Modified Habitat - Natural and semi-natural wetlands (PV site)	Medium	Moderate	**Moderate**
Modified Habitat - Fallow lands, wastelands, roadsides and boundary-strips (PV site)	Low	Moderate	**Minor**
Modified Habitat - Gardens and woodland belts (PV site)	Low	Moderate	**Minor**

Modified Habitat - Irrigation / Drainage Channels (PV site)	Low	Minor	**Negligible to minor**
Modified Habitat - Dry grassland (BESS site)	Low	Minor	**Negligible to minor**
Modified Habitat - Fallow land (BESS site)	Low	Minor	**Negligible to minor**

Habitat loss impact will be further mitigated by the following mitigation measures:

- On average, the planned construction footprint within the PV plant site will be located about 200 meters away from the Chirchik river banks. A minimum buffer of 60m protection zone from the riverbank is implemented as a No-Go zone. Thus habitat loss of Riverine habitat (the sole natural habitat found within the AoI) will be minimized.
- The EPC Contractor will maintain the following to restrict the construction footprint as much as possible:
- Any access roads will be a width of 6m. The allowed construction buffer will not exceed 5m to each side of the permanent road footprint.
- The allowed construction buffer for the substation footprint will not exceed 10m buffer from the edges of the permanent built-up area.
- The allowed construction buffer around the PV panels and BESS will not exceed a maximum 30m buffer.
- The EPC contractor will commit to the restoration of habitat post-construction in unused land areas that are not required for O&M maintenance, subject to a review of operational restrictions for vegetation-related shading and soiling, for efficient power generation within the space-constrained facility. The Habitat Restoration Plan will provide the restoration measures that will be undertaken for natural habitats within residual zones in the project area, post-construction restoration via seeding, re-planting, and landscaping with native, high-value species, monitoring and reporting requirements of the plan. Taking shading exclusion zones into account, restoration efforts involving woody species (trees and shrubs) will target relatively large and isolated (peripheral) residual sites utilized for construction purposes exclusively. These sites include the EPC Contractor office, sub-contractor premises, customs supervision, lay-down and waste storage areas located on the eastern side of the PV plant site.
- The EPC contractor will commit to the restoration of habitat post-construction in unused land areas that are not required for O&M maintenance, subject to a review of operational restrictions for vegetation-related shading and soiling, for efficient power generation within the space-constrained facility. The Habitat Restoration Plan will provide the restoration measures that will be undertaken for natural habitats within residual zones in the project area, post-construction restoration via seeding, re-planting, and landscaping with native, high-value species, monitoring and reporting requirements of the plan. Of particular importance to note is that PV arrays have been

shown to increase the ability of vegetation recolonization, so a properly developed and executed Habitat Restoration Plan can maximize the biodiversity value of the vegetation regrowth underneath and adjacent to/ amongst the PV panel arrays. This phenomena means that despite a relatively large land take, the actual habitat and flora losses can be substantially mitigated and the site can eventually have moderately high biodiversity value during the operational phase.

Natural Habitat and No Net Loss

The above suite of mitigation measures ensures that the only permanent natural habitat loss is where the project's physical footprint overlaps with riparian scrub. The following figure demonstrates the areas where this occurs; the total permanent loss in land area of riparian scrub habitat is calculated at 11.6 ha (i.e., only 6.9% of the original habitat extent is impacted). As demonstrated in the map, the amount of riparian scrub permanently lost is nominal in comparison to modified habitats affected by the project infrastructure.

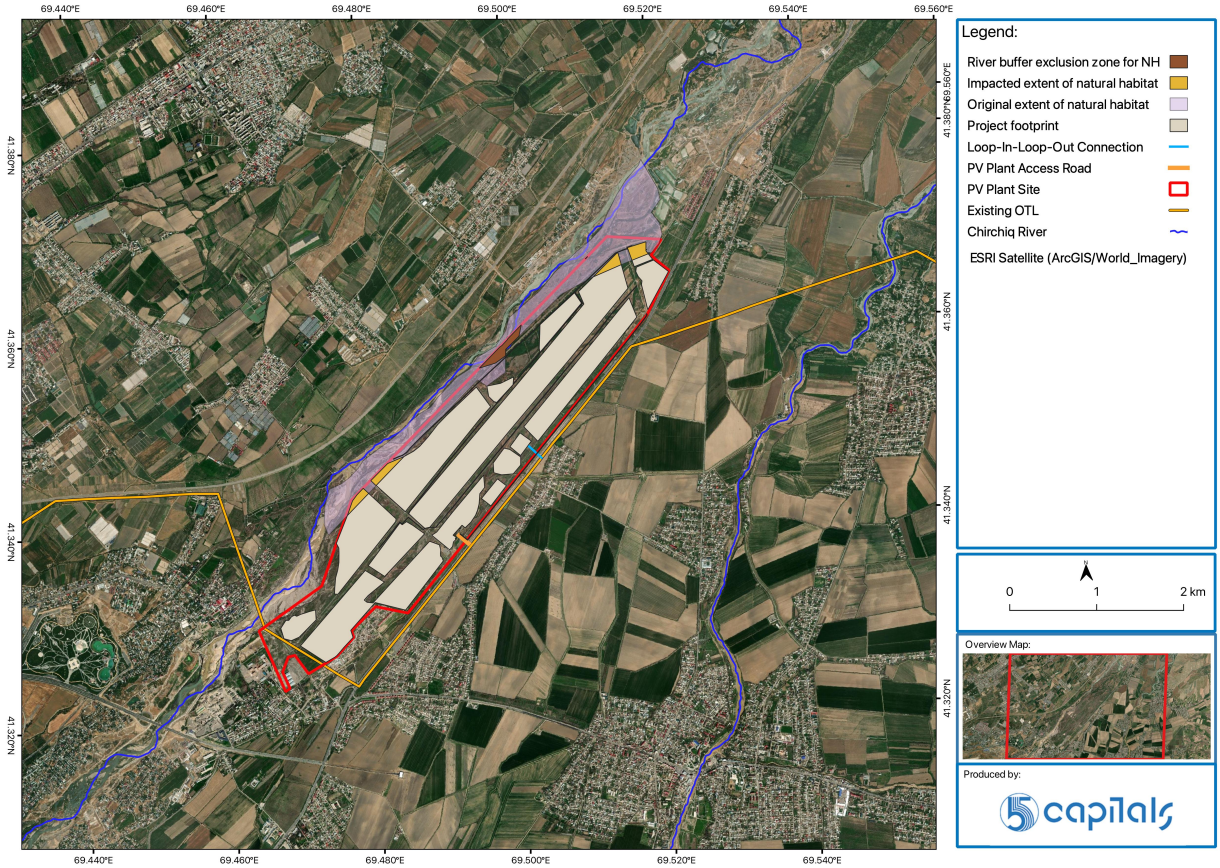


Figure 7-1 Extent of the original natural habitat (purple) relative to the habitat area impacted by construction (orange)

Recalling that No Net Loss is not the equivalent of Zero Loss, when applied to habitat, NNL could be taken as no adverse change to the ability of the habitat in question to support the ecosystem currently being supported. The riparian scrub habitat downstream and upstream remain untouched by the project and connectivity is retained throughout the river buffer

due to the 60m set back. Therefore, even with the permanent loss of 11.6 ha of natural habitat, it can be conferred that No Net Loss is achieved.

With post-construction restoration and compensatory restoration of habitats as much as possible, the residual significance is Negligible to Minor.

Table 7-10 Residual Significance of Mitigated Habitat Loss

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	Residual
Natural Habitat - Riparian scrub (PV site)	High	Negligible	**Minor**
Modified Habitat - Natural and semi-natural wetlands (PV site)	Medium	Minor	**Minor**
Modified Habitat - Fallow lands, wastelands, roadsides and boundary-strips (PV site)	Low	Minor	**Negligible to minor**
Modified Habitat - Gardens and woodland belts (PV site)	Medium	Minor	**Minor**
Modified Habitat - Irrigation / Drainage Channels (PV site)	Low	Negligible	**Negligible to minor**
Modified Habitat - Dry grassland (BESS site)	Medium	Negligible	**Negligible to minor**
Modified Habitat - Fallow land (BESS site)	Medium	Negligible	**Negligible to minor**

7.5.1.2 Biodiversity Loss – Direct Mortality and Lowered Survivorship

CLEARING, EXCAVATION AND EARTHWORKS

Clearing of existing vegetation will result in direct loss and mortality of removed specimens. Further, wildlife such as burrowing rodents and herptiles may be directly crushed during earthworks, or may suffer stress-induced mortality.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-11 Significance of Unmitigated Direct Loss and Mortality

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Non-threatened Flora (over 90 species typical of the region and habitat)	Medium	Moderate	**Moderate**
Non-threatened Mammals (Insectivores & Rodents)	Low	Moderate	**Minor**
Nationally Important Herptiles (Snakes)	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low	Moderate	**Minor**

The following mitigation measures will be implemented to reduce the impacts on floral species:

- The EPC contractor will commit to the restoration of habitat post-construction in unused land areas that are not required for O&M maintenance. The Habitat Restoration Plan will provide the restoration measures that will be undertaken for natural habitats, post-construction restoration via seeding, re-planting, and landscaping with native, high-value species, monitoring and reporting requirements of the plan. Of particular importance to note is that PV arrays have been shown to increase the ability of vegetation recolonization, so a properly developed and executed Habitat Restoration Plan can maximize the biodiversity value of the vegetation regrowth underneath and adjacent to/ amongst the PV panel arrays. This phenomena means that despite a relatively large land take, the actual habitat and flora losses can be substantially mitigated and the site can eventually have moderately high biodiversity value during the operational phase.

The following mitigation measures will be implemented to reduce the impacts on fauna species:

- Minimization of the built footprint in design and minimize the construction buffer zone
- For chance encounters with species such as other herptiles, rodents, and invertebrates, the EPC will commit to implementing a chance-find procedure with individual relocations as deemed necessary. The Chance Find Procedure will be included within the CESMP to provide general guidance on potential ecological triggers for work stoppage and will be implemented by the EPC contractor team with the Environmental Manager of the EPC to be responsible for implementation after training from a qualified external ecologist.

Table 7-12 Residual Significance of Mitigated Direct Loss and Mortality

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Non-threatened Flora (over 90 species typical of the region and habitat)	Medium	Minor	**Minor**
Non-threatened Mammals (Insectivores & Rodents)	Low	Minor	**Negligible to Minor**
Nationally Important Herptiles (Snakes)	Medium	Minor	**Minor**
Non-threatened Herptiles	Low	Minor	**Negligible to Minor**

*It is important to note the history of the vegetation coverage and clearance of the site to date. At this time, it appears that approximately 70% of the southern half of the PV plant site has already been cleared by a governmental agency known as "Obodonlashtirish". During the visit, the regional ecologist clarified that during pre-clearance surveying and tree inventory work, 400 trees were counted on site, of which only 25 economically valuable trees (oak trees) required relocation. The remaining loss is then going to compensated for (either monetarily or by direct replanting at ratio of 10:1).

The developer ACWA Power has confirmed that the Ministry of Energy is contractually responsible for site clearance and associated requirements under the tree-clearance moratorium. Thus, although clearance impacts are assessed here and mitigation measures are proposed, these mitigation measures relating to relocation and/or compensation would fall under the remit of the Ministry and not the developer AWCA Power.

VEHICULAR COLLISION

Wildlife can be runover or collide with, motorized vehicles and equipment. Vehicle-related death from trucks and machinery are less of a concern for larger mammals such as Red Fox which are more likely to disperse in time to avoid collision (as the site vehicles will be traveling under speed restrictions and large equipment movement will be relatively slow).

Small to medium sized wildlife such as to hedgehog and rodents, lizards, snakes and amphibians have a higher chance of mortality from vehicular and machinery collisions.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-13 Significance of Unmitigated Vehicular Collision

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Non-threatened Mammals (Carnivores)	Medium	Moderate	**Moderate**
Non-threatened Mammals (Other)	Low	Minor	**Negligible to Minor**
Nationally Important Herptiles	Medium	Minor	**Moderate**
Non-threatened Herptiles (Amphibians, Lizards, Geckos, Snakes)	Low	Moderate	**Minor**

However, the following mitigation measures will be implemented to reduce the risks from these impacts:

- Strict speed controls which will be enforced by EPC HSE and Security teams; especially during the active period (Late Spring – April) for the Russian Tortoise;
- Ban against driving outside of delineated access roads and restricting driving and machinery operation to daylight hours;
- The CESMP will include protocol for removal of any road-kill carcasses immediately upon observation to at least 10 meters away from the access roads during the construction phase by the EPC Contractor.

With the above measures, the residual significance is presented in the following table.

Table 7-14 Residual Significance of Mitigated Vehicular Collision

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Non-threatened Mammals (Carnivores)	Medium	Negligible	**Negligible to**

Receptor	Value/ Sensitivity	Magnitude	Residual
			Minor
Non-threatened Mammals (Other)	Low	Negligible	**Negligible to Minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to Minor**
Non-threatened Herptiles (Amphibians, Lizards, Geckos, Snakes)	Low	Negligible	**Negligible to Minor**

7.5.1.3 "Take" (Poaching, Hunting, Gathering)

The presence of site workers can lead to increased hunting, poaching, or gathering on site. Flora and vegetative matter might be gathered for consumption or for fuel; eggs taken from breeding bird nests; poaching of hare, ground birds or tortoise for consumption or for domestic trade; and persecution of raptors, snakes, and carnivores could potentially take place.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-15 Significance of Unmitigated "Take"

Receptor	Value/ Sensitivity	Magnitude	Significance
Non-threatened Flora	Low	Moderate	**Minor**
Non-threatened Mammals	Low	Minor	**Negligible to Minor**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low	Minor	**Negligible to Minor**

However, the following mitigation measures will be implemented to reduce the risk of these potential impacts:

- Strict controls forbidding the gathering, poaching or otherwise disturbance of any flora or fauna on site, included in induction training
- Staff training such as toolbox talks on the importance of ecosystem integrity, especially focused on species of importance.

With the above measures, the residual significance is **Negligible** for all receptors.

7.5.1.4 Littering

Improper management of solid waste such as plastic containers and plastic bags, may result in wind-blown litter, which are a danger to wildlife due to entanglement or ingestion.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-16 Significance of Unmitigated Littering

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds	Very High	Minor	**Moderate to Major**
Threatened Birds	High	Minor	**Minor to Moderate**
Non-threatened Birds	Low	Minor	**Negligible to Minor**
Non-threatened Mammals (Non-Carnivores)	Low	Minor	**Negligible to Minor**
Non-threatened Herptiles	Low	Minor	**Negligible to Minor**

However, the following mitigation measures will be implemented to reduce the risk of these potential impacts:

- Preparation of a Waste Management Plan as one of the supplementary plans to the CESMP;
- Training will be provided to staff such as tool box meetings which include waste management
- Strict waste management supervision and controls under the HSE Team;
- Zero tolerance for littering on site;
- Daily inspections and clean-up of litter by EPC/sub-contractor(s) responsible.

With the above measures, the residual significance is Negligible to Minor for all receptors.

7.5.1.5 General Disturbance

The presence of anthropogenic activity is disturbing to many sensitive species, which can result in reduced survivorship, reproductive success, and ultimately, population decline.

Species particularly sensitive include the shy wildcat species, although most wildlife which is not already habituated to anthropogenic disturbance is anticipated to be negatively affected. Particularly, breeding birds with colonies present will be negatively affected if works occur during the breeding season.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-17 Significance of Unmitigated General Disturbance

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds (Migrants)	Very High	Moderate	**Major**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Moderate	**Moderate to Major**

Receptor	Value/ Sensitivity	Magnitude	Significance
Non-threatened Birds (all others)	Low	Moderate	**Minor**
All Bats	Medium	Moderate	**Moderate**
Non-threatened Mammals (Carnivores)	Medium	Moderate	**Moderate**
Non-threatened Mammals (Other)	Low	Moderate	**Minor**
Nationally Important Herptiles	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low	Moderate	**Minor**

However, the following mitigation measures will be implemented to minimize the magnitude of these potential impacts:

- Minimize construction footprint buffer zones and temporary laydown areas.
- If any breeding activity of European Turtle Dove is noted (will be elucidated in the Chance Find Procedure), take measures to put buffer zones in place and avoid disturbing work within the buffer zone(s) for the duration of active breeding. The buffer zone around any European Turtle Dove nests found within the PV power plant and BESS sites during pre-construction works in the breeding season will be 20 metres wide, in accordance with the best practices and guidelines (United States Fish and Wildlife Services Nesting Bird Protection Plans based on studies by California Public Utilities Commission (2015), Blumstein (2003), and Southern California Edison (2013).
- The EPC contractor will commit to the restoration of habitat post-construction in unused land areas that are not required for O&M maintenance. The Habitat Restoration Plan will provide the restoration measures that will be undertaken for natural habitats, post-construction restoration via seeding, re-planting, and landscaping with native, high-value species, monitoring, and reporting requirements of the plan. Of particular importance to note is that PV arrays have been shown to increase the ability of vegetation recolonization, so a properly developed and executed Habitat Restoration Plan can maximize the biodiversity value of the vegetation regrowth underneath and adjacent to/ amongst the PV panel arrays. This phenomenon means that despite a relatively large land take, the actual habitat and flora losses can be substantially mitigated and the site can eventually have moderately high biodiversity value during the operational phase.

With the above measures, the residual significance is presented in the following table.

Table 7-18 Residual Significance of Mitigated General Disturbance

Receptor	Value/ Sensitivity	Magnitude	Residual
Endangered Birds (Migrants)	Very High	Negligible to Minor	**Minor**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Minor	**Minor**

Receptor	Value/ Sensitivity	Magnitude	Residual
Non-threatened Birds (all others)	Low	Minor	**Negligible to minor**
All Bats	Medium	Minor	**Minor**
Non-threatened Mammals (Carnivores)	Medium	Minor	**Minor**
Non-threatened Mammals (Other)	Low	Minor	**Negligible to minor**
Nationally Important Herptiles	Medium	Minor	**Minor**

7.5.1.6 Biodiversity Displacement – Competition and Dispersal

Displacement / dispersal

Shyer species may be displaced away from the project area as a result of construction disturbance, having indirect secondary impacts on adjacent territories via increased competition for resources compromising population stability, causing ecosystem imbalances.

However, the surrounding areas on a landscape level seem to support similar habitat types and connectivity between habitat patches is readily available. Therefore, it is not anticipated that displaced individuals will have a significant impact on adjacent ecosystems.

Table 7-1 Significance of Unmitigated Displacement and Resulting Competition

Receptor	Value/ Sensitivity	Magnitude	Significance
Endangered Birds (Migrants)	Very High	Negligible	**Minor**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Minor	**Minor to moderate**
Non-threatened Birds (all others)	Low	Minor	**Negligible to minor**
All Bats	Medium	Moderate	**Moderate**
Non-threatened Mammals (Carnivores)	Medium	Minor	**Minor**
Non-threatened Mammals (Other)	Low	Moderate	**Minor**
Nationally Important Herptiles	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low	Moderate	**Minor**

Mitigation against this impact is not logistically feasible in most cases. Possible monitoring and management of population dynamics of displaced species in adjacent habitats throughout the project may be warranted when the significance is Major, however, in this case, no species group are at high risk of major significance arising from this particular secondary impact. Hence residual impacts are the same as unmitigated impacts.

PROLIFERATION OF GENERALIST SPECIES

The dispersal of shyer species away from disturbed areas can lead to an increase in generalist species such as Red Fox which are well adapted to anthropogenic habitats.

Further, poor management of solid waste can result in the proliferation of pest species, such as feral dog, cat, rats, and other urban-adapted species. This can cause further competition and displacement of native fauna.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-2 Significance of Unmitigated Proliferation

Receptor	Value/ Sensitivity	Magnitude	Significance
Endangered Birds (Migrants)	Very High	Negligible	**Minor**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Moderate	**Moderate to Major**
Non-threatened Birds (all others)	Low	Minor	**Negligible to minor**
Non-threatened Mammals (Carnivores – Not Including Red Fox)	Medium	Moderate	**Moderate**
Non-threatened Mammals (Other)	Low	Moderate	**Minor**
Nationally Important Herptiles	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low	Moderate	**Minor**

However, the following mitigation measures will be implemented to minimize the magnitude of these potential impacts:

- Preparation of a Waste Management Plan as one of the supplementary plans to the CESMP;
- Strict waste management supervision and controls under the HSE Team;
- Zero tolerance for littering on site;
- Training will be provided to staff such as tool box meetings which include waste management

- Daily inspections and clean-up of litter by EPC/sub-contractor(s) responsible.
- No provision of food waste for feral cats and dogs

With the above measures, the residual significance is presented in the following table.

Table 7-3 Residual Significance of Mitigated Proliferation

Receptor	Value/ Sensitivity	Magnitude	Residual
Endangered Birds (Migrants)	Very High	Negligible	**Minor**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Negligible	**Minor**
Non-threatened Birds (all others)	Low	Negligible	**Negligible to minor**
Non-threatened Mammals (Carnivores – Not Including Red Fox)	Medium	Negligible	**Negligible to minor**
Non-threatened Mammals (Other)	Low	Negligible	**Negligible to minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to minor**
Non-threatened Herptiles	Low	Negligible	**Negligible to minor**

7.5.1.7 Biosecurity Risks

INTRODUCTION OF PATHOGENS & INVASIVE SPECIES

Soil imports, intentional or via previously used excavation and earthworks equipment, may contain pathogens that can spread and infect native vegetation and fauna that do not have natural defense mechanisms.

Exotic seeds in soil imports can allow the spread of invasive, weedy species which outcompete native species. Secondary impacts may occur on wildlife which utilize the reduced native vegetation for foraging or shelter.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-4 Significance of Unmitigated Introduced Species

Receptor	Value/ Sensitivity	Magnitude	Significance
Flora	Medium	Moderate	**Moderate**
Endangered Birds (Migrants)	Very High	Negligible	**Minor**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Minor	**Minor to moderate**
Non-threatened Birds (all others)	Low	Minor	**Negligible to**

			minor
Non-threatened Mammals (Carnivores)	Medium	Minor	**Minor**
Non-threatened Mammals (Other)	Low	Minor	**Negligible to minor**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low	Minor	**Negligible to minor**

However, the following mitigation measures will be implemented to minimize the magnitude of these potential impacts:

- Soil imports will be taken from local quarry or borrow pit as close to the site as reasonably practical to avoid risk of foreign seeds and invasive species; Soil imports from outside of the area will undergo checks to prevent accidental introduction of exotic species / pathogens.
- Plant and machinery will require an HSE certificate of inspection, issued by the EPC, before coming onto site and this will include necessary cleaning /washing to reduce risks of importing invasive species in mud taken from urban sites.
- Of importance to note is that a total of 10 invasive alien flora species have already been identified within the project areas. The clearance methodology should include appropriate biosecurity controls for the removal and disposal of vegetative material from these species. Further the Chance Find Procedure should include elucidation on the same species for identification and appropriate management for additional chance finds during construction.

With the above measures, the residual significance is presented in the following table.

Table 7-5 Residual Significance of Mitigated Introduced Species

Receptor	Value/ Sensitivity	Magnitude	Residual
Flora	Medium	Negligible	**Negligible to minor**
Endangered Birds (Migrants)	Very High	Negligible	**Minor**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Negligible	**Minor**
Non-threatened Birds (all others)	Low	Negligible	**Negligible to minor**
Non-threatened Mammals (Carnivores – Not Including Red Fox)	Medium	Negligible	**Negligible to minor**
Non-threatened Mammals (Other)	Low	Negligible	**Negligible to minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to minor**

Non-threatened Herptiles	Low	Negligible	**Negligible to minor**

7.5.1.8 Environmental Quality

AIR QUALITY

Dust can coat vegetation, reducing photosynthesis and respiration ability, causing desiccation. Emissions of pollutants such as NOx, Sox, PM and CO can lower survivorship and increase susceptibility of affected wildlife to disease.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-6 Significance of Unmitigated Air Pollution

Receptor	Value/ Sensitivity	Magnitude	Significance
Flora	Medium	Minor	**Minor**
Endangered Birds (Migrants)	Very High	Negligible	**Minor**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Minor	**Minor to moderate**
Non-threatened Birds (all others)	Low	Minor	**Negligible to minor**
Non-threatened Mammals (Carnivores)	Medium	Minor	**Minor**
Non-threatened Mammals (Other)	Low	Minor	**Negligible to minor**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low	Minor	**Negligible to minor**

However, the following mitigation measures will be implemented to minimize the magnitude of these potential impacts:

- Refer to air quality control measures.

All tracks will be damped down to reduce risk of dust and this will be checked daily. With the above measures, the residual significance is Negligible for all receptors.

Table 7-7 Residual Significance of Mitigated Air Pollution

7.5.1.9 Noise & Vibration

Construction noise and vibration can cause acoustic masking, disturbance and displacement, and general reduction in survivorship and reproductive success in a variety of fauna. Most heavily impacted are acoustic communicators such as bird and bat species and a growing body of research is also investigating acoustic impacts on herpetofauna.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-8 Significance of Unmitigated Noise Impacts

Receptor	Value/ Sensitivity	Magnitude	Significance
Endangered Birds (Migrants)	Very High	Negligible	**Minor**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Minor	**Minor to moderate**
Non-threatened Birds (all others)	Low	Minor	**Negligible to minor**
Non-threatened Mammals (Carnivores)	Medium	Minor	**Minor**
Non-threatened Mammals (Other)	Low	Minor	**Negligible to minor**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low	Minor	**Negligible to minor**

However, the following mitigation measures will be implemented to minimize the magnitude of these potential impacts:

- Refer to noise control measures.
- Use of acoustic barriers, dampening, best available technology within construction methodology to reduce noise and vibration as much as possible. Intermittent noise is less desirable than continuous noise as it does not allow for habituation.
- If any breeding activity of European Turtle Dove is noted (will be elucidated in the Chance Find Procedure), take measures to put buffer zones in place and avoid disturbing work within the buffer zone(s) for the duration of active breeding.

With the above measures, the residual significance is presented in the following table.

Table 7-9 Residual Significance of Mitigated Noise Impacts

Receptor	Value/ Sensitivity	Magnitude	Residual
Endangered Birds (Migrants)	Very High	No change	**Neutral**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Negligible	**Minor**

Non-threatened Birds (all others)	Low	Negligible	**Negligible to minor**
Non-threatened Mammals (Carnivores)	Medium	Negligible	**Negligible to minor**
Non-threatened Mammals (Other)	Low	Negligible	**Negligible to minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to minor**
Non-threatened Herptiles	Low	Negligible	**Negligible to minor**

7.5.1.10 Light Pollution

Night-time lighting can impact nocturnal wildlife behaviour. It can act as an attractant, which can cause congregation and higher predation rates or change movement and migration behaviour; act as a repellent which causes displacement, or interfere with the circadian cycle and cause lower survivorship and reproductive success. However, lighting will be required only at specific work areas and not across the wider area or along access roads, thereby limiting lighting to relatively small areas, and only when and where night work is required.

The magnitude and unmitigated significance calculations are presented In the table below.

Table 7-10 Significance of Unmitigated Light Pollution

Receptor	Value/ Sensitivity	Magnitude	Significance
Endangered Birds (Migrants)	Very High	Minor	**Moderate to Major**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Minor	**Minor to moderate**
Non-threatened Birds (all others)	Low	Minor	**Negligible to minor**
Non-threatened Mammals (Carnivores)	Medium	Minor	**Minor**
Non-threatened Mammals (Other)	Low	Minor	**Negligible to minor**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low	Minor	**Negligible to minor**

However, the following mitigation measures will be implemented to minimize the magnitude of potential impact:

- Minimize external lighting as much as possible, only using minimal amounts as required for Health and Safety.

- Ensure lighting is fit for purpose and duration of lighting to be controlled and minimized as much as possible.
- Lights will be shielded to prevent skyglow, spill and glare.

With the above measures, the residual significance is presented in the following table.

Table 7-11 Residual Significance of Mitigated Light Pollution

Receptor	Value/ Sensitivity	Magnitude	Residual
Endangered Birds (Migrants)	Very High	Negligible	**Minor**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Negligible	**Minor**
Non-threatened Birds (all others)	Low	Negligible	**Negligible to minor**
Non-threatened Mammals (Carnivores)	Medium	Negligible	**Negligible to minor**
Non-threatened Mammals (Other)	Low	Negligible	**Negligible to minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to minor**
Non-threatened Herptiles	Low	Negligible	**Negligible to minor**

7.5.1.11 Contamination

Fuels and solvents will be used during construction activities and maintenance. Improper use, storage and handling can result in chemical spills and contamination of the soil and groundwater. Flora and fauna that come into contact may become ill or die.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-12 Significance of Unmitigated Contamination

Receptor	Value/ Sensitivity	Magnitude	Significance
Natural Habitat	High	Minor	**Minor or Moderate**
Modified Habitat (Medium)	Medium	Minor	**Minor**
Modified Habitat (Low)	Low	Minor	**Negligible to Minor**
Flora	Medium	Minor	**Minor**
Endangered Birds (Migrants)	Very High	Minor	**Moderate to Major**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Minor	**Minor or Moderate**
Non-threatened Birds (all others)	Low	Minor	**Negligible to Minor**

Non-threatened Mammals (Carnivores)	Medium	Minor	**Minor**
Non-threatened Mammals (Other)	Low	Minor	**Negligible to Minor**
Nationally Important Herptiles	Medium	Minor	**Minor**
Non-threatened Herptiles	Low	Minor	**Negligible to Minor**

However, the following mitigation measures will be implemented to minimize the magnitude of potential impact:

- Refer to hazardous materials control measures, emergency action plan and spill prevention and clean up measures.

With the above measures, the residual significance is presented in the following table.

Table 7-13 Residual Significance of Mitigated Contamination

Receptor	Value/ Sensitivity	Magnitude	Residual
Natural Habitat	High	Negligible	**Minor**
Modified Habitat (Medium)	Medium	Negligible	**Negligible to minor**
Modified Habitat (Low)	Low	Negligible	**Negligible to minor**
Flora	Medium	Negligible	**Negligible to minor**
Endangered Birds (Migrants)	Very High	Negligible	**Minor**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Negligible	**Minor**
Non-threatened Birds (all others)	Low	Negligible	**Negligible to minor**
Non-threatened Mammals (Carnivores)	Medium	Negligible	**Negligible to minor**
Non-threatened Mammals (Other)	Low	Negligible	**Negligible to minor**
Nationally Important Herptiles	Medium	Negligible	**Negligible to minor**
Non-threatened Herptiles	Low	Negligible	**Negligible to minor**

7.5.1.12 Soils

During construction earthworks and vehicle movement, soils may become compacted, which prohibits vegetation regrowth and use for burrowing. Further, removal of vegetation may cause an increase in wind-driven soil erosion, leading to loss of native soils.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-14 Significance of Unmitigated Soil Impacts

Receptor	Value/ Sensitivity	Magnitude	Significance
Natural Habitat	High	Moderate	**Moderate to Major**
Modified Habitat (Medium)	Medium	Moderate	**Moderate**
Modified Habitat (Low)	Low	Moderate	**Minor**
Flora	Medium	Moderate	**Moderate**

However, the following mitigation measures will be implemented to minimize the magnitude of potential impact:

- Minimize construction footprint and strict controls to prevent driving out of designated corridors
- The EPC contractor will commit to the restoration of habitat post-construction in unused land areas that are not required for O&M maintenance. The Habitat Restoration Plan will provide the restoration measures that will be undertaken for natural habitats, post-construction restoration via seeding, re-planting, and landscaping with native, high-value species, monitoring and reporting requirements of the plan. Of particular importance to note is that PV arrays have been shown to increase the ability of vegetation recolonization, so a properly developed and executed Habitat Restoration Plan can maximize the biodiversity value of the vegetation regrowth underneath and adjacent to/ amongst the PV panel arrays. This phenomena means that despite a relatively large land take, the actual habitat and flora losses can be substantially mitigated and the site can eventually have moderately high biodiversity value during the operational phase.

With the above measures, the residual significance is presented in the following table.

Table 7-15 Residual Significance of Mitigated Soil Impacts

Receptor	Value/ Sensitivity	Magnitude	Residual
Natural Habitat	High	Negligible	**Minor**
Modified Habitat (Medium)	Medium	Negligible	**Negligible to minor**
Modified Habitat (Low)	Low	Negligible	**Negligible to minor**
Flora	Medium	Negligible	**Negligible to minor**

7.5.1.13 Hydrological alteration

During construction, soil compaction, grading, or installation of impermeable surfaces may lead to:

- Change to surface runoff patterns and subsequent impact on downstream hydrological cycle
- Change to infiltration rates and patterns and subsequent impact on groundwater aquifers

Further, any unlikely events necessitating dewatering for deep excavation, will result in drawdown impacts on the affected aquifer. All of the above can lead to secondary impacts on vegetation within the hydrological catchment area.

However, the following measures are in place:

- Minimum 60m protection zone buffer from the riverbank to prevent any impact to the river's hydrological regime
- No drainage will be allowed to free-flow off site or towards the river. There are existing stormwater drains that will be utilized and all surfaces used and created during construction will be connected appropriately to the existing drainage system.
- No groundwater extraction will be undertaken and water will not be abstracted from any nearby canals.

As such, it is anticipated that there will be no direct impacts on the river's aquatic ecosystem, (hence why this ESIA has not assessed impacts on the riverbank/riverbed habitats and/or fully aquatic species such as freshwater invertebrates and fish).

The results of the rapid aquatic fish surveying indicate that there is one species, Alburnus oblongus, which is listed as Vulnerable on the Uzbek RDB, found within the channels on site (but not the river). All precautions will be taken to avoid any impact on the channels, but the risk of a unplanned accident occurring, although unlikely, still exists. As there is a minimal amount of chemicals and hazardous materials to be stored and used on site, it is not considered that a catastrophic spill event would be likely. However, in such an instance, the responses in the Emergency Action Plan would be implemented to ensure rectification measures such as quick clean up, post-remedial surveying and management will be undertaken.

7.5.2 Operation Phase

7.5.2.1 Ecosystem Function Degradation

HABITAT FRAGMENTATION (BARRIER EFFECT)

Development and operation of large-scale and linear alignment projects will fragment the landscape's existing habitats, reducing overall ecosystem connectivity and function. This in turn reduces the ability for vegetation recruitment and wildlife movement between habitat patches. Species with large home range requirements and migratory species in particular may be affected by fragmented habitat. Long-term fragmentation caused by physical barriers may also lead to a reduction in genetic exchange which is a concern for r-selected species with rapid generation turnover.

The site will not be fenced along its western (riverside) front; therefore, there will be no physical barriers to movement. Macro-avoidance is not considered to create fragmentation in this area since the species present are not known for macro-avoidance of anthropogenic developments. Thus, habitat fragmentation is not considered as a primary impact of significance.

BIODIVERSITY LOSS – DIRECT MORTALITY AND LOWERED SURVIVORSHIP

(i) Lake-effect (Birds & Bats)

It has been documented that birds, particularly waterbirds, have been recorded near PV plant installations in arid habitats where they otherwise would typically not be recorded. Hence, it has been theorized that there is a 'lake-effect' occurring, where the array of dark PV panels from an aerial view resembles a large inland lake, thus attracting migrant waterbirds to descend for stopovers. Some experts opinion that collision fatalities of birds are occurring due to mistaken descent into the panels themselves, while others claim this is unlikely but that there is a real impact due to unnecessary energy expenditure as well as the inability of some waterbirds to regain flight without using a water surface for take-off.

It is currently under debate if the so-called 'lake effect' causes collision impacts on birds, with many experts split on the matter. There is a lack of research on the causes and correlations of bird mortality at PV solar farms, although there is evidence that fatality does occur.

Similarly, bats may be subjected to lake-effect impacts. Bats have been studied and shown to mistake smooth anthropogenic surfaces for water, displaying drinking behaviour when tested with glass, wood and plastic smooth panels. However, they did not collide with the objects; further, the PV panels are situated at an angle and thus are less likely to cause an echolocation pattern that bats may mistake for the horizontal surface of water. On the other hand, bat mortality has also been recorded under PV panels in solar farms. It is therefore unclear if birds and bats suffer from 'lake-effect' or another phenomena is causing mortality at PV farms. It is unknown what the exact causes of fatality are, what the exact impacts are, and what the significance of those impacts are. A preliminary magnitude of "Moderate" has

been put forward at this time for waterbirds and bats, as even if Lake-effect is a factual phenomenon, it is unlikely to have a regional wide effect on bird and bat populations.

The magnitude and unmitigated significance calculations are presented in the table below.

Table 7-34 Significance of Unmitigated Lake-Effect Impacts

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Threatened Birds (*Common Pochard)*	High	Minor	**Minor to Moderate**
Non-threatened Birds (all others) – *waterbirds utilize river path as a migratory flyway*	Low	Moderate	**Minor**
All Bats	Medium	Moderate	**Moderate**

The following mitigation measures will be implemented to reduce collision risk:

- After commissioning of PV panels, undertake Bird & Bat Fatality Monitoring, which will entail carcass searches that will take place throughout the PV site. Best international practice will be followed in determining the appropriate level of search efforts as well as formulas for searcher-bias adjustments (Rodrigues *et al*., 2015a). The guidance document "Post-Construction Bird and Bat Fatality Monitoring for Onshore Wind Energy Facilities In Emerging Market Countries: Good Practice Handbook and Decision Support Tool" will be used to provide a framework for the Bird & Bat Fatality Monitoring Plan for the PV site.
- If deemed applicable, quantitative 'take' thresholds developed as per Potential Biological Removal (PBR) approach may need to be calculated for each species. This would be reported in the Biodiversity Management and Monitoring Plan. Surpassing these thresholds would trigger the adaptive management response to review the situation, identify mitigation upscaling, control tightening, or offsetting as options to course correct towards NNL.
- With the above measures i.e. careful monitoring of fatalities and an adaptive management approach, the residual significance is presented in the following table.

Table 7-35 Residual Significance of Mitigated Lake-Effect Impacts

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	RESIDUAL
Threatened Birds (Common Pochard)	High	Negligible	**Minor**
Non-threatened Birds (all others) – *waterbirds utilize river path as a migratory flyway*	Low	Negligible	**Negligible to minor**
All Bats	Medium	Negligible	**Negligible to minor**

7.5.2.2 Biodiversity Displacement – Competition and Dispersal

(i) Edge Effect - Displacement / dispersal & Resulting Competition

Shyer species may be displaced away from the project area, having indirect secondary impacts on adjacent territories via increased competition for resources compromising population stability, causing ecosystem imbalances.

However, the surrounding areas on a landscape level seem to support similar habitat types and connectivity between habitat patches is readily available. Therefore, it is not anticipated that displaced individuals will have a significant impact on adjacent ecosystems.

Table 7-36 Significance of Unmitigated Displacement/Edge Effect and Resulting Competition

RECEPTOR	VALUE/ SENSITIVITY	MAGNITUDE	SIGNIFICANCE
Endangered Birds (Migrants)	Very High	Negligible	**Minor**
Threatened Birds (1 Breeding Bird – European Turtle Dove)	High	Minor	**Minor to moderate**
Non-threatened Birds (all others)	Low	Minor	**Negligible to minor**
All Bats* (*Solar farm avoidance has been recorded in multiple species*)	Medium	Moderate	**Moderate**
Non-threatened Mammals (Carnivores)	Medium	Minor	**Minor**
Non-threatened Mammals (Other)	Low	Moderate	**Minor**
Nationally Important Herptiles	Medium	Moderate	**Moderate**
Non-threatened Herptiles	Low	Moderate	**Minor**

Mitigation against this impact is not logistically feasible in most cases. Possible monitoring and management of population dynamics of displaced species in adjacent habitats throughout the project may be warranted when the significance is Major, however, in this case, no species group are at high risk of major significance arising from this particular secondary impact. Hence residual impacts are the same as unmitigated impacts.

7.5.2.3 Environmental Quality

With appropriate design and operation, there should not be any significant impacts on biodiversity elements during the operational phase from air quality, noise/vibration, light pollution, erosion, or hydrological alterations.

However, care must be taken when designing and implementing the maintenance programme for the PV array to ensure that contamination from routine maintenance and cleaning does not enter the river ecosystem or run-off freely into the soils.

7.5.3 Decommissioning

A Decommissioning Plan will be prepared at least 18 months prior to planned decommissioning and submitted to the Regulator for review and approval. No decommissioning works can be commenced without a permit from the Regulator. The Plan will detail the site and surrounding environment and receptors and will likely require new baseline studies to assess the condition of the site, adjacent areas and the overall area of influence including designated sites. Based on the details outlined in this Report, the measures will likely relate to the following:

- Removal of all Project related components and wastes and appropriate disposal method that adopts the waste hierarchy and maximises re-use and recycling of materials;
- Restoration of terrestrial ecology habitats within the Project footprint including access roads e.g. re-seeding and re-vegetation using local indigenous species; and
- Remediation and/or scarification of any compacted soils.

7.6 Implementing Mitigation: Planning, Management and Monitoring

The mitigation measures applied to reduce significant impacts will require a number of management plans to detail the implementation and action items needed, as well as monitoring and reporting requirements to ensure compliance.

7.6.1 Design

The following outline the mitigation requirements that are relevant during design phase:

- Minimization of impact footprint by (1) design of project elements and (2) minimization of construction footprint buffers
- Adherence to 60m No-Go zone buffer for the riverbank

7.6.2 Pre-Construction / Pre-Clearance

The following outline the mitigation requirements that are relevant during pre-construction / pre-clearance phase:

- Review of Construction Methodology and Schedule by environmental professional especially in regards to:
- Site Clearance and Layout;
- Timing and method of works;
- Lighting Strategy; and

- Solid Waste Management Strategy.
- Preparation of CESMP, inclusive of:
- General Site controls;
- Solid Waste Control Plan;
- Wastewater Control Plan;
- Air quality control;
- Dust control;
- Noise control
- Lighting control;
- Hazardous Materials Control Plan;
- Emergency Action Plans;
- Spill Prevention and Clean-up Procedures;
- Preparation of Habitat Restoration Plan Framework.

Key mitigation measures for biodiversity at the site preparation stage were specified in the national EIA report and associated ESMP, and in the Biodiversity Chance Find Procedure (which was developed alongside the bankable ESIA and CHA), and implemented accordingly.

7.6.3 Construction

The following outline the mitigation requirements that are relevant during construction:

- The EPC will employ a full-time site-based Ecologist to ensure that ecology related measures are understood and fully implemented.
- Implementation of CEDMP:
- Daily Checklist;
- Weekly Inspection;
- Monthly Reporting; and
- Quarterly Auditing.
- Preparation of Habitat Restoration Plan (detailed)

7.6.4 Post-Construction

The following outline the mitigation requirements post-construction:

- Implementation of Habitat Restoration Plan;
- Carrying out restoration works;

- Post-restoration survey.

7.6.5 Operation

The following outline the mitigation requirements during operation phase:

- Preparation and Implementation of OESMP / ESMS, inclusive of:
- General Site Controls;
- Compliance checks and reporting include:
- Daily Checklist;
- Weekly Inspection;
- Monthly Reporting; and
- Quarterly Auditing.

7.6.6 Specific Requirements for DFIs

Although many DFIs follow the IFC P.S. 6, some also include additional guidance and standards (i.e., EBRD's P.R. 6, ADB's Environmental Safeguards). The following provides a summary of the DFI requirements that are *additional* to the ESIA's process of setting baseline conditions, identifying sensitive receptors, predicting impact, and proposing mitigation to reduce residual significance.

7.6.6.1 Critical Habitat

As summarized in Section 7.2 of this Report, the Critical Habitat screening and assessment process is first performed to identify if any CH criteria are triggered by the project. This requires scoping to assess potential species candidates for triggering CH, and subsequently using information obtained from surveys, secondary sources, and stakeholders to extrapolate a population estimate for the individual species/species group's "Ecologically Appropriate Area of Analysis" which may in many cases be overlapping but not 100% aligned with a project impacts' Area of Influence. If any extrapolated population estimates (extrapolated from existing information across the qualified EAAA) meet the appropriate CH thresholds, then CH will have been triggered.

If CH is identified, this triggers the project to provide proof that a number of requirements are met, including a net impact of Net Gain for the affected species/habitats. As elaborated in Section 7.2, the CH screening and assessment process identified potential species of concern, but ultimately found that no species triggers CH. However, some species have been deemed as "Priority Biodiversity Features", PBFs, which are defined in EBRD P.R. 6 as requiring a No Net Loss residual impact. The equivalence of PBFs in IFC P.S. 6 is termed Significant Biodiversity Values (SBVs) which are similarly, species of elevated concern but that

do not trigger CH. Further, IFC P.S. 6 requires the designation of habitats into Natural and Modified habitat typologies, for which Natural Habitat requires a No Net Loss residual impact.

7.6.6.2 No Net Loss

It is important to note that No Net Loss does not translate to zero loss. The definition of No Net Loss for species and habitats should be taken on a spatially and temporally broad view, meaning that the regional population / ecosystem function is not diminished in any significant way in the long term even if there are individual losses / quantifiable habitat loss. Thus a regional population of a species achieving NNL may see incremental losses or gains but overall remains stable or in a similar dynamic as if the project did not exist. (For example if non-project impacts are causing population decline, this would not be counted against the NNL target of the project). Similarly a specific habitat typology may lose acreage from the project but if the overall ecosystem function and carrying capacity does not change and is able to retain the same biodiversity value as if the project did not exist, this can similarly be considered as NNL.

7.6.6.3 Biodiversity Plans & Programmes

IFC P.S. 6 and EBRD P.R. 6 as well as other DFI standards and requirements refer to a number of specific biodiversity documents, mostly known by the following terminologies:

BIODIVERSITY ACTION PLAN

- Biodiversity Action Plan. This is a document that must be prepared in two circumstances: (1) Critical Habitat is triggered for any one element (2) CH is not triggered but the sensitivities of the site are considered enough to warrant the development of the BAP.
- The purpose of the Biodiversity Action Plan is to comprehensively narrate the full assessment process and provide the action plan for ensuring NNL / NG targets will be met in a transparent manner. Thus, the BAP report and/or associated tables are typically organized by receptor.
- The BAP is often disclosed as part of the publicly available project documentation.
- The BAP will first and foremost include the summary of the CHA process and findings as well as a narrative providing a brief but comprehensive understanding of the project's key biodiversity impacts and mitigation measures. Further, any CH triggering elements will be addressed with an overview of the baseline status, potential impacts, committed mitigation, and strategy to achieve Net Gain (including loss calculations, compensation and offset plans, and subsequent pathway to Net Gain). Implementation details such as timelines and monitoring requirements and evaluation indicators are also provided.
- A BAP should also include, for each PBF/SBV:
    - Baseline status
    - Acceptable Take Threshold (if applicable)
    - Predicted Impacts

- Mitigation Measures
- Residual Significance
- Compensation / Offsets (when NNL is not achieved via mitigation)

BIODIVERSITY MANAGEMENT PLAN

- Regardless of the presence of absence of CH, PBFs/SBVs; biodiversity-related commitments within the ESIA relating to mitigation, management and monitoring must be captured within the project's CESMP / OESMP / overall ESMS.
- A stand-alone BMP is not required if the project's CESMP/OESMP/overall ESMS and topic-specific management plans are well developed and adequately cross-referenced. Topic-specific plans include implementation plans to guide implementing parties on the requirements and methods to be undertaken; examples include Habitat Restoration Plan, Breeding Bird Protection Plan, Relocation Plan, etc.
- IFC P.S. 6 does not require a BMP in all cases, but suggests that a BMP will be useful in cases where there is significant biodiversity sensitivities and related requirements. Many DFIs request a BMP when there are multiple sensitivities as a way to consolidate all biodiversity management actions and requirements in a collated document.
- The purpose of the Biodiversity Management Plan is to provide a biodiversity-focused management plan to be used as a tool by implementing parties. Thus, the BMP is typically organized by project phase, in order to simplify the allocation of responsibilities to the relevant implementing party (which could be the developer, designer, contractor, operator, etc).
- The BMP, like many implementation and management plans, is often not required to be disclosed as part of the publicly available project documentation.
- The BMP will first and foremost include the summary of the ESIA process and findings in a narrative form, providing a brief but comprehensive overview of the project's ecological receptors, key biodiversity impacts and mitigation and monitoring commitments. This should include details relevant to the implementation method, timeframe, and how it should be recorded, reported, tracked, and evaluated.
- If there are a number of topic-specific plans related to Biodiversity or biodiversity-related commitments in other plans, these will be elucidated in the BMP to explain how any plans, sub-plans, control plans, management plans, and implementation plans should be cross-referenced. For example the BMP may provide an overview and information on the biodiversity requirements within the CESMP, a Habitat Restoration Plan, and/or a Relocation Plan developed for the project.
- Each and every management/control measure and monitoring commitment must be presented in a tabular format organized by phase, which includes:
    - References to any relevant documentation (i.e. a topic-specific plan),
    - Timing in the form of the implementation schedule, seasonality, and frequency,
    - Identification of the party responsible to ensure implementation and the specific personnel requirements for carrying out implementation;
    - Outcome reporting, which tracks all documentation that is meant to be an outcome of each management/control and/or monitoring measure.

- A BMP provides a clear assemblage of all biodiversity related management and monitoring actions and assigned responsibilities and roles. It does not need to include information relating to CH, PBF/SBVs, NNL or NG as it is immaterial to the implementation of the measures which have been determined based on the former assessments and requirements.

BIODIVERSITY MONITORING & EVALUATION PROGRAM

- The Biodiversity Monitoring & Evaluation Program is not stated to be required in all projects by IFC P.S. 6 / EBRD P.R. 6 etc, and similarly to the BMP, could potentially be foregone if the project has explicit biodiversity management, monitoring, and evaluation criteria outlined clearly in other relevant ESMS documents (CESMP, OESMP, ESMP, etc).
- However, in most cases, it may be beneficial to prepare a stand-alone BMEP, or combine the BMEP with the project's BAP and/or BMP if relevant.
- The core purpose of the BMEP is to firstly demonstrate compliance with the biodiversity commitments and secondly to demonstrate effectiveness of the mitigation in achieving desired outcomes (namely, NNL or NG respectively).
- A BMEP encapsulates the "Plan – Do – Check – Act" cycle and is a fundamental component of successful adaptive mitigation.
- On a receptor-specific basis, the BMEP provides a framework within which to monitor that each biodiversity mitigation measure is being implemented correctly and that the outcomes of the mitigation are inline with requirements.
- The BMEP may or may not be disclosed as part of the publicly available project documentation.
- The BMEP will first and foremost include a brief summary of the project's process to date, including:
    - Summary of CHA process and findings (CH / PBFs / SBVs)
    - Summary of ESIA process and findings (baseline / impacts / mitigation including NNL and NG requirements)
- The BMEP will then describe the adaptive management process that will be in place for monitoring implementation compliance and evaluating effectiveness. In some cases, a specific Biodiversity Committee may need to be formed that will oversee the various project phases from a technical advisory point of view. The committee would include implementing parties, project proponent, relevant lenders representatives or advisors, and technical biodiversity advisors. Each project phase may need slightly different composition of representatives in the committee. The purpose of the committee will be to meet on a regular basis as well as convening in any emergency situations. These meetings will review documentation of monitoring to date and identify if any adaptive changes need to be made to re-calibrate the biodiversity mitigation measures towards NNL / NG respectively.
- The BMEP is often tabulated, on a receptor/grouping basis (similar to BAP). However similar to BMP, the information provided is broken down in such a way as to clarify the requirements.
- For each PBF/SBV/CH element, the BMEP table will include:

- baseline status,
- acceptable level of take if relevant (thresholds for NNL),
- applicable project phase, required measures,
- reference documents,
- implementation schedule/frequency/timing,
- responsible party and personnel,
- outcome reporting, as well as
- means of verification,
- parameters and KPIs, and
- trigger actions that are implemented in the event that thresholds are crossed / targets are not met. (Often the trigger action will be convening of the Biodiversity Committee to review the situation and determine the adaptive changes needed, whether upscaling mitigation or implementing stricter controls, etc.)

7.7 Recommendations for Project

Based on the nature of this project, and the findings of the CHA and ESIA process, it is anticipated that a stand-alone BAP is not required. However, as there will be biodiversity-related commitments that will be outlined in a number of documents (CESMP, OESMP, ESMS; Habitat Restoration Plan) a BMP may be beneficial in order to provide a consolidated document relating to biodiversity management requirements and implementation planning. Further, this could be combined with the BMEP requirements (referred to henceforth as Biodiversity Management and Monitoring Plan, BMMP). Thus, a single biodiversity stand-alone document can encapsulate the BMP and BMEP requirements of the DFI standards.

7.8 General Mitigation Requirements

7.8.1 Loss of vegetation and habitat

AVOIDANCE, MITIGATION AND OFFSET MEASURES
• All construction activities will be restricted to demarcated construction zones within the project sites and designated access roads. • The protective buffer prescribed for Chirchik River (i.e., 60 metres from the banks of the river) will be observed for all construction activities within the PV plant site and interior access tracks. • Micro-siting of construction zones within the project sites and any access roads will avoid wooded vegetation (i.e., trees) to the extent feasible. • Micro-siting of construction zones within the project sites and any access roads will avoid riparian habitats (i.e., riverine reedbeds) to the extent feasible. • The use of herbicides and pesticides for maintenance of construction zones and temporary facilities will be strictly prohibited.

AVOIDANCE, MITIGATION AND OFFSET MEASURES

• Micro-siting of excavations and underground cable trenches will avoid Critical Root Zones (CRZs) of any large residual trees, to the extent feasible.
• Public access to the project sites will be restricted using procedural and engineering controls including site fencing, to prevent the introduction of invasive species, hunting and unauthorized wood harvesting from tree stands within the project area.
• Rehabilitation of all construction zones with the project sites will include the re-establishment of vegetative cover in residual areas within the project sites (i.e., those located outside of permanent clearance zones for the operation and maintenance of project facilities).
• Rehabilitation efforts shall include the restoration of any marginally impacted natural habitat sections based around the westerly riparian zone along Chirchik River.
• Compensatory replanting within designated sites to offset the loss of resident trees within the project site will be carried out in line with relevant regulatory requirements prescribed by the Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC).
• The re-establishment of vegetative cover for the rehabilitation of project sites post construction and off-site compensatory replanting for project-affected floral species will be implemented in close consultation with the Ministry of Ecology, Environmental Protection and Climate Change (MEEPCC) to ensure that seeding, replanting and landscaping activities include native floral species of high conservation value and/or concern, where necessary.
• Dedicated biodiversity officers will be engaged for carrying out general biodiversity inspections within construction zones, for the duration of construction activities.
• A biodiversity expert will be engaged for re-vegetation of the project sites (as part of rehabilitation) post construction.
• The following management plans and/or procedures will be developed and implemented as a minimum, based on the above-listed avoidance, mitigation, and off-setting measures for ecological impacts on floral species at the Project's construction stage.
  - Reinstatement and Landscape Management Procedure.
• The requirement for any additional management plans for any construction-phase potentially resident threatened species (and associated habitats) will be determined upon the finalization of the Project's Critical Habitat Assessment (CHA) and Environmental and Social Impact Assessment (ESIA). These plans potentially include:
  - Biodiversity Action Plan (BAP), subject to the outcomes of the final bird monitoring results).
  - Biodiversity Management Plan (BMP).
  - Biodiversity Monitoring and Evaluation Plan (BMEP).

7.8.2 Direct mortality of faunal species

AVOIDANCE, MITIGATION AND OFFSETTING MEASURES
• Dedicated biodiversity officers will be engaged for carrying out (i) watching briefs during land clearance and earthworks in and around habitats potentially suitable for threatened faunal species, and (ii) general biodiversity inspections within construction zones, for the duration of construction activities. • A biodiversity expert will be engaged for (i) the identification and supervision of response to biodiversity chance finds (i.e., encounters with threatened faunal species that were not identified during baseline biodiversity surveys within the project sites), and (ii) re-vegetation as part of rehabilitation of the project sites post construction. • All construction activities will be restricted to demarcated construction zones within the project sites and designated access roads. • The protective buffer prescribed for Chirchik River (i.e., 60 metres from the banks of the river)

AVOIDANCE, MITIGATION AND OFFSETTING MEASURES
will be observed for all construction activities within the PV plant site and interior access tracks. • Micro-siting of construction zones within the project sites and any access roads will avoid wooded vegetation (i.e., trees) to the extent feasible. • Micro-siting of construction zones within the project sites and any access roads will avoid riparian habitats (i.e., riverine reedbeds) to the extent feasible. • Any additional rounds of site clearance scheduled for the upcoming spring season (i.e., March to June 2024) will involve prior biodiversity inspections to identify any nesting sites utilized potentially resident avifaunal species. • Site clearance for delineated construction zones within the project sites will be progressed in a unidirectional manner, to facilitate the successful self-dispersion of various resident fauna, including burrowing mammalian and reptilian species. • Poaching of any mammalian species utilizing habitats in and around the project sites will be strictly prohibited. • Unwarranted attacks and killing of mammalian, reptilian and avian species utilizing habitats in and around the project sites will be strictly prohibited. • Speed limits will be established within the project sites to minimize the risk of road kills, particularly within construction zones located close to natural habitats adjoining the sites. • The establishment of excavations and underground cable trenches will include benching and movable ramps (e.g., wooden logs/ planks) to allow for the escape of entrapped fauna. • Daily biodiversity inspections will be carried out for the identification of any live fauna entrapped within on-site excavations and trenches and subsequent evacuation measures (e.g., controlled capture and release, structural measures to aid escape). • Daily biodiversity inspections will be carried out to record wildlife mortalities including road kills. • Haphazard dumping of solid and liquid waste into waterbodies in and around the project sites will be strictly prohibited. The discharge of liquid construction waste (e.g., sewage, concrete washout, used/waste oils) into water bodies will be proscribed. • Dedicated biodiversity officers will be engaged for carrying out (i) biodiversity watching briefs during land clearance and earthworks in and around habitats potentially suitable for threatened faunal species, and (ii) general biodiversity inspections within construction zones, for the duration of construction activities. • A biodiversity expert will be engaged for (i) the identification and supervision of response to biodiversity chance finds (i.e., encounters with threatened faunal species that were not identified during baseline biodiversity surveys within the project sites), and (ii) re-vegetation of the project sites (as part of rehabilitation) post construction. • The requirement for any additional management plans for any construction-phase potentially resident threatened species (and associated habitats) will be determined upon the finalization of the Project's Critical Habitat Assessment (CHA) and Environmental and Social Impact Assessment (ESIA). These plans potentially include: - Biodiversity Action Plan (BAP), subject to the outcomes of the final bird monitoring results). - Biodiversity Management Plan (BMP). - Biodiversity Monitoring and Evaluation Plan (BMEP).

7.8.3 Transient displacement of sensitive fauna and disruption of ecological processes

AVOIDANCE, MITIGATION AND OFFSETTING MEASURES
• Construction works will be restricted to the daytime, to the extent possible, in order to (i)

AVOIDANCE, MITIGATION AND OFFSETTING MEASURES
minimize disturbance and displacement of faunal mammalian, reptilian and avian species utilizing habitats nearby the project sites, and (ii) prevent accidental animal kills. • Measures for abating noise emissions will be implemented for the duration of construction activities. Such measures will include (but not be limited to) siting noise-generating hotspots away from off-site human and ecological receptors to the extent feasible, switching off idle machinery with acoustic impacts, use of sound proofing installation and acoustic enclosure for noise-generating equipment, and the establishment and/or utilization of acoustic barriers. • Measures for abating light spills will be implemented for the duration of construction activities. Such measures will include (but not be limited to) minimizing the height of lighting poles, orienting floodlights towards the interior of the project sites, use of flood light shields and Light-Emitting Diode (LED) lamps to the extent feasible. • An adequate number of waste bins will be placed at strategic locations within the project site for collection of non-hazardous construction waste to minimize littering. • Dedicated bins will be placed around any on-site kitchen, office and resting facilities to enable the collection and temporary storage of putrescible waste. On-site bins and skips dedicated to this waste stream will be covered and regularly emptied/ replaced to prevent pest infestation. • Haphazard dumping of solid and liquid waste into waterbodies in and around the project sites will be strictly prohibited. The discharge of liquid construction waste (e.g., sewage, concrete washout, used/waste oils) into water bodies will be proscribed. • Excavation and stockpiling will be sited as far as possible from unprotected drainage channels, infiltration ponds, irrigation canals, natural streams and Chirchik River. • Silt traps fences or curtains will be installed where earthworks must be carried out in close proximity to unprotected drainage channels, infiltration ponds, irrigation canals, natural streams and Chirchik River. • Any earthworks within drainage channels, infiltration ponds and natural streams will be avoided, suspended, or otherwise curtailed to the extent feasible during periods of heavy rainfall and/or rapid snowmelt, to the extent feasible. • Designated facilities with an impermeable base (flooring), roofing, and facilities for temperature control, lighting protection, and fire detection and suppression will be established for the storage of hazardous materials and waste. These facilities will be sheltered to prevent exposure of chemical/waste stock to direct sunlight, precipitation, humid external conditions, and wind.

7.8.4 Introduction of Invasive and Alien Species (IAS)

AVOIDANCE, MITIGATION AND OFFSETTING MEASURES
• Excavated soil will be stockpiled and preserved within dedicated sites to enable its reuse in backfilling excavations and landscaping as part of site rehabilitation post the completion of construction works. • Method statements by operators of haulage machinery for the import of soil and aggregates will include the requirement for emptying and cleaning of dump vessels prior to project-related aggregate haulage trips. Vessel cleaning operations will be documented using a checklist that will be kept within the vehicle at all times. • Any imports of soil and aggregates will be sourced from borrow pits and quarry sites located closest to the project sites, to the extent feasible and in coordination with relevant Local Government Authorities (LGAs). • Visual inspections will be carried out for imported stocks of tree seeds, manure and compost during site rehabilitation, to identify any invasive plant specimens with potential for on-site regeneration and propagation. Suitable weed control measures will be implemented for any

related finds.

- Washing of equipment and machinery (including vehicles) will only be permitted in designated areas, with impermeable surfaces and isolated drainage systems that lead to dedicated sumps, treatment facilities including oil/water separators and/or lined evaporation ponds.
- Dedicated biodiversity officers will be engaged for carrying out invasive and alien species inspections within construction zones, for the duration of construction activities. A checklist of common alien and invasive floral species within the project-affected districts and region will be developed in advance of construction work.
- The clearance of invasive and alien floral species within the project sites will follow a weed control hierarchy. Control measures such as the use of herbicides and fire will be prohibited.

8 NOISE AND VIBRATION

8.1 Legal Requirements and Standards

8.1.1 National laws and regulations

The SanPin No. 0267-09 relating to rules on acceptable levels for habitable areas in Uzbekistan sets out the acceptable noise levels for habitable areas both inside and outside of buildings in Uzbekistan as shown in the table below.

Table 8-1 Noise Limits under SanPiN No.0267-09

LOCATION	TIME	SANPIN NO. 0267-09
Noise levels in premises of residential, public buildings and on the territory of residential areas	7am to 11pm	55dB(A)
	11pm to 7am	45dB(A)

The SanPinNo. No 03225-16 Sanitary standards for permissible noise levels in the workplace aims to protect the health of the staff and workers in the workplace. The law represents noise levels for a variety of internal and external application as shown in the table below:

Table 8-2 Work Environment Noise Limits

TYPE OF WORK, WORKPLACE	REQUIREMENT
Performing all types of work on the permanent workplaces in industrial premises and in the enterprises	80db(A)

8.1.2 Lender requirements

8.1.2.1 EBRD

Directive 2002/49/EC relating to the assessment and management of environmental noise (the Environmental Noise Directive – END). The Directive does not set limits or target values, nor does it prescribe the measures to be included in EU Member State (or Uzbekistan) action plans for noise, thus leaving such items at the discretion of the competent authorities.

8.1.2.2 EPFIs

The World Bank Group General EHS Guidelines (2007) – Table 1.7.1.

8.2 Baseline Conditions – PV Plant Site

The PV plant site is located within a well-developed part of Yuqorichirchik District, which lies about 6 km from the outskirts of Tashkent City. The project footprint is situated within a fenced plot which encompasses an operational well-field and waterworks constituting a water supply system operated by Uzsuvtaminot.

The following land uses were recorded within a 300-metre distance from the site boundaries, during the ESIA-stage baseline surveys:

- Uzsuvtaminot office located on the eastern end of the site.
- Establishments north of the site include a crop farm, an aquacultural pond, and the fringes of a residential community in the Tashtogizoq makhalla.
- Establishments east of the site include crop farms and the fringes of residential communities in the Taraqqiyot, Gulobod and Istiqlol makhallas, as well as the 4R-12 highway.
- Establishments south of the site include residential communities in the Istiqlol makhalla, a regional grain storage facility, cotton processing factory, and a recreational facility (fishing oriented) which is currently under construction. Part of this area can be considered a commercial/ industrial zone.
- No establishments are located within the western vicinity of the site, which includes the Chirchik river valley and additional Uzsuvtaminot waterworks (west of the river channel).

The vicinity of the project site generally includes residential areas. However, a portion of the vicinity south of the site can be categorized as a commercial and industrial area, due to the presence of establishments such as factories, warehouses and retail outlets.

AMBIENT NOISE MONITORING METHODOLOGY

Following the identification of adjacent land uses and potential noise impact receptors, noise measurements were carried out to establish the baseline level of ambient noise as a frame of reference for prediction of cumulative noise levels during construction, subsequent mitigation planning, and noise monitoring during construction and operations. These measurements were conducted between the 18th and 19th of June, 2023.

A total of three monitoring locations were selected for the survey. These locations were considered representative of baseline noise levels at noise-sensitive establishments located within 300 metres of the PV plant site and the site entry point. The monitoring locations are shown in Table 8-3 below.

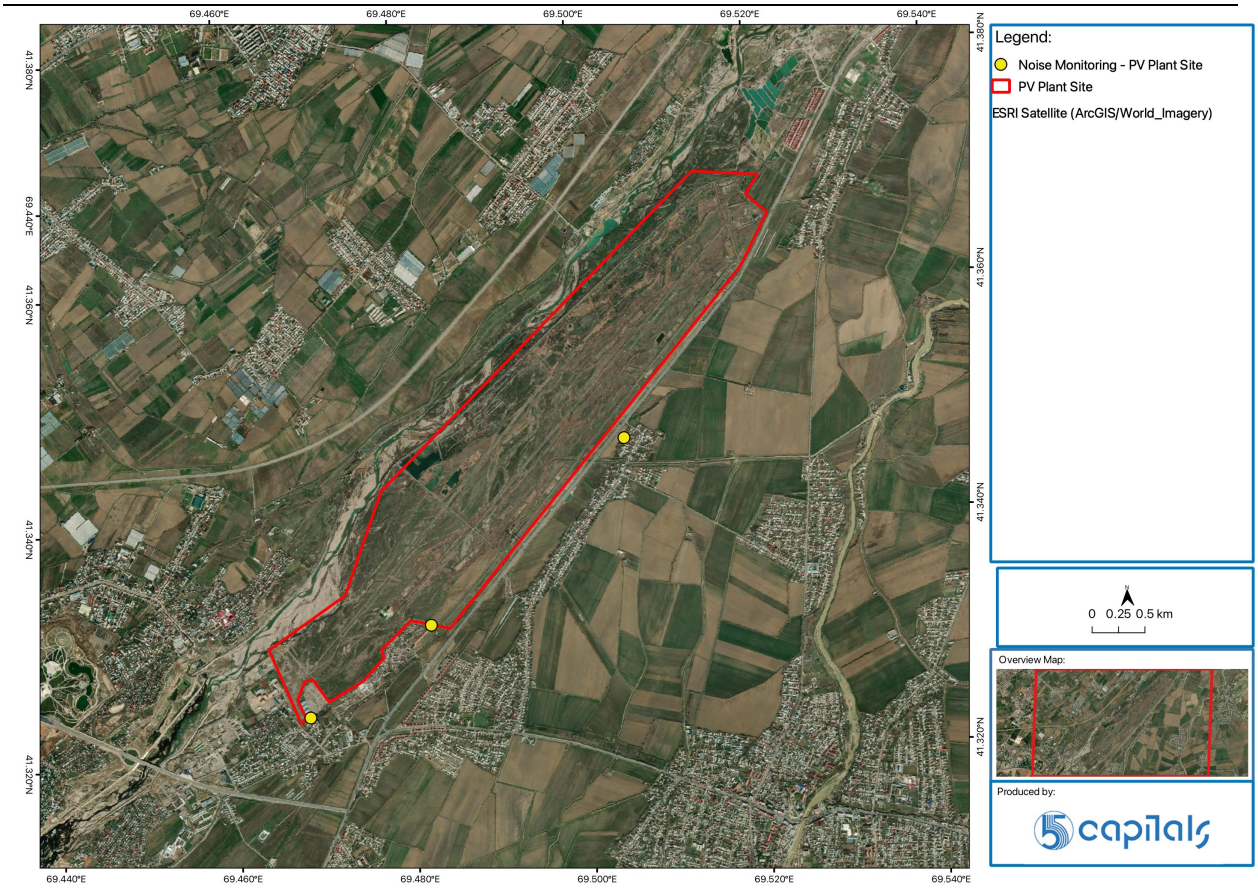


Figure 8-1 Noise monitoring locations around the PV plant site

The locational context of the monitoring locations is further provided in Table 8-3 below.

Table 8-3 Information on noise monitoring locations for the PV plant site

NOISE MONITORING LOCATION	DESCRIPTION	GPS COORDINATES	
		LATITUDE	LONGITUDE
N 01	Residence located 156 metres from the eastern PV plant site boundary (i.e., residential location)	41.346694°	69.505014°
N 02	Industrial facility located 42 metres from the eastern PV plant site boundary (i.e., commercial/ industrial location)	41.323895°	69.468335°
N 03	Residence located 28 metres from the eastern PV plant site boundary (i.e., residential location)	41.331382°	69.482377°

Baseline ambient noise monitoring was undertaken using a Class 1 noise level meter (Rion NL 52). The noise meters were mounted on tripods such that the microphone was fixed 1.7 metres above ground level, and within a distance no less than 5 metres from reflective surfaces, in efforts to obtain free-field results. The meters were equipped with all-weather

wind shields for the full duration of measurements. The noise meters were also calibrated at the start and end of the measurements, with a negligible recorded deviation of ≤0.5 dB.

The survey was set to cover both working and weekend days, and the analysis of the measurements accounted for daytime and night-time noise levels. Daytime measurements were made between 7 am and 11 pm whereas night-time measurements were made between 11 pm and 7 am. A-weighted noise level measurements were made over continuous 24-hour durations and noise level data was logged at 10-minute intervals.

ANALYTICAL RESULTS FOR AMBIENT NOISE MONITORING

The acoustic indices included in noise monitoring and average results for each are presented in Table 8-4.

Table 8-4 Averaged results for noise monitoring near the PV plant site

NOISE MEASUREMENT LOCATION	DATE	NOISE MEASUREMENT DURATIONS	LA_{EQ}	LA_{MAX}	LA_{MIN}	LA_{10}	LA_{90}	SANPIN STANDARDS		IFC (EHS) GUIDELINE STADARDS	
								RESIDENTIAL ZONES	COMMERCIAL AND INDUSTRIAL ZONES	RESIDENTIAL ZONES	COMMERCIAL AND INDUSTRIAL ZONES
N 01	19-20 June	Daytime	47.73	65.67	39.35	49	42.31	55	80	55	70
		Night-time	48.16	65.56	36.37	48.81	39.74	45	80	45	70
N 02	18-19 June	Daytime	48.72	67.66	39.01	49.86	41.58				
		Night-time	51.32	65.56	44.36	52.11	47.77				
N 03	20-21 June	Daytime	50.07	67.2	40.89	50.72	43.91				
		Night-time	46.7	62.86	40.36	48.18	42.57				

As shown in Table 8-4, the analysis of noise level data included the establishment of averaged, A-weighted noise values split between the indicated daytime and night-time durations.

Based on average results for LA_{90}, which is the best indicator for ambient noise (environmental) noise, noise levels within the vicinity of the PV plant mostly range from 42 dB(A) to 47 dB(A), for 90% of the time. Nevertheless, continuous sound pressure levels (LA_{eq}) between 47 dB(A) and 51 dB(A). In general, daytime levels of ambient noise (in terms of LA_{eq}) are well within both local and international limits for residential and commercial/ industrial zones. However, night-time levels of ambient noise in all the monitoring locations exceed local and international limits for residential zones.

Temporal variation in noise levels for the entire monitoring duration within each noise monitoring location was analysed with reference to the time series graphs below, which depict the fluctuation in each acoustic index across the monitoring duration.

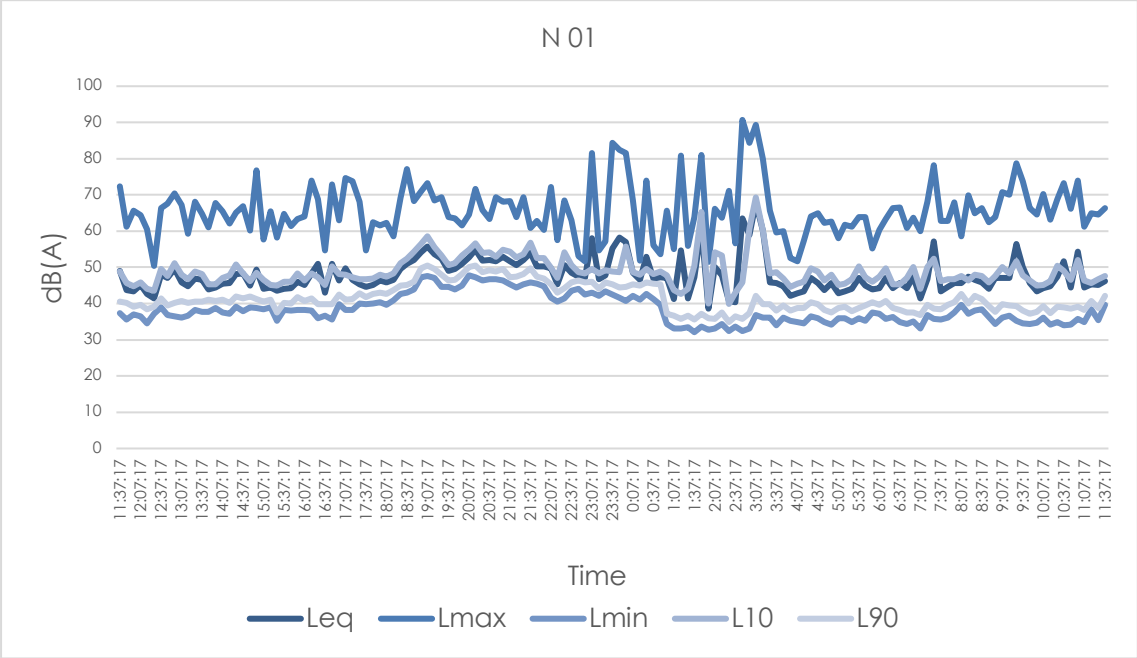


Figure 8-2 Variation in noise levels across the monitoring duration at location N01

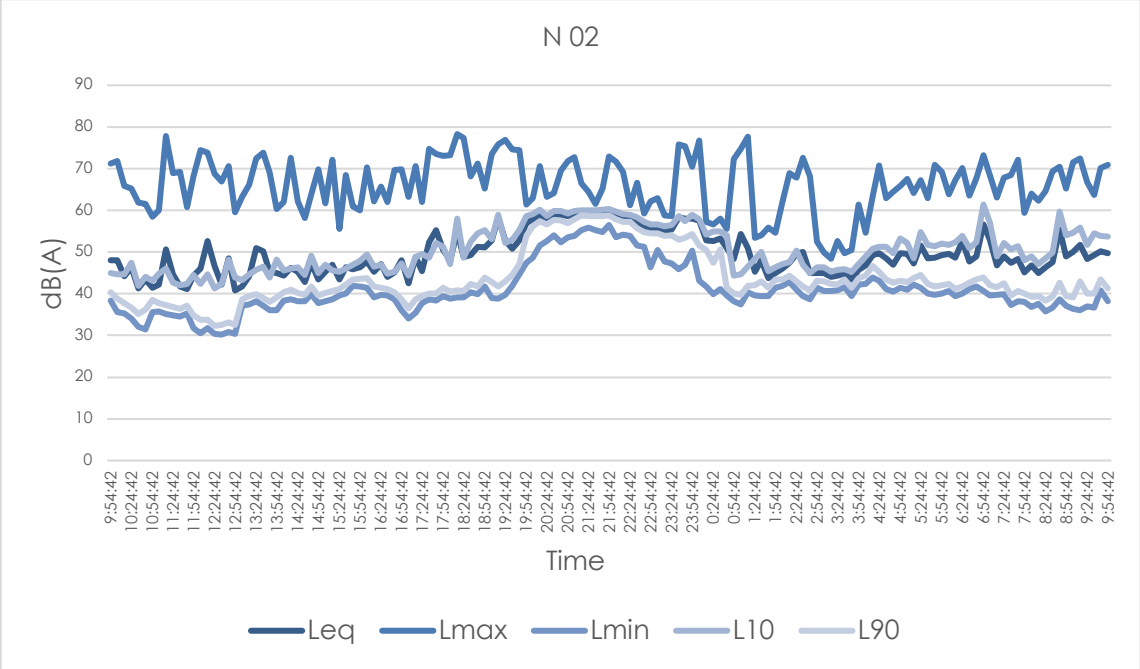


Figure 8-3 Variation in noise levels across the monitoring duration at location N02

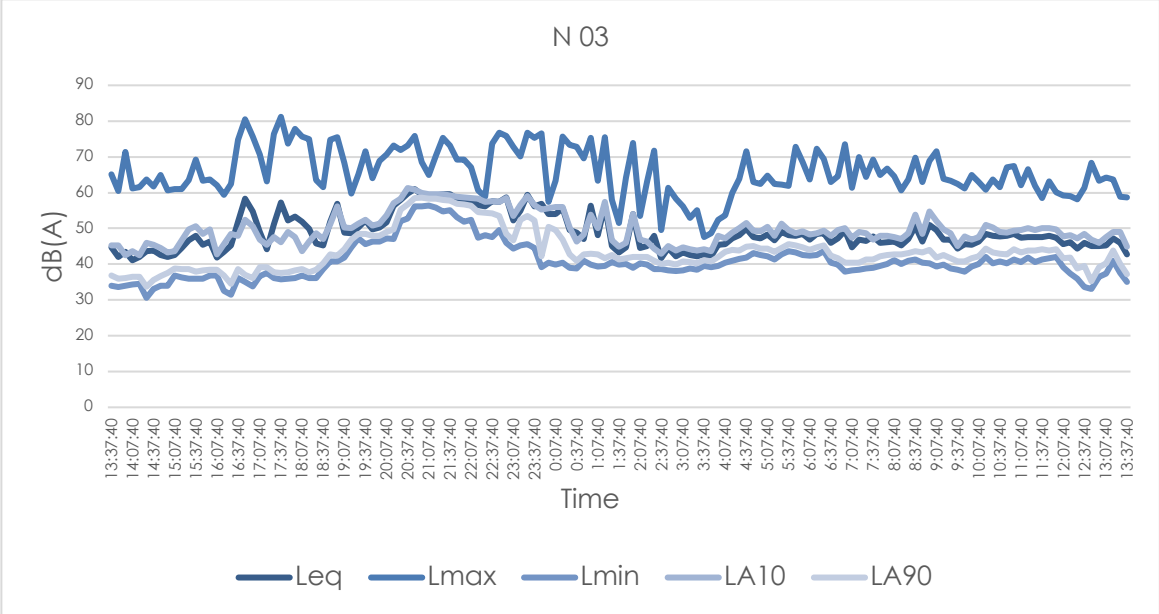


Figure 8-4 Variation in noise levels across the monitoring duration at location N03

As shown in the graphs above, predominant ambient noise levels, which are best represented by the LA_{90} logs, tend to peak during the late evening hours between 6 pm and 12 am. Elevated noise levels during this duration are attributable to influences from motorway traffic along the 4R-12 highway, operations at the nearby grain storage facility and wind conditions.

The fence line along the northern, eastern, and southern boundaries of the PV plant site (with the exception of the western boundary facing Chirchik River) can be considered an acoustic barrier for potential noise emissions from project activities.

Discernible ground borne vibrations were not recorded over the course of the noise monitoring survey.

8.3 Baseline Conditions – BESS Site

The BESS site is located within a relatively greenfield zone within Parkent District, which lies about 16 km from Tashkent City. No establishments are present within the footprint of the BESS and the interconnection cable route.

The following land uses were recorded within a 300-metre distance from the site boundaries, during the ESIA stage baseline surveys:

- A secluded part-time residence located 140 metres north-east of the site.
- An unpaved track along the eastern boundary of the site.
- A farmhouse located 300 metres south-west of the site.
- Crop farms adjoining the south-eastern site boundary and underground cable path.
- Herding activities on meadows located between the western margin of the site and the Khandam canal.

AMBIENT NOISE MONITORING METHODOLOGY

Following the identification of adjacent land uses and potential noise impact receptors, noise measurements were carried out to establish the baseline level of ambient noise as a frame of reference for prediction of cumulative noise levels during construction, subsequent mitigation planning, and noise monitoring during construction and operations. This round of baseline noise monitoring was conducted on 29 August 2023.

One monitoring location was selected for the survey. This location was considered representative of baseline noise levels at noise-sensitive establishments located within 300 metres of the BESS site and the associated access roads. The monitoring location is shown in Table 8-5 below.

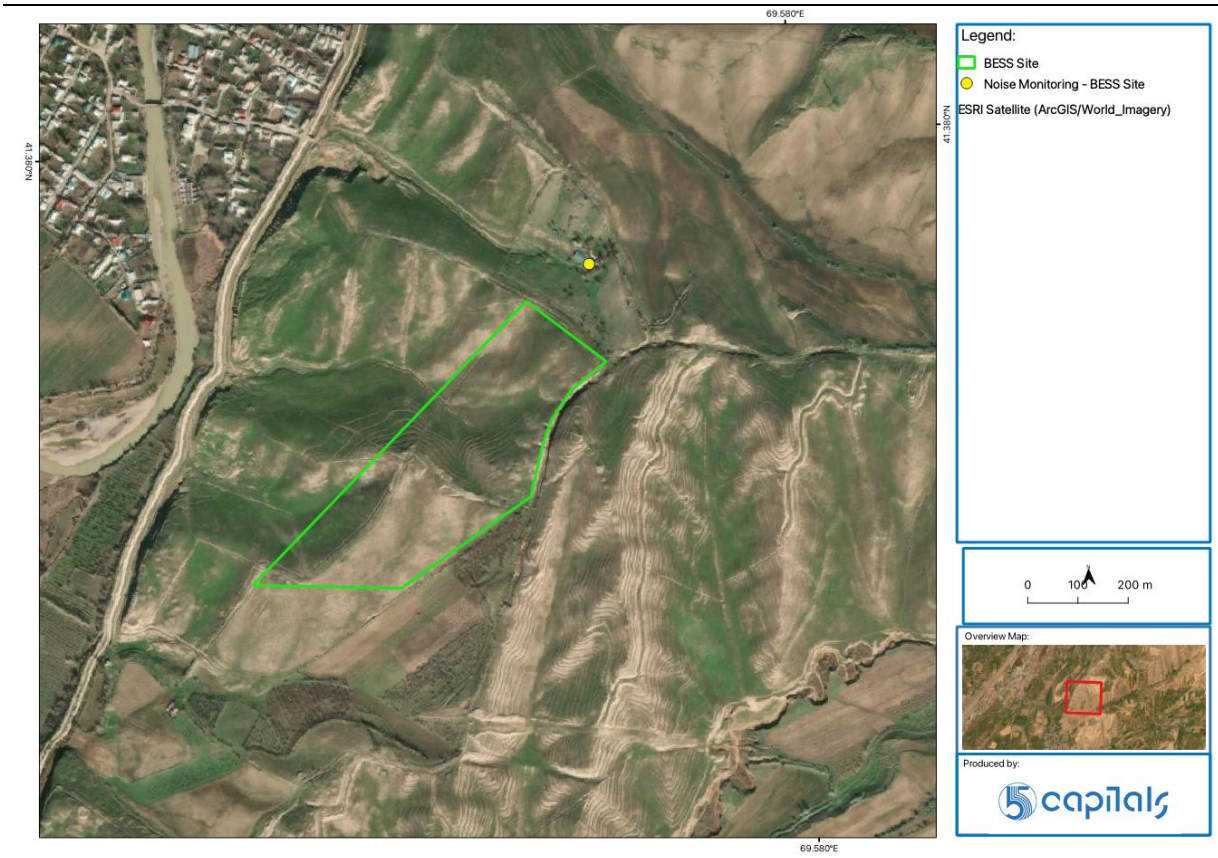


Figure 8-5 Noise monitoring location nearby the BESS site

The locational context of the monitoring location is further provided in Table 8-5 below.

Table 8-5 Information on noise monitoring location for the BESS site

NOISE MONITORING LOCATION	DESCRIPTION	GPS COORDINATES	
		LATITUDE	LONGITUDE
N 04	Residence located 140 metres from the north-eastern BESS site boundary (i.e., residential location)	41.377760	69.575104

The methodology for the baseline noise measurements is presented in Section 8.2 of this report.

ANALYTICAL RESULTS FOR AMBIENT NOISE MONITORING

The acoustic indices included in noise monitoring and average results for each are presented in Table 8-6 below.

Table 8-6 Averaged results for noise monitoring near the BESS site

NOISE MEASUREMENT LOCATION	DATE	NOISE MEASUREMENT DURATIONS	LA_{EQ}	LA_{MAX}	LA_{MIN}	LA_{10}	LA_{90}	SANPIN STANDARDS		IFC (EHS) GUIDELINE STADARDS	
								RESIDENTIAL ZONES	COMMERCIAL AND INDUSTRIAL ZONES	RESIDENTIAL ZONES	COMMERCIAL AND INDUSTRIAL ZONES
N 04	19-20 June	Daytime	41.57	56.60	31.62	43.49	34.95	55	80	55	70
		Night-time	42.51	53.75	35.37	44.45	38.01	45	80	45	70

As shown in Table 8-6, the analysis of noise level data included the establishment of averaged, A-weighted noise values split between the indicated daytime and night-time durations.

Based on average results for LA_{90}, which is the best indicator for ambient noise (environmental) noise, noise levels within the vicinity of the BESS site range from 35 dB(A) to 38 dB(A), for 90% of the time. Nevertheless, continuous sound pressure levels (LA_{eq}) vary between 41 dB(A) and 43 dB(A). In general, both daytime and night-time levels of ambient noise (in terms of LA_{eq}) are well within both local and international limits for residential and commercial/ industrial zones. However, night-time levels of ambient noise in all the monitoring locations exceed local and international limits for residential zones.

In addition, temporal variation in noise levels for the entire monitoring duration within the noise monitoring location was analysed using the time series graph below, which depicts the fluctuation in each acoustic index across the monitoring duration.

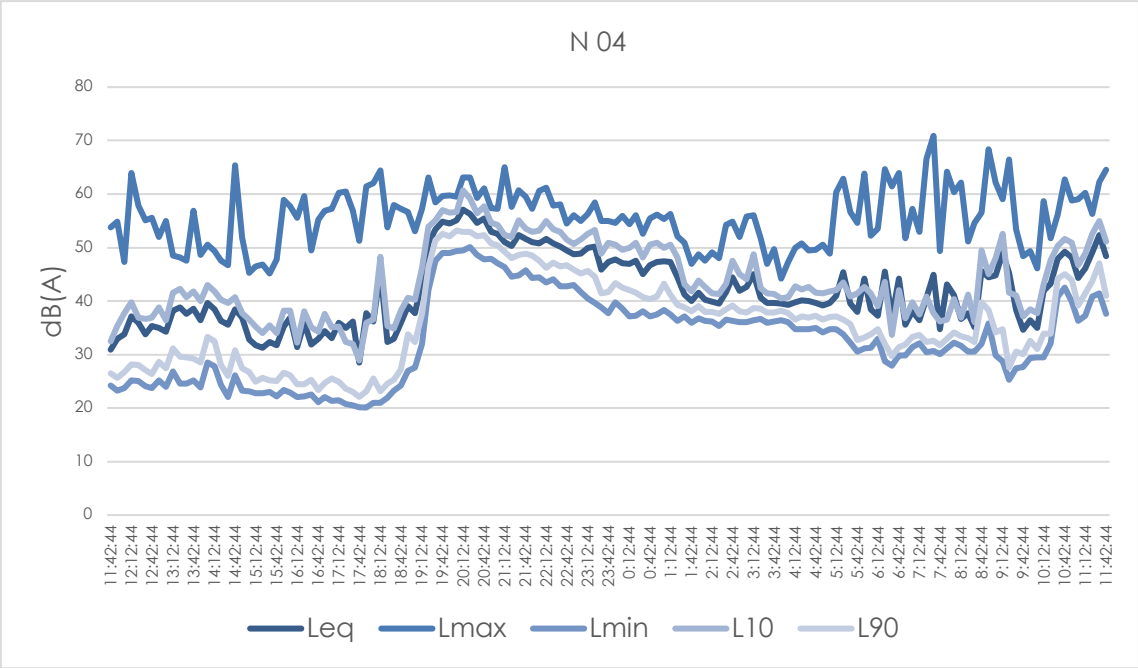


Figure 8-6 Variation in noise levels across the monitoring duration at location N04

As shown in the graph above, predominant ambient noise levels, which are best represented by the LA_{90} log, peak around 7 pm and 11 am. Elevated noise levels within these timeframes are attributable to influences from nearby herding activities and wind conditions.

The vegetation screens around the can be considered an acoustic barrier for the nearby residential facilities for potential noise emissions from project activities.

Discernible ground borne vibrations were not recorded over the course of the noise monitoring survey.

8.4 Receptors

The following table provides an overview of E&S impact receptors in the context of potential noise and vibration impacts within the Project's Areas of Influence (AoI). A sensitivity rating and corresponding description is further provided for each relevant receptor.

Table 8-7 E&S impact receptors – Noise and vibration

RECEPTOR	SENSITIVITY	JUSTIFICATION
Construction workers	High	Construction workers have a potentially high sensitivity to noise emissions and vibration from sources at close range.
Operation and Maintenance (O&M) workers	High	O&M workers have a potentially high sensitivity to noise emissions and vibration from sources at close range.
Residential establishments	High	Residents within nearby residential establishments have a potentially high sensitivity to noise emissions and ground-borne vibration from project activities.
Commercial and establishments	Medium	Residents within nearby commercial and industrial establishments have a potentially moderate sensitivity to noise emissions and ground-borne vibration from project activities, due to existing daytime and night-time ambient noise exceedances recorded within this receptor zone (i.e., N 02).
Ecological receptors (i.e., fauna)	High	Mammal, reptile and avian species resident within the riparian habitat west of the PV plant site have a potentially high sensitivity to acoustic disturbances and ground borne vibration, which can trigger transient displacement and dispersal and affect breeding and foraging patterns.

8.5 Potential Impacts and Impact Management Measures

8.5.1 Construction phase

8.5.1.1 Elevated levels of ambient noise

The Project's construction phase will involve a broad range of noise-generating activities, including the pile driving, offloading of materials and equipment, movement of construction vehicles, and the operation of other construction machinery (e.g., excavators, compactors etc.). Stationary and mobile sources of construction noise have the potential to influence ambient noise levels within the vicinity of the project sites and transit corridors. The establishment of temporary on-site facilities for construction labour, such as staff offices and canteens, may also contribute to an intermittent increase in ambient noise, beyond the project site.

Noise emissions from construction activities potentially pose a nuisance to noise-sensitive human receptors located within close proximity to the project sites (i.e., typically within 300 metres of construction noise sources). Within nearby residential and commercial establishments, elevated levels of ambient noise arising from construction works may cause annoyance, impaired concentration, and sleep disturbance. Residential and commercial establishments located within the immediate vicinity of the project sites and those based around the access tracks leading up to the BESS site are therefore subject to potential nuisances from noise generation during construction works. The Uzsuvtaminot office and guard posts located within the PV plant site is amongst the closest third-party receptors of potential noise influences from construction works.

For ecological receptors within adjacent habitats, construction-related noise and instances of impulsive noise can lead to a transient displacement of resident species (i.e., dispersal and habitat avoidance), which can disrupt the normal ecological processes within these habitats, such as breeding and foraging.

In the absence of mitigation, the impact significance is potentially moderate, considering the presence of sensitive land-uses nearby the project sites and the BESS site in particular, where less influences of ambient noise levels exist.

QUANTITATIVE MODELLING OF NOISE EMISSIONS FROM CONSTRUCTION EQUIPMENT

To gauge the level of acoustic disturbance to off-site receptors from construction-related noise, a basic noise prediction model has been adopted in line with specific guidance provided in the *BS 5228-1:2009 - British Standards: Code of practice for noise and vibration on construction and open sites*. The modelling commenced with the identification of typical noise emission levels for the range of equipment to be employed in construction works. The noise levels, expressed in terms of A-weighted continuous sound pressure level (i.e., LAeq) at 10 metres at 10 metres' distance from the equipment location, were drawn from the Standards.

Table 8-8 Provisional list of construction equipment and respective noise levels at 10 metres' range

CONSTRUCTION EQUIPMENT	BS 5228-1:2009 REFERENCE CODE	SOUND PRESSURE LEVEL, LA_{EQ} DB (A)
Bulldozer	Table C.5, No.14	81
Excavator	Table C.2, No.43	78
Mobile crane	Table C.4, No.52	75
Dump truck	Table C.2, No.31	87
Truck-mounted drill rig	Table C.3, No.15	82
Maximum total source noise contribution at 10 metres		86.4

The predictive calculations set out in *Annex F* of the Standards were premised on the following precautionary assumptions for a worst-case noise emissions scenario:

- Each piece of equipment will only be operational for 50% of the working day.
- The equipment is located at the same location at the boundary of the site.

Subsequently, a number of noise propagation parameters were included in the noise modelling equations, namely (i) distance attenuation, (ii) ground absorbance, and (iii) barrier attenuation. The adjustment due to ground absorbance has been made based on all nearby receptors being >25m from source and using the equation; 25*LOG(10/Distance to receptor)+2.

Table 8-9 Predicted increases in noise levels at receptors

RECEPTOR	DAYTIME BASELINE NOISE LEVEL, LA_{EQ} DB(A)	DISTANCE FROM SOURCE (M)	ANTICIPATED CONSTRUCTION NOISE AT RECEPTOR LOCATION (DBA)	CUMULATIVE NOISE LEVEL	CHANGE FROM BASELINE LEVEL LA_{EQ} DB(A)
N 01	48	156	56.6	60.1	3.5
N 02	49	42	70.9	73.9	3
N 03	50	28	75.3	78.3	3
N 04	42	140	62.8	65.8	3

Paragraph E.3.2 of BS5228 describes the ABC Method, which considers the existing ambient noise environment (the LA_{eq} noise level environment) at the neighbouring sensitive receptors and identifies levels, which, if exceeded, would be considered to result in a significant adverse effect. This method is notably applicable to residential receptors exclusively.

Table E.1 of BS5228 sets out significance effect threshold values at receptors. The process for determining this requires the determination of the ambient noise level at the relevant receptor (rounded to the nearest 5 dB), which is then compared to the total noise level, including the predicted construction noise level. If the combined noise level exceeds the appropriate category value, then the impact is deemed to be significant. The relevant statistics from Table E.1 are set out in the following table.

Table 8-10 Construction Phase Noise – ABC Assessment

ASSESSMENT CATEGORY AND THRESHOLD VALUE PERIOD (LAEQ)	THRESHOLD VALUE, IN DECIBELS - DB(A)		
	CATEGORY A	CATEGORY B	CATEGORY C

Assessment Category and Threshold Value Period (LAeq)	Threshold Value, in Decibels - dB(A)		
	Category A	Category B	Category C
Daytime (07:00 to 19:00 hrs) and Saturdays (07:00 to 13:00 hrs)	65	70	75
Evenings and weekends	55	60	65
Night-time (23:00 to 07:00 hrs)	45	50	55
Note 1: A significant effect has been deemed to occur if the total LA_{eq} noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level.			
Note 2: If the ambient noise level exceeds the threshold values given in the table (i.e., the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total LAeq noise level for the period increases by more than 3 dB due to construction activity.			
Note 3: The above impact assessment method is applicable to residential receptors exclusively. A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values. B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values. C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.			

Note: The ABC Method does not provide levels of significance, as such professional judgement has been applied for relevant evaluation within applicable significance tables.

Going by this method, the cumulative (construction-influenced) noise levels predicted for each of the three residential receptors (i.e., N 01, N 03 and N 04) exceed the corresponding "Category A" thresholds for daytime noise. As such, the predicted noise level increases at these receptors represent a potentially significant acoustic impact.

8.5.1.2 Elevated levels of ambient ground borne vibration

The Project's construction phase will entail a number of site preparation and construction activities that will employ vibration-generating machinery and equipment. These activities typically include land clearing, grading, excavation, rock-breaking, compaction and pile driving. Different levels of ground borne vibration emanate from heavy construction machinery, such as bulldozers, excavators, graders, vibratory rollers, drill rigs, cranes, and Heavy Goods Vehicles (HGVs).

The propagation of ground borne vibration from sources within construction areas is dependent on a number of factors, including at-source ground vibration frequency, ground conditions and topography. The intensity of ground borne vibration typically decreases with increasing distance away from the source, as energy is dissipated through propagation

media. The main impacts associated with the generation of major ground borne vibration beyond construction zones can be categorized as follows:

- Disturbance to occupants of nearby residential, commercial and industrial establishments (i.e., distress, interrupted concentration and sleep disruptions).
- Temporary effects on nearby built-up structures and building contents (i.e., shaking structures, associated rattling).
- Structural damage to nearby buildings, particularly foundation failures and wall cracks or fissures.
- Displacement of burrowing fauna resident with adjacent habitats.

The standard measure for construction-related vibration is Peak Particle Velocity (PPV). The table below indicates a scale for the perceptibility of vibration levels from construction machinery.

Table 8-11 Vibration levels and corresponding degree of perception

VIBRATION LEVEL (PPV)	DEGREE OF PERCEPTION
0.1	Not perceptible
0.15	Threshold of perception
0.35	Slightly noticeable
0.7-1	Noticeable
2.2	Highly noticeable
> 6.0	Disturbing

In general, reported distances from ground borne vibration sources within which regular inspection of building condition is recommendable for timely identification of related structural damages are (i) 50 metres for compaction and demolition activities, and (ii) 100 meters for pile driving. Residential and commercial establishments located within the immediate vicinity of the project sites and those based around the access tracks leading up to the BESS site are therefore subject to vibration-related nuisances and the remote risk of property damage from any extreme vibration-generation events during construction works.

With regard to sensitive ecological receptors within habitats located within the immediate vicinity of the project sites and the PV plant's western surrounds in particular, potentially high levels of ground borne vibration from the operation of heavy construction machinery present an additional form of acoustic disturbance to burrowing fauna. As with high levels of ambient noise, these disturbances can induce the transient displacement of resident faunal species from suitable habitats.

In the absence of mitigation, the impact significance is potentially moderate, considering the low likelihood of high-intensity compaction and blasting works.

8.5.1.3 Occupational exposure to noise and vibration

Construction workers are particularly prone to adverse impacts associated with construction noise and vibration. Frequent exposure to high levels of continuous and intermittent noise, and repeat exposure to impulse noise, pose a range of occupational health conditions, such as irritability, fatigue, auditory impairment, and hearing loss.

Similarly, prolonged exposure to vibratory equipment and hand-held power tools can result in a number of short-lived and chronic health complications. Over time, Hand-Arm Vibration (HAV) can cause a sustained loss of sensation in hands and fingers, musco-skeletal disorders and HAV syndrome. Whole-body vibration can also lead to health effects such as fatigue, motion sickness and muscular conditions.

Table 8-12 Overview of potential impacts relating to noise and vibration during construction

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Elevated levels of ambient noise	Project sites and the surrounding vicinity (audible influence potentially extending between 500 metres and 1 kilometre from on-site sources and transit corridor/ access routes)	Moderate	Residential establishments	High	**Moderate/ Major**	**Minor/ Moderate**
			Commercial and industrial establishments	Medium	**Moderate**	**Minor**
			Ecological receptors	High	**Moderate/ Major**	**Minor/ Moderate**
Elevated levels of ambient ground borne vibration	Project sites, transit corridors, and the surrounding vicinity (audible influence potentially extending between 500 metres and 1 kilometre from on-site sources and transit corridor/ access routes)	Moderate	Residential establishments; Commercial and industrial establishments	High	**Moderate/ Major**	**Minor/ Moderate**
			Ecological receptors	High	**Moderate/ Major**	**Minor/ Moderate**
Occupational exposure to noise and vibration	Construction zones and adjacent labour facilities within the project sites	Moderate	Construction workers	High	**Moderate/ Major**	**Minor/ Moderate**

IMPACT AVOIDANCE, MITIGATION AND OFFSET MEASURES

Elevated levels of ambient noise

- Noise-generating activities will be sequenced or phased where possible (rather than simultaneous execution) as to keep any disturbance from noise to a minimum.
- Consideration of acoustic enclosures and barriers (e.g., equipment housing and shielding, perimeter fencing), or other methods to attenuate construction noise, will be required close to non-mobile sources of noise.
- Acoustic covers on machine engines to remain closed at all times as applicable.
- Where practical, electrically powered plant will be preferred to mechanically powered alternatives.
- All mechanically powered plant, diesel engine vehicles and compression equipment will be fitted with noise control components (exhaust silencers, mufflers) as available from the manufacturer.
- Equipment and operations with a high acoustic impacts will be sited as far as possible from sensitive receptors located within and nearby the

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance

project sites

- Careful handling of materials and waste such as lowering rather than dropping items.
- Night-time construction works will be avoided to the extent feasible. Where unavoidable, night work permits (if applicable) will be obtained from the relevant authorities.
- Wherever practical, all equipment generating ground vibration (e.g., ground compactors, jack hammers, pile drivers and heavy goods vehicles) and activities will be sited away from the Project boundary.
- Equipment and machinery generating noise and/or ground-borne vibration will be switched off when not in use.
- Delivery vehicles will be prohibited from waiting outside the site with their engines running (consideration of driver waiting room with heating/AC).
- Ensure any applicable permits are in place for deliveries to the site and for any works performed outside normal working hours. The movement of heavy vehicles during the night will be avoided to the extent feasible.
- Review vendor specifications and accept site plant and vehicles, in particular heavy vehicles, based on noise generation (as far as practical).
- Where available in country, audible reversing alarms with broadband noise (white noise) will be preferred over tone alarms (beeping), to limit external disturbance to communities.
- Speed limits established in the Traffic Management Plan will be adhered to.
- Notice will be provided to the sensitive receptors along as early as possible (minimum one-week notice) of periods of nosier works in regard to certain construction activities and for how long such activities will be likely to last in accordance with the Stakeholder Engagement Plan (SEP).
- The impacted receptors will have access to a grievance mechanism in accordance with the Project SEP so that any grievances regarding noise can be collected during the construction phase.
- Based on the ESIA and any follow-up risk assessment, the EPC Contractor will develop and implement a (i) Noise Management Plan and (ii) Traffic Management Plan, and incorporate these Plans into all relevant method statements.

Elevated levels of ambient ground borne vibration

- Equipment and machinery generating noise and/or ground-borne vibration will be switched off when not in use, and concurrent vibratory impact from multiple sources will be minimized to the extent feasible.
- The local communities will be informed of the timeline of the works which may result in vibration impacts.
- Where practical, works that may result in vibration impacts will be kept to the centre of the construction areas.
- Vehicles and mechanical plant will be maintained in good condition to minimise excessive vibration.

Exposure to occupational noise and vibration

- Identify workers who may be exposed to elevated noise levels (equal to or exceeding 80dB(A)) and brief them on occupational risks from noise

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
exposure. Provide noise reduction PPE to workers. • Respond to noise related complaints from workers and take corrective and preventive actions as necessary. • Use hierarchy of control related to noise to reduce impact on workers (in the order of physical removal of noise source, replace with quieter options, isolate workers from the high-noise source, change the work methodology, and use of PPE). • Operators of vibrating hand-held machinery (if any) will be provided with appropriate PPE (e.g., protective gloves and ear muffs/plugs) and be given suitable breaks from using such equipment to reduce the impacts of vibration. • Workers potentially exposed to high noise and vibration will be provided with appropriate PPE with respect to the occupational Health and Safety (H&S) risk assessments conducted for specific activities. • Workers potentially exposed to high noise and vibration will be trained to identify situation when PPE is required to be worn and on how to effectively utilize the PPE. • Training will be provided to Uzsuvstaminot workers regarding OHS safeguards and appropriate PPE requirements for noise emissions from on-site construction activities. • Surveillance of noisy work areas will be conducted as required to assess occupational noise related potential issues and hearing tests will be conducted on workers if required based on risk assessment which will be further detailed in the occupational H&S Plan. • These mitigation measures will be incorporated to the applicable occupational H&S plan being developed and implemented on-site.						

8.5.2 Operations phase

8.5.2.1 Elevated levels of ambient noise

At the operational stage, noise emissions will arise from the operation of numerous and high-voltage electrical equipment. For PV plant facilities, these emissions potentially comprise low-frequency, humming noise from constituent inverters and medium-to-high voltage transformers. For the BESS plant, operational noise emissions will likewise be generated by the array of inverters and transformers, as well as the high-capacity Heating, Ventilation and Air Conditioning (HVAC) system.

Corona discharge and associated crackling noise can also occur around overhead, high-voltage conductors within the PV plant site. However, the intensity of corona noise is proportional to the level of discharged voltage/ current. There is no potential for audible levels of corona noise from 220 kV facilities within the PV plant and BESS, taking into account humid conditions, which are most conducive to the corona effect.

The movement of vehicles for transportation of O&M workers and transfer of materials and equipment for maintenance purposes may influence ambient noise levels. The PV plant site access gate and entry road are adjacent to the 4R-12 highway, and project-associated traffic will therefore not generate perceptible increases in traffic related noise along the highway corridor. For the BESS site, any transient nuisances associated with operational traffic will be limited to establishments immediately adjacent to the access tracks between the site and nearby main roads located some two kilometres south of the site.

8.5.2.2 Occupational exposure to noise and vibration

The above-described noise emissions will occur for the duration of the Project's operational phase. For the PV plant site, the Project's O&M workers as well Uzsuvtaminot O&M personnel are subject to occasional nuisances from low levels of operational noise from the network of inverters and electrical sub-station, during outdoor O&M activities within the PV plant site. Any acoustic influences from the facility will not be felt within on-site buildings and office.

Similarly, O&M workers within the BESS site are subject to outdoor exposure to low-frequency noise emissions from the array of inverters, transformers, and the HVAC system. The low-frequency operational noise may also pose a nuisance to noise-sensitive fauna, such as birds. This impact will not occur on a frequent basis, as the O&M personnel will be stationed within the on-site offices.

Table 8-13 Overview of potential impacts relating to noise and vibration during operation

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Elevated levels of ambient noise	Vicinity of the BESS site and access road	Minor	Residential establishments; fauna	High	**Minor/ Moderate**	**Minor**
Exposure to occupational noise	Workstations within the BESS site	Minor	O&M workers	High	**Minor/ Moderate**	**Minor**
Impact avoidance, mitigation and management measures **Elevated levels of ambient noise** • Noise generating equipment will be housed within enclosures to the extent feasible. • A permanent fence will be established around the BESS site to provide an acoustic barrier, and vegetation screens will be maintained where possible. • Regular inspection and maintenance of operational equipment and machinery, including vehicles. **<u>Exposure to occupational noise and vibration</u>** • Soundproofing measures will be implemented for on-site offices within the BESS facility. • O&M workers with frequent or extended exposure to operational noise within the BESS will be provided with hearing protection (PPE).						

8.5.3 Decommissioning phase

Project decommissioning will entail the deconstruction of project facilities, demobilization of related equipment and materials, as well as potential repurposing and/or rehabilitation works. At this stage, potential impacts relating to noise and vibration will be similar to the above-described construction-phase impacts. Specifically, this set of impacts potentially includes:

- Elevated levels of ambient noise
- Elevated levels of ambient ground borne vibration
- Occupational exposure to noise and vibration

For the avoidance and mitigation of these impacts, relevant impact management measures specified in Section 8.5.1 will be implemented. Accordingly, the same pre-management and residual significance ratings are provisionally assigned to mutually relevant impacts on noise-sensitive receptors.

8.6 Monitoring Requirements

Table 8-14 below provides an overview of the key monitoring arrangements for evaluating performance against applicable standards relating to noise and vibration, in the Project's construction and operational phases. A more elaborate and comprehensive coverage of these requirements will be provided in the Construction- and Operations-phase Environmental and Social Management Plans (C-ESMP, O-ESMP) and Environmental and Social Monitoring Plans (ESMoPs).

Table 8-14 Monitoring arrangements for impacts and preventative and mitigation measures relating to noise and vibration

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
Occupational exposure to noise and vibration	Grievances concerning noise	- All related grievances are closed out within the shortest practicable duration	- Worker Grievance Log	Ongoing	- EPC Contractor HR/ H&S Officer
Elevated levels of ambient noise	A-weighted, equivalent continuous sound level – daytime noise (7am to 11pm)	- 55dB(A)	- Noise monitoring locations targeted for ESIA baseline survey	Weekly for 15 minutes per location	- EPC Contractor Environmental Officer
	A-weighted, equivalent continuous sound level night-time noise (11pm to 7am)	- 45dB(A)	- Noise monitoring locations targeted for ESIA baseline survey	Weekly for 15 minutes per location	- EPC Contractor Environmental Officer
	Grievances concerning noise	- All related grievances are closed out within the shortest practicable duration	- Community Grievance Log	Ongoing	- EPC Contractor CLOs

9 AIR QUALITY

9.1 Legal Requirements and Standards

9.1.1 National laws and regulations

THE LAW OF THE REPUBLIC OF UZBEKISTAN "ON ATMOSPHERIC AIR PROTECTION" (1996, AMENDED ON 13.03.2019)

This regulation specifies standards, quality and harmful effects norms, requirements on fuels, lubricants, production and operation of vehicles and other transport means and equipment, ozone layer protection requirements, obligations of enterprises, institutions and organisations toward atmospheric protection, and compensations of damages from atmospheric pollutions.

SanPiN № 0293-11 "Hygienic regulations. List of Maximum Permissible Concentrations (MPC) of contaminants in the atmospheric air of inhabitant areas in the territory of the Republic of Uzbekistan".

Table 9-1 Ambient Air Quality MPC (mg/m³)

POLLUTANT	(MPC MG/M³)			
	ONE-TIME	24-HOUR	MONTHLY	ANNUAL
NO_2	0.085	0.06	0.05	0.04
NO	0.6	0.25	0.12	0.06
CO	5	4	3.5	3
SO_2	0.5	0.2	0.1	0.05
NH_3	0.2	0.12	0.06	0.04

Note: Maximum one-time concentration - the highest concentration detected at 20-30-minute sampling.

- Average daily concentration is the average of the one-time concentrations detected during the day or obtained with continuous 24-hour sampling.
- Monthly average concentration is the average of the average daily concentration detected during the month.
- Average annual concentration - the average of the number of average monthly concentrations revealed during a year in the course of one-time sampling.

9.1.2 Lender requirements

9.1.2.1 EBRD

Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe.

Note: Not being a member State of the EU, it is noted that the Uzbekistan government does not manage ambient air quality in line with these standards, and as such the applicability of these standards in this ESIA assessment will only be for good practice benchmarking purposes, and not compliance assessment.

9.1.2.2 EPFIs

WHO Ambient Air Quality Guidelines (as referenced by the World Bank Group General EHS Guidelines, 2007).

9.2 Baseline Conditions – PV Plant Site

The PV plant site is located within a well-developed part of Yuqorichirchik District, which lies within the Chirchik River valley, some 6 km from the outskirts of Tashkent City. The vicinity of the project site generally includes residential areas. However, a portion of the vicinity south of the site can be categorized as a commercial and industrial area, due to the land-use in this zone.

The site is located about 50 metres from the 4R-12 highway connecting to the ring roads surrounding Tashkent City. With the exception of this roadway, no major sources of air pollution were identified within two kilometres of the PV plant site, during the ESIA-stage baseline surveys (i.e., industrial stack emissions, fugitive dust from adjacent construction works etc.).

According to a high-level hydrometeorological study carried out for the Project, the average long-term wind speed in Tashkent is 2.2 metres per second. These speeds are usually recorded at the start of winter and spring. The study indicated that local wind conditions can culminate in gusts with a speed of 23 to 25 metres per second, particularly in the months of June and December.

AMBIENT AIR QUALITY MONITORING METHODOLOGY

Following the identification of adjacent land uses, air quality measurements were carried out to establish the baseline level of ambient air quality as a frame of reference for subsequent mitigation planning and construction-phase air quality monitoring. These measurements were conducted at one monitoring location, between the 18th and 20th of June, 2023. The

selected location was considered representative of baseline air quality levels within potentially sensitive receptors located nearby the PV plant site fence line and the 4R-12 highway.

The monitoring location is shown in Table 8-1 below.

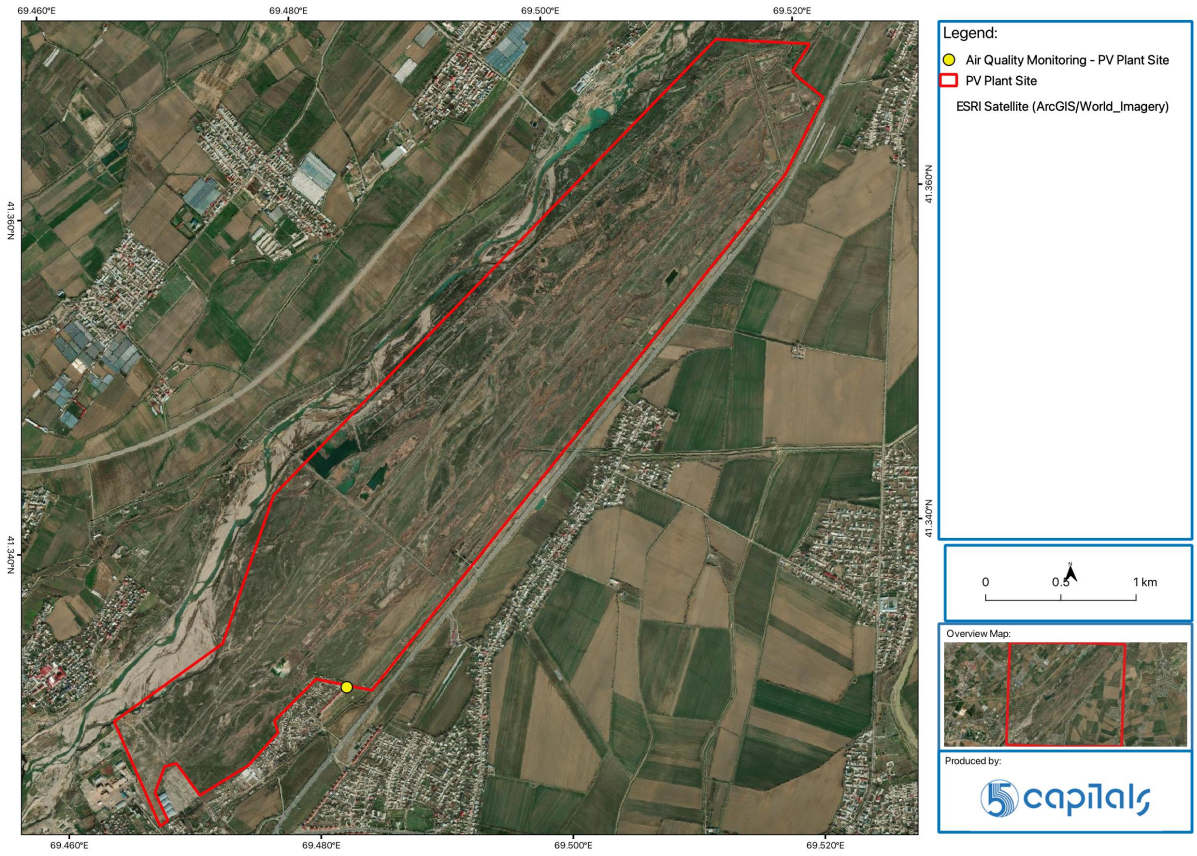


Figure 9-1 Air quality monitoring locations around the PV plant site

The locational context of the monitoring location is further provided in Table 9-2 below.

Table 9-2 Information on noise monitoring locations for the PV plant site

NOISE MONITORING LOCATION	DESCRIPTION	GPS COORDINATES	
		LATITUDE	LONGITUDE
AQ 01	Residence located 10 metres from the eastern PV plant site boundary (i.e., residential location)	41.331382°	69.482377°

Baseline ambient air quality monitoring was undertaken using an air quality monitor (AQ Mesh), equipped with an anemometer. Air quality measurements were taken over a continuous 24-hour duration. Data for air quality parameters was logged at 15-minute intervals.

The list of parameters included in ambient air quality monitoring and average results for each are presented in Table 9-3 below.

Table 9-3 Averaged results for air quality monitoring near the PV plant site

PARAMETER	UNIT	MEAN AIR CONCENTRATIONS (µG/M³)	NATIONAL (SANPIN № 0293-11) STANDARDS	WHO STANDARDS (µG/M³)
Carbon monoxide (CO)	µg/m³	315	4000	-
Carbon dioxide (CO)	µg/m³	766	-	-
Nitrogen oxide	µg/m³	66	250	-
Nitrogen dioxide	µg/m³	64	60	25
Sulphur dioxide	µg/m³	37	200	40
PM2.5	µg/m³	7	-	15
PM10	µg/m³	20	-	45

As shown in Table 9-3, average results for all air quality parameters fall within national and WHO 24-hour guideline limits for air pollutants including particulate matter, with the exception of nitrogen dioxide.

Temporal variation in ambient air quality within the monitoring location for the entire duration of monitoring was analysed with reference to the time series graph below, which depicts the fluctuation in key parameters over time.

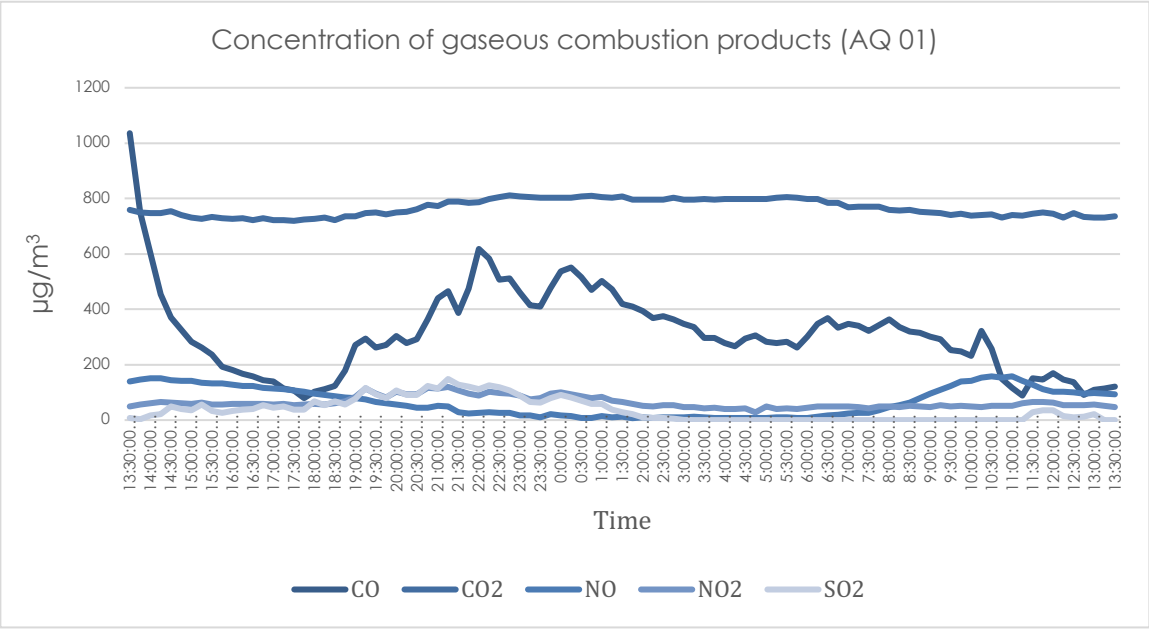


Figure 9-2 Variation in Nitrogen dioxide across the monitoring duration at location AQ01

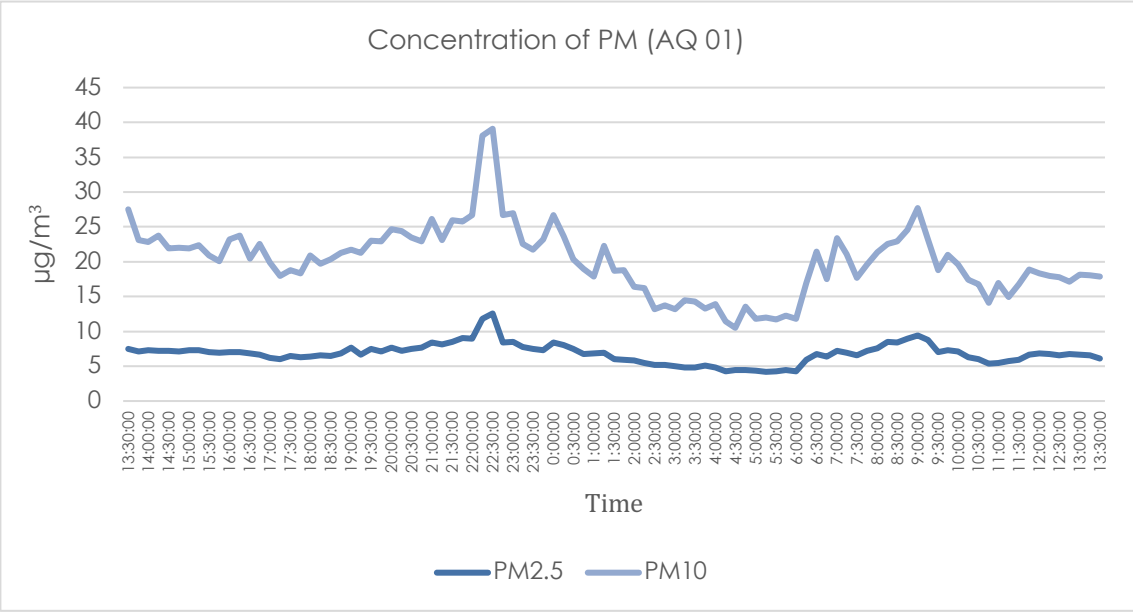


Figure 9-3 Variation in PM concentration across the monitoring duration at location AQ01

In general, air quality monitoring results indicate that ambient concentrations of gaseous and particulate air pollutants generally peak during the 9 pm-12 am and 7 am-9 am timeframes. For PM specifically, a relatively high variance was observed for PM_{10}. The variability in ambient concentrations of combustion- and dust-related air pollutants is largely ascribable to the cyclic changes in vehicular traffic volumes along the 4R-12 highway located nearby the monitoring locations.

In addition, the analysis demonstrates that pre-project ambient concentrations of particulate matter (i.e., $PM_{2.5}$ and PM_{10}) meet the WHO guideline thresholds for this category of air pollutant.

9.3 Baseline Conditions – BESS Site

The BESS site is located within a relatively undeveloped part of Parkent District, which lies at the western foot of the Ugam and Pskem mountain ranges, about 16 kilometres from the outskirts of Tashkent City. The following land uses were recorded within a 300-metre distance from the site boundaries during the ESIA-stage baseline surveys:

- A secluded part-time residence located 140 metres north-east of the site.
- An unpaved track along the eastern boundary of the site.
- A farmhouse located 300 metres south-west of the site.
- Crop farm adjoining the south-eastern site boundary.
- Herding activities on meadows located between the western margin of the site and the Khandam canal.

Little to no vehicular traffic along the existing unpaved roads nearby the BESS site was observed at the time of the ESIA-stage baseline surveys, due to the meagre extent of land-use and commercial activity within the landscape surrounding the BESS site. Land within the site and adjacent uncultivated tracts is largely vegetated with a patchwork of arid grassland and scrubs.

During the surveys, dust dispersal from ongoing activities in and around the site was not observed, with the exception of fugitive dust on unpaved sections of the adjacent access route during transit. No other prevalent air quality influences were noted within 2 kilometres of the site.

Taking into consideration the absence of air pollution sources nearby the site and potentially sensitive establishments, quantitative air quality monitoring was not carried out.

9.4 Receptors

The following table provides an overview of E&S impact receptors in the context of potential air quality impacts within the Project's Areas of Influence (AoI). A sensitivity rating and corresponding description is further provided for each relevant receptor.

Table 9-4 E&S impact receptors – Air quality

RECEPTOR	SENSITIVITY	JUSTIFICATION
Construction workers	High	Construction workers have a potentially high sensitivity to the emission and dispersion of air pollutants (i.e., exhaust gases and PM) at close range.
Operation and	High	O&M workers have a potentially high sensitivity to the emission

RECEPTOR	SENSITIVITY	JUSTIFICATION
Maintenance (O&M) workers		and dispersion of air pollutants (i.e., exhaust gases and PM) at close range.
Residential establishments	High	Residents within nearby residential establishments have a potentially high sensitivity to the emission and dispersion of air pollutants (i.e., exhaust gases and PM) at close range, with generally good baseline levels of air quality.
Commercial and establishments	Medium	Residents within nearby commercial and industrial establishments have a potentially moderate sensitivity to the emission and dispersion of air pollutants (i.e., exhaust gases and PM) at close range, considering the fence barriers and ongoing exhaust emissions within relevant premises.
Ecological receptors (i.e., fauna)	Low	Herptile and floral species resident within habitats within the immediate vicinity of the PV plant and BESS sites have a potentially low sensitivity to fugitive dust from construction-related earthworks and movement of heavy machinery.

9.5 Potential Impacts and Impact Management Measures

9.5.1 Construction phase

9.5.1.1 Elevated levels of ambient dust

The Project's construction phase will entail a host of site preparation activities and earthworks, including land clearance, excavation, grading, stockpiling as well as loading and off-loading of aggregates. Construction activities will also necessitate the circulation of heavy machinery, including Heavy Goods Vehicles (HGVs) within the project sites and along the Project's transit corridor. Construction-related traffic will include trips for the delivery and export of aggregate materials (e.g., backfilling and grading materials, excavation and site clearing spoils).

Earthworks, earth moving activities and the transportation of construction aggregates will result in the generation and dispersal of airborne dust. Dust generation, wind erosion and elevated levels of ambient dust levels pose the following adverse impacts on nearby residential, commercial and industrial receptors:

- Reduced visibility within impacted areas and associated health and safety hazards (e.g., traffic accidents along unpaved transit routes).
- Respiratory ailments and other health effects resulting from sustained dust dispersal.
- Soiling and smothering of nearby third-party assets (i.e., dust deposition on down-wind crop farms, aquacultural ponds, windows, roofing etc.).
- Degradation of sensitive vegetation within sections of riparian habitat in and nearby the western extremity of the PV plant site.

Wind erosion and dust dispersal is likely to be more significant in and around the BESS and interconnection cable sites, due to the uneven terrain (subject to relatively intensive grading), aridity and silty soils characterizing these sites. At the time of this assessment, the grading method (and extent of potential cut-and-fill operations) could not be established. Nevertheless, the relevant impact assessment and mitigation measures presented subsequently draw on a precautionary analysis based on the worst-case grading alternative.

In the absence of mitigation, this impact is potentially moderate/major, considering the dust-sensitive residential land use nearby sources of airborne dust.

9.5.1.2 Elevated levels of ambient exhaust pollutants

The Project's construction phase will involve the operation of various motorized equipment and machinery. This includes heavy construction machinery, such as bulldozers, excavators, graders and cranes, light-duty vehicles, as well as HGVs for construction logistics. Construction activities within the BESS sites will further necessitate diesel-powered generator sets, which will operate continuously for uninterrupted power supply during working hours.

The operation of fuel-powered equipment and machinery will result in exhaust emissions which will influence ambient air quality levels within immediately adjacent receptor locations. Any emissions from the construction vehicles, plant and equipment are expected to mix in ambient air close to the point of origin and are unlikely to be discernible, and are therefore not likely to be distinguishable from the background concentrations or emissions that will not result in an exceedance in ambient air quality standards/concentration.

Noxious exhaust emissions can have an adverse impact on human health, such as respiratory conditions, eye irritation, fatigue and nausea.

9.5.1.3 Occupational exposure to air pollutants

Construction activities within the project sites will degrade ambient air quality due to the emission of exhaust (combustion) fumes, airborne dust as well as fugitive volatile pollutants and odours. While dust and exhaust emissions will be generated by sources elaborate in Section 9.5.1.2 above, further declines in ambient air-quality can occur within on-site construction facilities and workplaces. Specifically, noxious gases (i.e., hydrogen sulphide, methane, etc.) and offensive odours may pervade areas surrounding temporary facilities dedicated to the storage and transfer of putrescible, domestic waste, and sewage. Further, enclosed facilities dedicated to the storage of construction-related materials/ chemicals potentially present fugitive emissions of toxic Volatile Organic Compounds (VOCs) (e.g., benzene, formaldehyde etc.). The expected range of impact from VOCs is likely to be less than 100m from source such as chemical storage areas, hazardous waste storage areas, etc.

The concentration of these pollutants is potentially highest at source locations within various construction working areas. Construction workers are therefore subject to a comparatively high exposure to construction-related air pollution, particularly within dust-prone areas where intensive earthworks will occur. Occupational exposure to high levels of airborne dust, exhaust fumes, VOCs and offensive odours poses a host of occupational health and safety risks, such as respiratory conditions, eye irritation, fatigue, nausea, carbon monoxide poisoning, and cumulative chronic conditions (i.e., cancers, anaemia, etc.).

Table 9-5 Overview of potential impacts relating to ambient air quality during construction

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Elevated levels of ambient dust – PV plant, LILO, underground cable and access road sites	Vicinity of the PV plant, LILO, underground cable and sites and transit corridors including access roads (discernible influence potentially extending to 350 metres from sources, as indicated in UK IAQN guidelines[6])	Moderate	Residential establishments	High	**Moderate/ Major**	**Minor**
			Commercial and industrial establishments	Medium	**Moderate**	**Minor**
			Ecological receptors	High	**Moderate/ Major**	**Minor**
Elevated levels of ambient dust – BESS site	BESS site and its 500-metre buffer	High	Residential establishments	High	**Moderate/ Major**	**Moderate**
			Commercial establishments and livelihood resources	High	**Moderate/ Major**	**Moderate**
			Ecological receptors	High	**Moderate/ Major**	**Minor**
Elevated levels of ambient exhaust pollutants	Vicinity of project sites and transit corridors including access roads (discernible influence potentially extending to 200 metres from sources, as indicated in UK DMRB guidelines[7])	Minor	Residential establishments	High	**Minor/ Moderate**	**Minor**
			Commercial and industrial establishments	Medium	**Minor**	**Negligible**
			Ecological receptors	High	**Minor/ Moderate**	**Minor**
Occupational exposure to air	Construction zones, including on-site roads for vehicular transit	Moderate	Construction workers	High	**Moderate/ Major**	**Minor**

[6] United Kingdom Institute of Air Quality Management

[7] United Kingdom Design Manual for Roads and Bridges.

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
pollutants	Indoor and confined spaces for handling and storage of Volatile Organic Compounds (VOCs)					
	Construction zones and labour facilities close to mobile toilets and storage facilities for domestic and putrescible waste (discernible influence potentially extending up to 100 metres from sources)					

Impact avoidance, mitigation and offset measures

Elevated levels of ambient dust – BESS site

- Alternative grading technology to minimize the extent of conventional cut-and-fill operations within the BESS sites will be considered to the extent feasible.
- In the event that a batching plant is installed within the BESS site, all the necessary permits related to the construction and operation of the batching plant will be secured.
- Dust protection nets shall be installed along the BESS site perimeter prior to the start of any dust generating activities within the BESS site, particularly vegetation clearance, topsoil stripping, grading, and excavation.
- Water sprinkling systems will be deployed for dust suppression during grading (cut-and-fill) operations within the BESS site. Relevant excavation, backfilling and stockpiling sites will be damped down (i.e., watered) at least once a day, for the duration of planned cut-and-fill operations with the exception of days with rainfall. The frequency of ground wetting shall be increased in the event that dust monitoring and/or community and worker grievances indicate substantial exceedences of the threshold for ambient dust/ PM concentration.
- Continual, on-site supervision will be provided to ensure that the height of excavated soil unloading/ drop-off is minimized, particularly during dry, and windy conditions.
- Continual dust monitoring will be conducted in and around (within 300 metres) of the BESS site, to ensure that dust levels during earthworks (and site grading in particular) are within applicable thresholds.
- Adaptive dust suppression is carried out in a manner that is commensurate to dust conditions.

Elevated levels of ambient dust – General

- Weather forecasts will be monitored to identify periods with strong wind conditions and allow provisions for commensurate dust suppression measures within any arid sites prone to dust generation.

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
• Any land grading and excavations within any arid and dust-prone areas within the project sites will be avoided during strong hot, dry, and substantially windy weather conditions. • Cement and other fine powders will be sealed after use or put in bunded containers at appropriate, sheltered storage sites. • Internal roads inside the project site will be compacted to ease navigation and reduce vehicular power consumption. • Only designated access tracks will be used for project traffic, and internal access roads will be demarcated and signposted as necessary, to maximize compaction and reduce the ground-damping zone for dust suppression. • Where sand and other aggregates are transported to or from the site, trucks will not be overloaded and will be appropriately covered/sheeted to avoid loses and dust dispersal en-route. • Vehicle speed on all site roads and along the access road into the site will be restricted to 20 km/hour. • Exhaust emissions from trucks and vehicles will be minimised by ensuring the use of good condition vehicles (e.g., compliant to vehicle emission requirements). There will be pre-requisite requirements of site vehicles to ensure no black smoke before entering site and that any identified machinery or vehicles with black smoke will require maintenance and re-assessment before it is returned. • Heavy goods/ haulage vehicle engines will be turned off during drop-off and pick-up waiting time, to minimize gaseous emissions. Air-conditioned/heated shelters will be provided for drivers in designated waiting, loading and unloading areas to prevent drivers waiting in vehicles. • Regular damping down of any unpaved access tracks and dust-prone construction working areas, to minimize the generation and re-suspension of air-borne dust. • Provide project workers with full PPE kit including dust masks, and goggles where appropriate. • Open burning of solid waste (including vegetation clearance debris) within the project sites will be proscribed. • Advance notices will be provided to sensitive residential and commercial establishments within communities located nearby the project sites as early as possible (minimum one-week notice) in the event of intensive earthworks within dust-prone areas under arid and high-wind conditions. • Aggregate stockpiles (i.e., any find sand, cement etc.) and dust generating activities will be sited away from the site boundaries and/or isolated using barriers such as fencing or vegetation screens to minimize dust dispersal. • Relevant risk assessment will be conducted following the ESIA, in the event that any dust-prone zones of concern are identified during site inspection, and any monitoring locations will be established within dust generation hotspots. • Continual dust monitoring will be conducted in and around (within 300 metres) of the BESS site, to ensure that dust levels during earthworks (and site grading in particular) are within applicable thresholds. • Adaptive dust suppression is carried out in a manner that is commensurate to dust conditions. • Training will be provided to Uzsuvstaminot workers regarding OHS safeguards and appropriate PPE requirements for dust generation from on-site construction activities. • Based on the ESIA and any follow-up risk assessment, the EPC Contractor will develop and implement an (i) Air Quality and Emissions Management						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance

Plan, (ii) Soil Management and Erosion Control Plan, and (iii) Traffic Management Plan, and incorporate these Plans into all relevant method statements.

Elevated levels of ambient exhaust pollutants

- Only designated access tracks will be used for project traffic, and internal access roads will be demarcated and signposted as necessary, to maximize compaction and reduce the ground-damping zone for dust suppression.
- Only designated access tracks will be used for project traffic, and internal access roads will be demarcated and signposted as necessary.
- Vehicle speed on all site roads and along the access road into the site will be restricted to 20 km/hour.
- Unnecessary usage of vehicles, plant and equipment will be minimised and unnecessary idling of vehicles and plant will be avoided.
- Deliveries of equipment/plant to the site will be efficiently managed to reduce the number of trips.
- Exhaust emissions from trucks and vehicles will be minimised by ensuring the use of good condition vehicles (e.g., compliant to vehicle emission requirements). There will be pre-requisite requirements of site vehicles to ensure no black smoke before entering site and that any identified machinery or vehicles with black smoke will require maintenance and re-assessment before it is returned.
- Low Sulphur diesel fuel will be used, if available, through the local supply chains.
- Heavy goods/ haulage vehicle engines will be turned off during drop-off and pick-up waiting time, to minimize gaseous emissions. Air-conditioned/heated shelters will be provided for drivers in designated waiting, loading, and unloading areas to prevent drivers waiting in vehicles.

Exposure to occupational air pollutants

- Hazardous materials stored and used on site with potential gas emissions (e.g. Volatile Organic Compounds) will be located in well-ventilated, but secure low-risk areas, away from major transport routes and away from the site boundary and receptors locations (where possible).
- Volatile fuels and chemicals (including hazardous wastes) will be stored in sealed containers. On site storage of large quantities of volatile fuels will be avoided, equally prolonged exposure to direct sun and heat will be avoided.
- Open burning of waste will be strictly prohibited.
- Chemical storage areas will be purpose built and well maintained. A data log of all chemicals with MSDSs will be provided at the storage facility within easy access.
- The management measures specified above will be implemented to minimize occupational exposure to airborne dust and exhaust pollutants.
- Adequate and well-equipped sanitary facilities will be established within the project sites (with sufficient flush water).
- Effective cleaning and maintenance of toilets will be undertaken to avoid congestion, backflow, and emanation of strong septic odours. Cleaning records/inspection sheets will be displayed in the toilets for purposes of monitoring.
- All septic tanks must be sealed (with applicable vents) and fully functioning.

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
• Septic tanks must be operated and maintained according to manufacturer recommendations. • Sanitary wastewater will be removed from site by licensed contractors and disposed in waste treatment facilities approved by the local municipality. • Where possible, all sanitary facilities and septic tanks will be sited away from receptor locations. • Organic, putrescent domestic waste from on-site kitchen/ canteen areas will be collected, segregated and stored at designated facilities that are sited away from workstations and site boundaries (where receptors are immediately adjacent to the site). • Organic, putrescent waste will be picked up from designated storage areas on a sufficiently regular basis by licensed waste management service providers. • Adequate haulage vehicles will be used for the pick-up and transportation of solid waste and wastewater from the project sites.						

9.5.2 Operations phase

Impacts on ambient air quality are not expected to occur in the Project's operational phase and have therefore been scoped out of the assessment.

9.5.3 Decommissioning phase

Project decommissioning will entail the deconstruction of project facilities, demobilization of related equipment and materials, as well as potential repurposing and/or rehabilitation works. At this stage, potential impacts relating to air quality will be similar to the above-described construction-phase impacts. Specifically, this set of impacts potentially includes:

- Elevated levels of ambient dust
- Elevated levels of ambient exhaust pollutants
- Occupational exposure to air pollutants

For the avoidance and mitigation of these impacts, relevant impact management measures specified in Section 9.5.1 will be implemented. Accordingly, the same pre-management and residual significance ratings are provisionally assigned to mutually relevant impacts on sensitive receptors.

9.6 Monitoring requirements

Table 9-6 below provides an overview of the key monitoring arrangements for evaluating performance against applicable standards relating to ambient air quality, in the Project's construction and operational phases. A more elaborate and comprehensive coverage of these requirements will be provided in the Construction- and Operations-phase Environmental and Social Management Plans (C-ESMP, O-ESMP) and Environmental and Social Monitoring Plans (ESMoPs).

Table 9-6 Monitoring arrangements for impacts and preventative and mitigation measures relating to ambient air quality and carbon emissions

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
Elevated levels of ambient dust	$PM_{2.5}$	15 µg/m³	- Air quality monitoring locations targeted for ESIA baseline survey	Weekly for 20 minutes per location	- EPC Contractor Environmental Officer
	PM_{10}	45 µg/m³		Weekly for 20 minutes per location	- EPC Contractor Environmental Officer
	Dust suppression measures (PV plant, LILO, underground cable and access road sites)	Evidence of dust suppression by damping down, speed limits and covering of hauled aggregate loads	- Construction zones, laydown areas, dirt access tracks	During periods of high activity and dry/windy conditions; Upon grievances related to dust	- EPC Contractor Environmental Officer
	Dust suppression measures (BESS site)	- Installation and maintenance of dust protection netting along the perimeter of the BESS site. - Daily operation of sprinkler systems for dust suppression during cut-and-fill operations within the BESS site (and non-rainy days). - Evidence of general dust suppression within the BESS site by damping down, speed limits and	- Cut-and-fill zones, other soil-stripping, excavation and stockpiling sites, laydown areas, dirt access tracks	Daily during construction. Continual during site grading.	- EPC Contractor Environmental Officer

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
		covering of hauled aggregate loads.			
	Grievances concerning dust conditions	All related grievances are closed out within the shortest practicable duration	- Community and Worker Grievance Logs	Ongoing	- EPC Contractor HR Officer
Occupational exposure to air pollution	Visual assessment of emissions to be undertaken while vehicles and equipment are in use;	No visual observation of black smoke	- All non-road vehicles and engines	Ongoing	- EPC Contractor Environmental Officer
	Third-party inspection of vehicles, including inspection during the initial acceptance criteria of such vehicles to site.	Records of periodic inspection and maintenance	All non-road vehicles and engines	Annually	
	Grievances concerning offensive odours (i.e., VOCs etc.)	All related grievances are closed out within the shortest practicable duration	- Worker Grievance Logs	Ongoing	- EPC Contractor CLOs

10 LANDSCAPE AND VISUAL AMENITY

10.1.1 Legal Requirements and Standards

NATIONAL LAWS AND REGULATIONS

Specific legislation in regard to landscape and visual impacts is not known to exist in Uzbekistan and there are no specific requirements for this linked to lender guidelines. However, any Project activities/design that could impact cultural resources may need to be assessed in the context of that cultural resource.

10.2 Baseline Conditions – PV Plant Site

The baseline surveys integrating into the ESIA study include a characterization of the visual context in and around the PV plant site. This process involved the following main analyses, which constitute the basis of subsequent visual impact assessment:

- Landscape character assessment.
- Viewpoint analysis.

A high-level analysis of the landscape features and visual amenities was also carried out.

LANDSCAPE CHARACTER ASSESSMENT

The Landscape Character Assessment (LCA) began with a desktop review of the salient landscape elements and visual receptors present within the 5km radii of the PV plant and BESS sites. The search radius was based on a provisional, rule-of-thumb Area of Influence (AoI), taking into account the local topography and relevant aspects of the PV plant and BESS design. The landscape elements identified as part of the rapid landscape survey are outlined in the table below.

Table 10-1 List of landscape elements within the provisional AoI of the PV plant

SN	NAME OF LANDSCAPE ELEMENT	DESIGNATION	RELATIVE LOCATION
1.	Baytqorgon Park	Recreational area	2.8 km north-west of the site
2.	New Uzbekistan National Park	Recreational area	2 km south-west of the site
3.	4R-12 highway	Urban highway	45 metres east of the site
4.	Residential clusters within 8 nearby communities	Rural settlements	0.5 to 2 km from the site

The assessment also involved the identification of the existing, vertically intrusive structures within the landscape in the provisional 5 km AoI, via review of satellite imagery and site walkovers. These features include (but are not limited to the following) the following:

- The existing 220 kV overhead transmission line running along the PV plant and BESS sites.
- The existing electrical sub-station located nearby the BESS site.
- High-rise buildings located in the peripheral extent of Tashkent City.

VIEWPOINT ANALYSIS

Following the identification of notable landscape characters within the provisional PV plant AoI, a viewpoint analysis was carried out to identify visual receptors that are subject to high visual impact that would warrant a supplemental assessment.

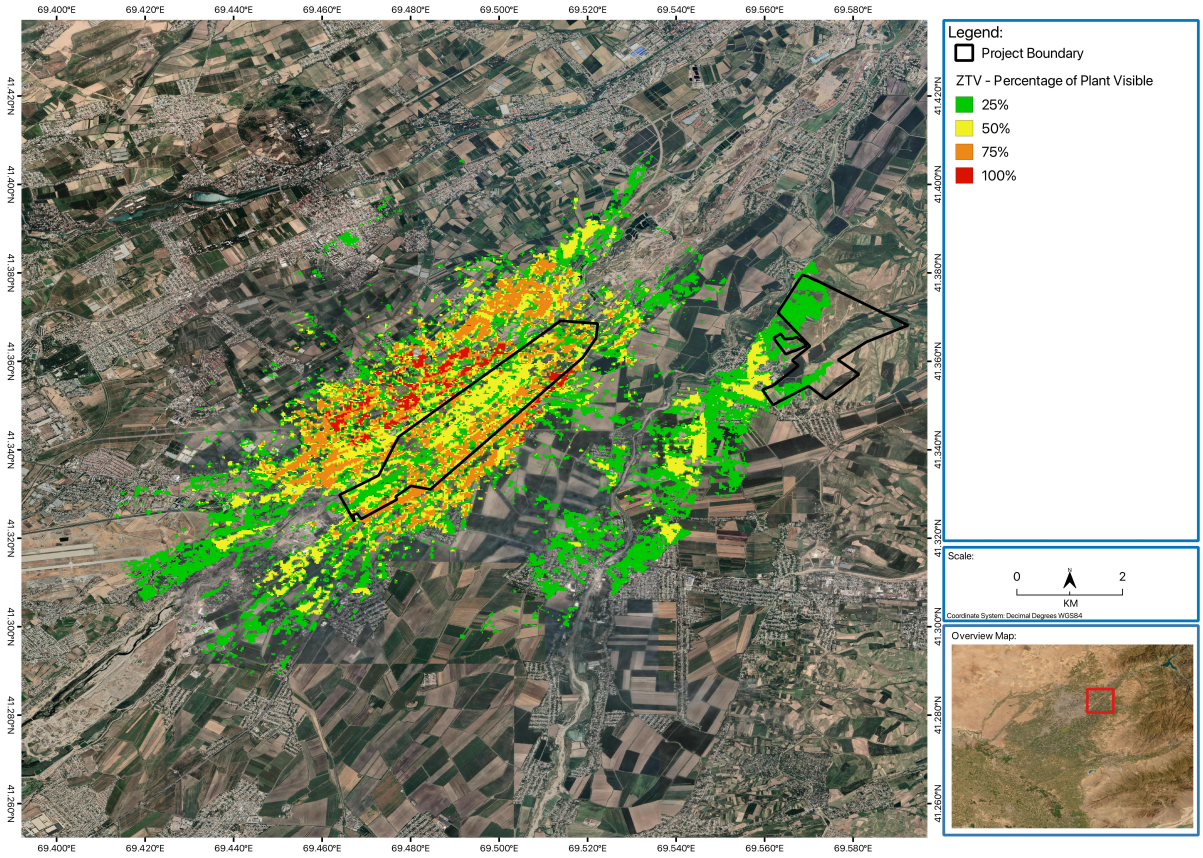


Figure 10-1 Zone of theoretical visibility simulated for the development of the PV plant

This analysis primarily involves the delineation of a Zone of Theoretical Visibility (ZTV). The ZTV was modelled using a global 30×30 metres Digital Elevation Model (DEM) sourced from the SRTM digital database. The simulation projects the theoretical AoI based on the relative elevation of infinite viewpoints (to that of the PV plant array) and splits the AoI into sections with different visual impact ratings. The impact magnitude is evaluated in terms of the

number of PV arrays visible from any given viewpoint. The ZTV is an informative assessment tool, however the following limitations should be taken into consideration:

- The visibility model is two dimensional and does not evaluate visual impact based on the height of the Project's intrusive structures in the viewsheds at any given viewpoint/ receptor. The lateral extent of intrusions within the receptors' field of view is the sole variable factored into the evaluation, whereas the vertical extent of intrusions is treated as a constant.
- The visibility model is based on a medium-resolution DEM and does not account for the screening effect of intervening features such as vegetation, natural landforms and buildings, which can reduce of preclude the visual impact of the solar arrays.

Nevertheless, high impact zones provisionally identified by the ZTV were inspected on satellite imagery, and two representative viewpoints were selected for ground truthing and subsequent visual impact assessment. Observations on the ground indicated that viewsheds within the potentially sensitive viewpoints discerned from the ZTV model do not provide a view of the existing PV plant site.

On-site walkovers around the BESS site also indicate that the part-time residence located 140 metres north of the BESS area may be subject to visual impacts from developments within the relatively elevated and undeveloped BESS site. Potentially affected landscape elements for this particular viewshed include grassy interlocking hills with scenic value.



Figure 10-2 Scenic landscape features around the PV plant site (left) and the BESS site (right)

10.3 Receptors

The following table provides an overview of E&S impact receptors in the context of potential impacts on community health and safety within the Project's Areas of Influence (AoI). A sensitivity rating and corresponding description is further provided for each relevant receptor.

Table 10-2 E&S impact receptors – Community health and safety

RECEPTOR	SENSITIVITY	JUSTIFICATION
Residences and other establishments located nearby the BESS site	Low	Residences and other establishments within the ZTV have a potentially low sensitivity to visual impacts as no landscape elements high visual amenity/ aesthetic value have been identified within the surrounding landscape, with the exception of a few limited recreational areas. The visual receptors are nonetheless subject to declines in visual amenity from the modification of the elevated terrain, construction scars and the installation of the BESS superstructures, among other visual impacts.
Residences and other establishments located nearby the PV plant iste	Low	Residences and other establishments within the ZTV have a potentially low sensitivity to visual impacts as no landscape elements high visual amenity/ aesthetic value have been identified within the surrounding landscape, with the exception of a few limited recreational areas. The visual receptors are nonetheless subject to glint and glare impacts, among other visual impacts.

10.4 Potential Impacts and Impact Management Measures

10.4.1 Construction phase

10.4.1.1 Loss of visual amenity due to alteration of landscape character

The Project's construction phase will entail vegetation clearance earthworks, civil works, and temporary establishments that will degrade the visual amenity of the existing landscape elements, unobstructed viewpoints located within the vicinity of the project sites. Specifically, excavations, stockpiles, laydown areas, on-site labour facilities, as well as heavy construction machinery may present an eyesore to nearby residents, particularly where construction zones are not fenced.

Areas of intensive earthworks within dust-prone sites may also temporarily undermine the aesthetic value of existing viewsheds, particularly those encompassing the BESS area.

10.4.1.2 Visual nuisance due to light spills

Construction activities and related establishments will require outdoor lighting for security purposes and any instances of night-time construction work. The introduction of intense lighting for onsite illumination may result in light spills which may present a visual nuisance to

nearby establishments and residences in particular. The intrusive effect of light trespass is likely to be more pronounced within residential establishments situated close to the BESS area, due to limited existing light sources and well-lit establishments within the surrounding landscape.

Table 10-3 Overview of potential impacts relating to landscape and visual amenity during construction

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Loss of visual amenity due to alteration of landscape character	• Zone of visibility of pre-existing vegetation, construction establishments and construction scars	Major	Residences and other establishments located nearby the project sites	Low	**Minor/ moderate**	**Minor**
Visual nuisance due to light spills	• Project sites and the immediate vicinity	Major	Residences and other establishments located nearby the project sites	Low	**Minor/ moderate**	**Minor**

Impact avoidance, mitigation and offset measures

Loss of visual amenity due to alteration of landscape character

- Wherever possible, visual screens will be established or maintained around laydown areas, stockpiling sites, parking areas, and other visually intrusive construction zones within the project sites, to minimize the impact of construction blight on off-site receptors (i.e., through site fence, vegetation buffers/ hedgerows etc.).
- Vegetation removal will be restricted to demarcated construction zones within the project sites and designated transit corridors.
- Idle machinery and equipment will be restricted to designated parking areas within the project site or relevant machinery bases, and haphazard. parking along access roads and the vicinity of the project sites will be prohibited.
- Existing quarry sites will be used for acquisition of construction sand and other aggregates.
- Upon completion of construction works, all temporary structures and plants will be dismantled and demobilized, and any associated waste will be transferred to designated facilities for waste management.
- Site rehabilitation will be implemented following the completion of construction activities, with complete backfilling of on-site excavations, removal of stockpiles, temporary structures and equipment, as well as the re-establishment of vegetative cover in residual areas within the project sites (i.e., those located outside of permanent clearance zones for the operation and maintenance of project facilities).
- A Soil Management and Erosion Control Plan, Waste Management Plan and Traffic Management Plan will be developed and implemented.

Visual nuisance due to light spills

- Night-time construction work will be minimized to the extent feasible and conducted with prior approval from relevant authorities and advance notices to residential communities located within 500 metres of the project sites.

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
• Any floodlights required for night-time illumination will be oriented towards the interior of the project sites. • Construction lights will be fixed at a maximum position angle of 30° from vertical mounts and the height of lighting poles or towers will be minimized. • Floodlight shields and Light-Emitting Diode (LED) lamps will be adopted where intensive lighting is required.						

10.4.2 Operations phase

10.4.2.1 Loss of visual amenity due to alteration of landscapes of scenic value

The development of the PV plant and BESS site will result in a permanent alteration of the landscape features constituting viewshed within neighbouring settlements. Land conversion will be particularly noticeable at sensitive viewpoints within the vicinity of the BESS area. The establishment of built-up structures such as new fencing, sub-station towers, the overhead LILO will result in visual intrusion and nuisances, and a resultant decline in the visual appeal of existing landscape elements.

Potential impacts on landscape character will nonetheless be cumulative, as some of the landscape elements are already degraded by intrusive structures and urban blight. Further, the PV plant site is currently fenced to a height that is generally higher that the height of the panel installation, which will limit the potential impact on immediately adjacent establishments.

10.4.2.2 Nuisance and safety hazards due to glint and glare from PV panels

The establishment of the PV plant site will result in glint and glare impacts due to the reflection of light from the PV modules. Glint refers to the momentary flash of bright light typically received by moving receptors, whereas glare is defined as a continuous source of bright light typically received by static receptors. Depending on the visibility of the solar panels to nearby receptors, high exposure to glint and glare can result in distraction, flash-blindness, and in extreme cases, retinal burn.

Receptors of potential glint and glare impacts potentially include high-rise residential buildings within the visibility zones of the PV plant infrastructure. Glare and glint are not expected to impact on motorway users along the 4R-12 highway, considering the height of the mounted panels, local topography and the existing fence encompassing the PV plant area. Road users within impact zones may be subject to H&S incidents which can result from the distraction and loss of visibility associated with glint and glare, particularly within affected roads (e.g., service roads within the PV plant site).

Table 10-4 Overview of potential impacts relating to community landscape and visual amenity during operations

E&S IMPACT	AREA OF INFLUENCE	IMPACT MAGNITUDE	POTENTIAL RECEPTORS (DIRECT AND INDIRECT RECEPTORS)	RECEPTOR SENSITIVITY	PRE-MANAGEMENT IMPACT SIGNIFICANCE	RESIDUAL IMPACT SIGNIFICANCE
Loss of visual amenity due to alteration of landscapes of scenic value	• Zone of visibility of permanent intrusive superstructures.	Major	Residences and other establishments located nearby the project sites	Low	**Minor/ moderate**	**Minor**
Nuisance and safety hazards due to glint and glare from PV panels	• Zone of visibility of PV panel arrays.	Major	Residences and other establishments located nearby the project sites	Low	**Minor/ moderate**	**Minor**

IMPACT AVOIDANCE, MITIGATION AND OFFSET MEASURES

Loss of visual amenity due to alteration of landscapes of scenic value

- Wherever possible, prominent built-up structures and visible establishments (i.e., fence lines and battery containers), will not be painted in conspicuous colours causing unappealing contrast with the surrounding landscape.
- A post-construction site rehabilitation plan will include efforts to establish vegetative screens/ hedge rows, around the BESS site.

Nuisance and safety hazards due to glint and glare from PV panels

- PV modules with in-built technology to minimize reflection of incident light will be used for the full operational lifetime of the PV plant.
- The site fence encompassing the PV plant site will be maintained.
- Vegetation screens/ hedgerows will be enhanced to the extent possible to further screen the PV arrays within the PV plant site (subject to shading, fire safety restrictions etc.).

10.4.3 Decommissioning phase

Project decommissioning will entail the deconstruction of project facilities, demobilization of related equipment and materials, as well as potential repurposing and/or rehabilitation works. At this stage, potential impacts relating to landscape and visual amenity will be similar to the above-described construction-phase impacts. Specifically, this set of impacts potentially includes the loss of visual amenity due to alteration of landscape character.

For the avoidance and mitigation of this impact, relevant impact management measures specified in Section 10.4.1.1 will be implemented. Accordingly, the same pre-management and residual significance ratings are provisionally assigned to mutually relevant impacts on sensitive receptors.

10.5 Monitoring requirements

Table 10-5 below provides an overview of the key monitoring arrangements for evaluating performance against applicable standards relating to landscape and visual amenity, in the Project's construction and operational phases. A more elaborate and comprehensive coverage of these requirements will be provided in the Construction- and Operations-phase Environmental and Social Management Plans (C-ESMP, O-ESMP) and Environmental and Social Monitoring Plans (ESMoPs).

Table 10-5 Monitoring arrangements for impacts and preventative and mitigation measures relating to landscape and visual amenity

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
Visual nuisance due to light spills	Grievances concerning light spills	- All related grievances are closed out within the shortest practicable duration	- Community Grievance Log	Ongoing	- EPC Contractor CLOs
Loss of visual amenity due to alteration of landscape character	Percentage of site-specific rehabilitation activities completed in line with the Site Rehabilitation Plan	- 100% of site-specific rehabilitation activities have been completed in line with the Site Rehabilitation Plan	- Disturbed zones within the project sites	Daily during demobilization	- Project Company Environmental Officer - EPC Contractor Environmental Officer

11 TRAFFIC AND TRANSPORTATION

11.1 Legal Requirements and Standards

11.1.1 National laws and regulations

The Ministry of Transportation is responsible for all transport related activities and their requirements should be fully complied with in terms of routing of Heavy Goods Vehicles (HGVs) and site vehicles, licensing, road diversions, heavy/wide loads etc. Some of the relevant national requirements for the Project include:

- Law "About traffic safety" of the Republic of Uzbekistan August 19, 1999 No. 818-I (as amended on 29-12-2015): The main objective of this law is to ensure protection of life and health of citizens and their protection.
- Regulations on road safety during transportation of large and heavy loads by road transport (Annex No.2 to the Decree of Cabinet of Ministers No. 342 of December 26, 2011): This law determines the requirements of ensuring and coordinating traffic safety during the transportation of large size and heavy loads on public roads on the territory of Uzbekistan. It also details the basic requirements for the technical condition equipment and furnishing of vehicles used for the transport of large and heavy loads as well as safety.
- Criteria and Procedure for Determining International Road Transportation of Loads (approved by the Decree of Ministry of Transport of the Republic of Uzbekistan and State Customs Committee of the Republic of Uzbekistan dated October 31, 2019, No. 6).
- Regulations on transport of loads by road in the Republic of Uzbekistan (Annex to Decree of Cabinet of Ministers No. 213 of 01.08.2014).

11.1.2 Lender requirements

11.1.2.1 EBRD

The EBRD PR 4 on Health and Safety establishes management requirements with regards to traffic and road safety risks to workers and potentially affected communities. Relevant EU road and traffic safety management standards must therefore be taken into consideration.

"For Projects that operate moving equipment on public roads and other forms of infrastructure, the client will seek to prevent the occurrence of incidents and injuries to members of the public associated with operation of such equipment."

11.1.2.2 EPFIs

The assessment will be undertaken with due consideration of the recommendations set out within the IFC/World Bank General EHS Guidelines (2007) Section 3.4 Traffic Safety, within Section 3: Community Health and Safety.

11.2 Project Logistics

Uzbekistan is a land-locked country with well-developed inland transportation infrastructural and logistical hubs based on multi-modal transit routes for the import, export and country-wide freight. This infrastructure includes dry ports connecting to the international transport corridors linked to major seaports in China, Russia, Iran, India and Western Europe. The corridors include high-capacity railways, and a domestic network of highways measuring a total length of 42,500 km. A total of eight major airports are also operational within the country, including the Tashkent International Airport located within Tashkent City.

The project sites are located close to the 4R-12 highway, which serves both Yuqorichirchik District and Parkent District, and feeds into the M39, M34 and A373 regional highways. These paved radial highways connect the country's regions and hinterland to a network of ring roads within the commercial capital.

Globalink conducted the route survey along the Project's transit corridor for the Bash and Dzhankeldy wind projects in 2022. No constraints have been identified along the route for the Project. The Project's international transit corridor will originate from a border post in China to custom points at Kolzhat in Kazakhstan. Subsequently, project components will be transported to custom points at the Yallama border post, and then onwards to route M-39 in Uzbekistan, and from rout M-39 to the project sites in Yukorichirchik and Parkent Districts.

11.3 Baseline Conditions – PV Plant Site

The PV plant site is located along the 4R-12 district highway, which links feeder roads within the districts of Yukorichirchik, Parkent and Kibray to the ring road along the outskirts of Tashkent City. The single carriageway is paved and in good condition, as shown in Figure 11-1 below.



Figure 11-1 View of the 4R-12 highway and entry gate towards the PV plant site

An existing 50-metre road links the PV plant site entry/exit gate to the highway (on the eastern side). This road will be used for site access, during construction. To prevent the congestion of construction vehicles during periods of peak construction traffic, an additional entry and exit gate will be established along the south-western site boundary. This gate will allow direct connection with an existing road connecting the 4R-12 highway to the industrial zone located south-west of the site.

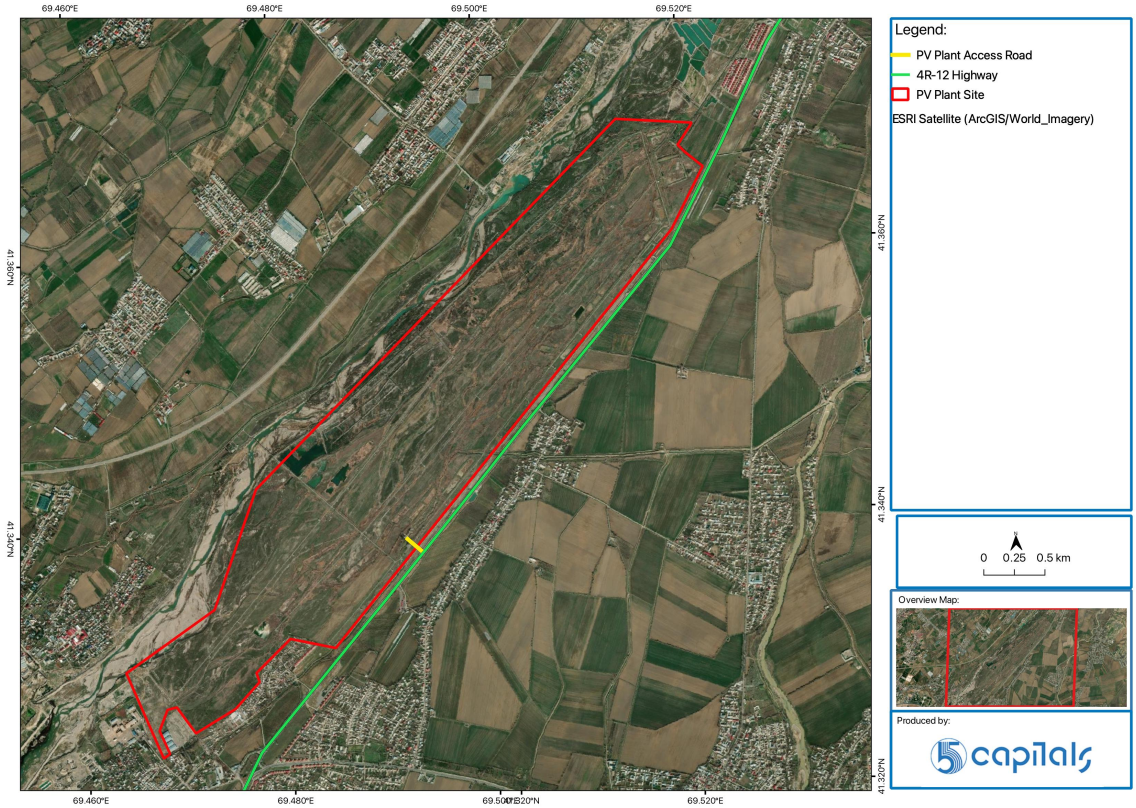


Figure 11-2 Entry/exit road connecting the PV plant site to the adjacent 4R-12 highway

Direct entry to the northern side of the site is not feasible, due to the existing continuous fence wall, and agricultural property located north of the site, where a contiguous fence is also present. The main entry point(s) will be connected to the network of internal service roads that extend across the entire area within the PV power plant plot.

Site visits during the ESIA indicated low to moderate traffic volumes along the 4R-12 highway, and a predominant lack of vehicular traffic along the access road leading to the existing entry/exit gate.

TRAFFIC MONITORING

A rapid traffic count study was conducted as part of the ESIA, to provide a more detailed indication of baseline traffic conditions along the 4R-12 highway. The survey was conducted on the 27th May and 29th May, 2023, with a view to capturing both working- and non-working day traffic patterns between 9 am and 7pm. Traffic volumes were assessed by counts specific to several vehicle categories (i.e., heavy duty to light duty vehicles). Table 11-1 and Table 11-2 below provide an overview of traffic volumes for different vehicle categories within the survey durations.

Table 11-1 Results for traffic count on a non-working day

DURATION	HGV	CARS	VAN	MOTORCYCLE	TOTAL
TRAFFIC VOLUME – NON-WORKING DAY COUNTS					
9:00-9:30	73	858	30	10	971
9:30-10:00	66	840	32	10	948
10:00-10:30	71	872	20	3	966
10:30-11:00	89	935	29	3	1,056
Sub-total for morning hours					3,941
13:00-13:30	83	1080	25	6	1,194
13:30-14:00	60	1020	23	4	1,107
14:00-14:30	80	1075	27	1	1,183
14:30-15:00	90	1102	25	1	1,218
Sub-total for afternoon hours					4,702
17:00-17:30	89	1414	27	3	1,533
17:30-18:00	109	1518	37	2	1666
18:00-18:30	58	1480	51	8	1597

DURATION	HGV	CARS	VAN	MOTORCYCLE	TOTAL
TRAFFIC VOLUME – NON-WORKING DAY COUNTS					
18:30-19:00	108	1663	38	1	1810
Sub-total for afternoon hours					6,606
Total					**15,249**

Table 11-2 Results for traffic count on a working day

DURATION	HGV	CARS	VAN	MOTORCYCLE	TOTAL
TRAFFIC VOLUME – WORKING DAY COUNTS					
9:00-9:30	57	826	22	12	917
9:30-10:00	53	862	31	11	957
10:00-10:30	66	890	25	3	984
10:30-11:00	76	839	22	2	939
Sub-total for morning hours					3,797
13:00-13:30	83	1080	25	6	866
13:30-14:00	60	1020	23	4	932
14:00-14:30	80	1075	27	1	968
14:30-15:00	90	1102	25	1	953
Sub-total for afternoon hours					3,719
17:00-17:30	89	1414	27	3	1,222
17:30-18:00	109	1518	37	2	1,266
18:00-18:30	58	1480	51	8	1,277
18:30-19:00	108	1663	38	1	1,303
Sub-total for afternoon hours					5,068
Total					**12,584**

The traffic count results indicate that traffic volumes along the 4R-12 highway has low-moderate traffic conditions. Stable traffic flows at an average rate of 2,000 vehicles per hour were recorded during the working day survey duration. In the same duration, Heavy Goods

Vehicles (HGVs) accounted for about 7% of the total traffic count. For both working day and non-working day counts and observations, traffic volumes peaked in the evening hours.

11.4 Baseline Conditions – BESS Site

The BESS site and the interconnection cable route can be accessed through an unpaved road branching out of the feeder road serving the Kavardan community situated south-west of the sites. As the road cuts across a relatively underdeveloped area, observations of traffic conditions along the road indicated occasional movements of small vehicles, and no congestion hotspots. The BESS site can also be accessed through an unpaved road, which lies further east (700 metres at most) from the main access track. This road was developed for the construction of a nearby overhead transmission line corridor.

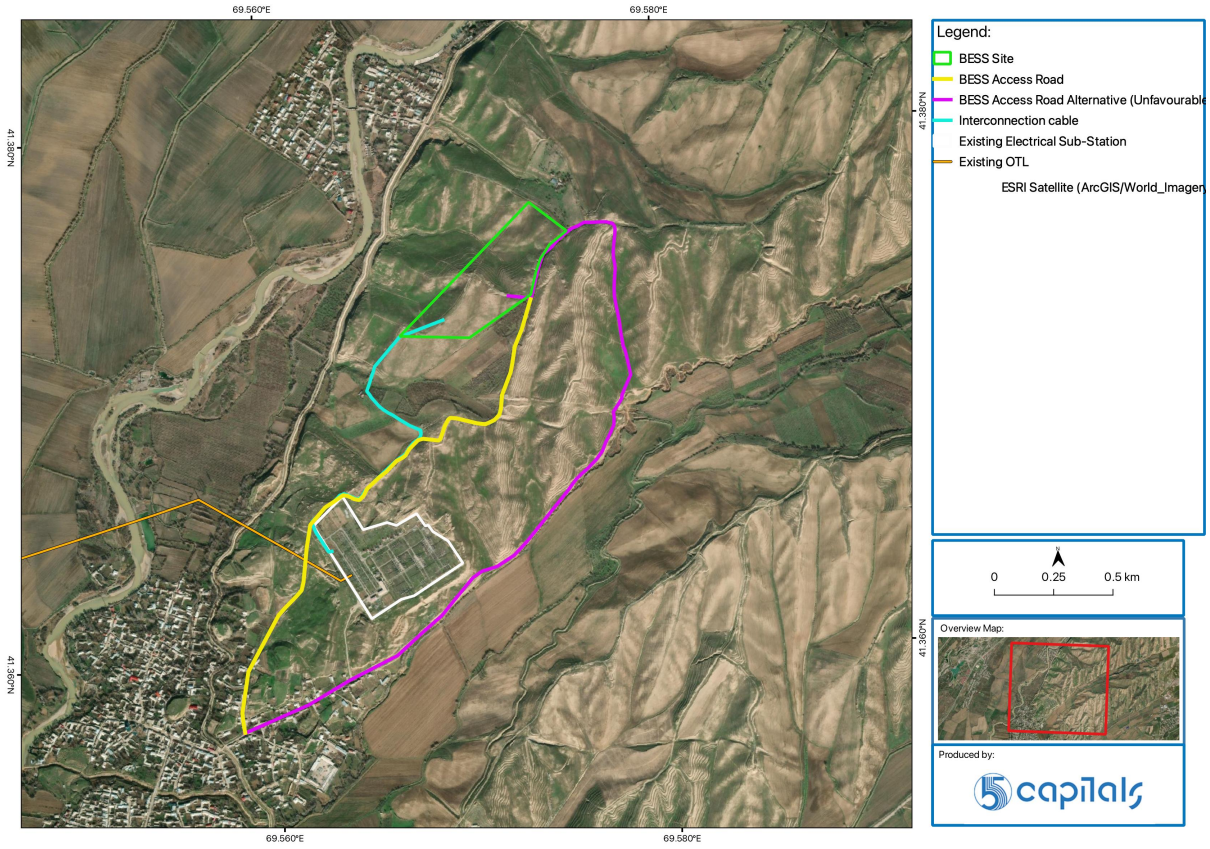


Figure 11-3 Access roads for transit to and from the BESS site

The follow-up feasibility studies altogether indicated that the former access route surveyed as part of the ESIA was the most favourable alternative, due to a number of E&S constraints on the eastern (latter) route.

Considering the very low traffic conditions observed along these roads, baseline traffic counts were not carried out during the ESIA.

11.5 Receptors

The following table provides an overview of E&S impact receptors in the context of potential impacts relating to traffic and transportation within the Project's Areas of Influence (AoI). A sensitivity rating and corresponding description is further provided for each relevant receptor.

Table 11-3 E&S impact receptors – Traffic and transportation

RECEPTOR	SENSITIVITY	JUSTIFICATION
Households and establishments utilizing the project access roads and associated feeder roads	High	Households and establishments utilizing existing access tracks and associated feeder roads have a potentially high sensitivity to project related vehicular traffic and related time losses, due to commutes and logistics to and from Tashkent City

11.6 Potential Impacts and Impact

11.6.1 Construction phase

11.6.1.1 Increased traffic congestion along public roads

The Project's construction phase is expected to heighten traffic volumes along the entire project transit corridor and with unpaved access tracks and associated feeder roads in particular. The latter set of roads are subject to higher vehicle traffic considering requisite speed restrictions and the relatively limited capacity on this tier of public roads.

Construction traffic is anticipated to peak during the mobilization period, due to the frequency of materials delivery and transfer of heavy construction machinery. The absence of on-site construction labour camps will also necessitate daily commutes for construction workers. Potential congestion hotspots along feeder roads include junctions, intersections, crossings, speed bumps and bus stops. Other traffic factors include the occurrence of roadworks, traffic accidents and inclement weather, which can cause roadblocks, road closures and diversions.

Increases traffic congestion and increased travel times resulting from project traffic can disrupt local transportation patterns, impede timely access to workplaces and other key destinations, cause economic losses and present an inconvenience to road users.

Table 11-4 Overview of potential impacts relating to traffic and transportation during construction

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Increased traffic congestion along public roads	Kavardan community, sections of 4R-12 highway within 1 km of the PV plant site	Moderate	Households and establishments utilizing the project access roads and associated feeder roads	High	**Moderate/ Major**	**Minor/Moderate**

Impact avoidance, mitigation and offset measures

Increased traffic congestion along public roads

- A traffic study will be undertaken prior to mobilization for construction to identify transportation constraints including traffic congestion hotspots and inadequate road conditions.
- Follow-up engagement with transportation and traffic safety authorities (i.e., district khokimiyats, Ministry of Transportation, traffic police) will be undertaken as part of H&S risk assessments in relation to project traffic and the development of related safeguards, including traffic accident emergency response plans.
- Dedicated access roads will be established within the Project's transit corridor to isolate project traffic, to the extent feasible.
- Suitable by-passes, traffic control signage and personnel (i.e., flagmen etc.) will be established to divert vehicular and pedestrian traffic in the event of upgrading and/or maintenance works along existing public roads that will be utilized for access to the project sites, in consultation with relevant local authorities (i.e., regional and district khokimiyats, road maintenance agencies).
- Project traffic will be organized to avoid peak traffic hours and traffic congestion hotspots to the extent feasible, in consultation with relevant local authorities.
- Transit service for construction labour will include staff buses, to curb the volume of project traffic.
- Project logistics will be implemented to ensure convoys of construction vehicles (and Heavy Goods Vehicles in particular) are dispatched with maximal load to minimize the number of consignments/ delivery trips to the project sites.
- The parking of project vehicles will be restricted to designated parking bays within the project sites.
- A vehicle breakdown response plan will be developed as part of the Traffic Management Plan, to ensure prompt transposition or towing of immobile vehicles from public and access roads.
- A Traffic Management Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented.

11.6.1 Operations phase

Impacts on traffic and transportation are not expected to occur in the Project's operational phase and have therefore been scoped out of the assessment.

11.6.2 Decommissioning phase

Project decommissioning will entail the deconstruction of project facilities, demobilization of related equipment and materials, as well as potential repurposing and/or rehabilitation works. At this stage, potential impacts relating to traffic and transportation will be the same as those associated with the construction phase.

For the avoidance and mitigation of these impacts, relevant impact management measures specified in Section 11.6.1 will be implemented. Accordingly, the same pre-management and residual significance ratings are provisionally assigned to mutually relevant impacts on sensitive receptors.

11.7 Monitoring requirements

Table 11-5 below provides an overview of the key monitoring arrangements for evaluating performance against applicable standards relating to traffic and transportation, in the Project's construction and operational phases. A more elaborate and comprehensive coverage of these requirements will be provided in the Construction- and Operations-phase Environmental and Social Management Plans (C-ESMP, O-ESMP) and Environmental and Social Monitoring Plans (ESMoPs).

Table 11-5 Monitoring arrangements for impacts and preventative and mitigation measures relating to traffic and transportation

E&S Impact	Key Performance Indicator/ Parameter	Target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
Increased traffic congestion along public roads	Installation of traffic signage and signposts along all project access roads	- Traffic signage and signposts have been installed along all project access roads	- All project access roads	Weekly during mobilization	- EPC Contractor H&S Officer
	Grievances concerning project-related vehicular traffic along public roads	- All related grievances are closed out within the shortest practicable duration	- Community Grievance Log	Ongoing	- EPC Contractor CLOs

12 CULTURAL HERITAGE

12.1 Legal Requirements and Standards

12.1.1 National laws and regulations

RELEVANT LEGISLATION IN UZBEKISTAN RELATING TO ARCHAEOLOGY AND CULTURAL HERITAGE INCLUDE:

- Law No. ZRU-229 "On protection and use of the objects of archaeological heritage" (13 October 2009).
- Law No. 269-II "On the Protection and Use of Cultural Heritage Sites (30 August 2001, as amended).
- Presidential Decree No. R-5181 "On improving the protection and use of objects of tangible cultural and archaeological heritage" (16 January 2018).
- Resolution of the President of the Republic of Uzbekistan № RP-4068 dated December 19, 2018 "On measures for improving actions for protection of material cultural heritage objects".
- Resolution of the Cabinet of Ministers of the Republic of Uzbekistan № 846 dated October 4 2019 "On approval of the national list of real state sites and objects of material cultural heritage".

The above laws seek to protect and sites and objects of cultural heritage which are considered as part of the national heritage for all the people in Uzbekistan.

In addition, the Criminal Code of the Republic of Uzbekistan includes provisions that prohibit the intentional destruction or damage of objects of tangible cultural heritage under state protection, with further protections in place to protect cultural property in PAs, in particular protected historical and cultural territories, without first obtaining permission.

12.1.2 Lender requirements

12.1.2.1 EBRD

EBRD Performance Requirement 8 recognises the importance of cultural heritage, both tangible and intangible for present and future generations. The aim is to protect cultural heritage and to guide clients in avoiding or mitigating adverse impacts on cultural heritage in the course of their business operations. The clients are expected to be precautionary in their approach to the management and sustainable use of cultural heritage.

12.1.2.2 EPFIs

In accordance with the Equator Principles, the assessment will refer to applicable IFC Performance Standards on Social and Environmental Sustainability, specifically with due

consideration of Performance Standard 8 – Cultural Heritage. PS8 aims to protect the adverse impacts of project activities and support its preservation and to promote equitable sharing of benefits from the use of cultural heritage. Cultural heritage in this standard refers to:

- Tangible forms of cultural heritage, such as tangible moveable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values.
- Unique natural features or tangible objects that embody cultural values, such as sacred groves, rocks, lakes, and waterfalls.
- Certain instances of intangible forms of culture that are proposed to be used for commercial purposes, such as cultural knowledge, innovations, and practices of communities embodying traditional lifestyles.

12.2 National Context

Uzbekistan is endowed with some of the richest cultural heritage attractions in Central Asia. The country's cultural legacy includes uniquely magnificent and historic monuments, architectural complexes and artefacts. At present, a total of five prominent cultural heritage sites are legally protected under the World Heritage Convention administered by the United Nations Educational, Scientific and Cultural Organization (UNESCO) international convention. These sites feature ancient cities marked by palaces, fortresses, mosques, and grandiose city walls. Furthermore, an additional 33 sites have been nominated for World Heritage designation. These sites include caravanserais, mausoleums, desert castles, rock paintings and silk road sites spread across the country.

According to recent UNESCO publications[8], intangible cultural heritage in Uzbekistan includes oral traditions and expressions (folklore), performing musical and dance rituals and festivals, traditional knowledge and practices, notably long-standing sericulture skills, and traditional handcraftsmanship. The cultural fabric of Uzbekistan is characterized by fairly conservative customs and patriarchal values, which are influenced by the country's mainstream Islamic religion, to a certain extent.

Due to the widespread prevalence of physical cultural resources in Uzbekistan, tangible cultural heritage due diligence is a mandatory requirement for major development projects, prior to construction. The authority solely responsible for the conduct of specialized surveys and inventory, under the oversight of the national Cultural Heritage Agency, for subsequent

[8] UNESCO Intangible Cultural Heritage. 2014. Periodic report No. 01048/Uzbekistan. Report on the implementation of the Convention and on the status of elements inscribed on the Representative List of the Intangible Cultural Heritage of Humanity.

restoration and preservation of tangible cultural heritage resources, is the Institute of Archaeology.

12.3 Baseline Conditions

The ESIA involved a series of consultations with the following stakeholders, to obtain information on cultural heritage sensitivities within the Yukorichirchik and Parkent Districts:

- Tashkent Regional Department of Cultural Heritage
- National Cultural Heritage Agency
- National Institute of Archaeology
- Project-affected communities within the districts

The consultations, in form of consultative letters, Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs) were aimed at (i) identifying the existing cultural heritage sites in and around the project sites, (ii) establishing the national and international designation of the existing cultural heritage sites, and (iii) identifying the current value of tangible resources within cultural heritage sites to local community members and the wider national and international community.

The extent of the cultural heritage survey was primarily focused on land within the project sites and a 300 metres' radius from the boundaries of each site (i.e., PV plant, BESS, and interconnection footprints). Nevertheless, supplementary information on designated cultural heritage sites within one kilometre of each site was sought, to gain a broader understanding of the cultural sensitivities prevalent within nearby areas in the project-affected districts.

An overview of cultural heritage sensitivities and the national designation of these sensitivities is provided in Table 12-1 below.

Table 12-1 Cultural heritage resources and exploration sites within 1 km of the project sites

ID	CULTURAL HERITAGE RESOURCES	DESIGNATION AND CULTURAL IMPORTANCE	MANDATORY AND RECOMMENDED PROTECTION MEASURES
Cultural Heritage Sites and Exploration Areas (within 300 m)			
CH 01	Kavardan heritage site	• The site is situated about 230 metres south-west of the BESS interconnection cable route and about 560 metres from the BESS site. • The site was registered as a national archaeological object by the regional cultural heritage department, in accordance with the Resolution No.846 *Approval of the National List of Immovable Property Objects of Tangible Cultural Heritage*. • The site encompasses the Kavardan city ruins, which date back two to three millenia Before Christ (BC). • The city was occupied in the Early Iron Age (the last quarter of the 14th century BC to the 9th century BC). • After a thousand-year hiatus, the area of the "Kavardan" monument was reclaimed by the inhabitants of the Qovunchi culture. During this period, the first fortified places belonging to local rulers (Khonimtepa and Khontepa) appeared. • According to archaeological research, the Kavardan ruins comprise arch and shahriston (the main part of the city surrounded by walls) monuments and fortresses. • Recent exploration studies within the area have uncovered findings such as jewellery boxes dating back to the V-VI periods of the Namazgoh, a cemetery, fragments of Andronovo culture ceramics, shoe-making instruments, cellars characteristic of Burgulyk culture. Several ceramic objects typical of the Mingo'rik complex and household items including pottery and ornaments dating back to the 5th Century were also discovered within the site. • The site is not utilized by local communities for cultural, commercial, spiritual or artistic purposes. • The site has been given a UNESCO world heritage site designation.	• No construction activities are allowed with 100 metres of the boundaries of this site. • A pre-construction archaeological survey has been completed within the BESS sites, therefore there are no major concerns regarding the reallocation and development of these sites. Nevertheless, the project developer should coordinate with the Institute of Archaeology to ensure archaeological supervision during construction. • A designated expert from the institute of archaeology should be available for a watching brief to identify potential finds and determine the next steps.

ID	CULTURAL HERITAGE RESOURCES	DESIGNATION AND CULTURAL IMPORTANCE	MANDATORY AND RECOMMENDED PROTECTION MEASURES
Cultural Heritage Resources and Exploration Areas (within 1 km)			
CH 02	Jetitepa heritage site	• The site is situated about 1.2 kilometres south of the BESS interconnection cable route and about 2 kilometres metres from the BESS site. • The site was registered as a national archaeological object by the regional cultural heritage department, in accordance with the Resolution Resolution No. 846 on the *Approval of the National List of Immovable Property Objects of Tangible Cultural Heritage*. • The site is not utilized by local communities for cultural, commercial, spiritual, or artistic purposes. • The site has not been given a UNESCO world heritage site designation.	No specific requirements as the site is located well away from the project sites.
CH 03	Karavultepa	• The site is situated about 350 metres south-west of the BESS interconnection cable route. • The site was registered as a national archaeological object by the regional cultural heritage department, in accordance with the Resolution Resolution No. 846 on the Approval of the National List of Immovable Property Objects of Tangible Cultural Heritage. • Archaeological findings include various household items from ancient settlements, however detailed descriptions are not available as exploration work is ongoing. • The site is not utilized by local communities for cultural, commercial, spiritual, or artistic purposes. • The site has not been given a UNESCO world heritage site designation.	No specific requirements as the site is located well away from the project sites.
CH 04	Moltepa	• The site is situated about 350 metres south of the BESS interconnection cable route. • The site was registered as a national archaeological object by the regional cultural heritage department, in accordance with the Resolution Resolution No. 846 on the Approval of the National List of Immovable Property Objects of Tangible Cultural Heritage. • Archaeological findings include various household items from ancient	No specific requirements as the site is located well away from the project sites.

ID	CULTURAL HERITAGE RESOURCES	DESIGNATION AND CULTURAL IMPORTANCE	MANDATORY AND RECOMMENDED PROTECTION MEASURES
		settlements, however detailed descriptions are not available as exploration work is ongoing. • The site is not utilized by local communities for cultural, commercial, spiritual, or artistic purposes. • The site has not been given a UNESCO world heritage site designation.	
CH 05	Xitoyepa	• The site is situated about 925 metres east of the PV plant site. • The site was registered as a national archaeological object by the regional cultural heritage department, in accordance with the Resolution Resolution No. 846 on the Approval of the National List of Immovable Property Objects of Tangible Cultural Heritage. • Archaeological findings include various household items from ancient settlements, however detailed descriptions are not available as exploration work is ongoing. • The site is not utilized by local communities for cultural, commercial, spiritual, or artistic purposes. • The site has not been given a UNESCO world heritage site designation.	• No specific requirements as the site is located well away from the project sites.
Intangible Cultural Heritage			
N/A	Navruz ceremonial customs	No sensitive forms of intangible heritage exist within Tashkent Region. The ceremonial customs for the historical, country-wide Navruz celebrations may be considered the only unique traditional practice within the region. In addition, no Indigenous Peoples (IPs) reside in the host districts and the wider Tashkent region.	• No specific requirements.

An overview of cultural heritage sites located within 1 kilometre of the PV power plant site is provided in Figure 12-2 below.

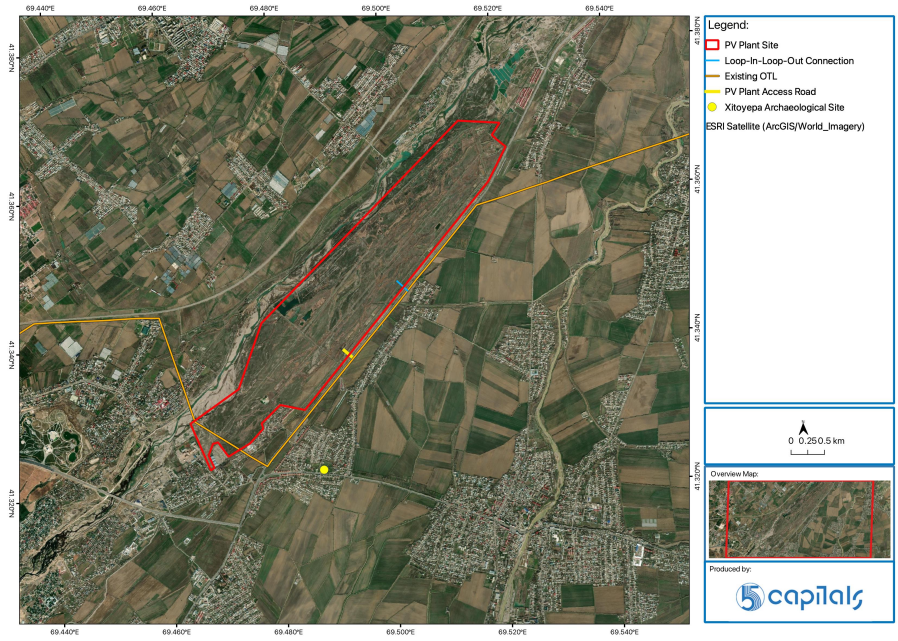


Figure 12-1 Archaeological sites located within 1 kilometre of the PV power plant site

An overview of cultural heritage sites located within 1 kilometre of the BESS site is provided in Figure 12-2 below.

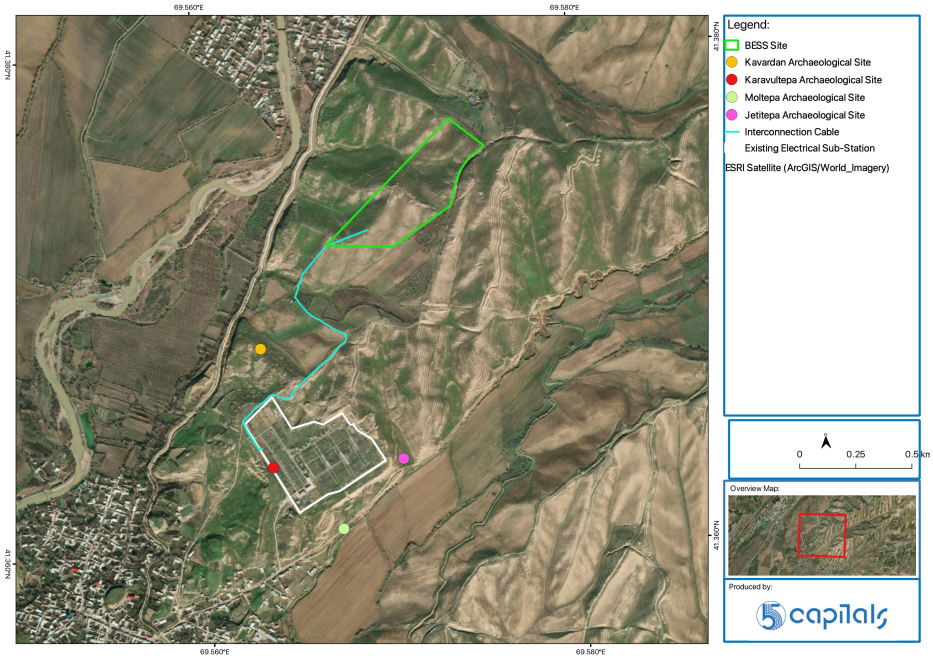


Figure 12-2 Archaeological sites located within 1 kilometre of the BESS site

The BESS site and interconnection cable sites are situated within a tract of land that was originally allocated to the Cultural Heritage Agency, for archaeological exploration to ensure the identification and conservation of any remaining tangible heritage close to the cluster of designated CH sites. The original extent of this tract of land totalled 179 hectares. Following the issuance of the Presidential Resolution for the Project, the Cultural Heritage Agency, through the Institute of Archaeology, carried out a mandatory pre-construction archaeological survey within the site, with a view to confirming the absence of any previously unknown tangible heritage resources within the sites delineated for the establishment of the BESS and the interconnection cable.

While the report for this survey was not publicly available at the time of this assessment, follow-up engagement with the Cultural Heritage Agency indicated that no tangible cultural heritage was identified within the project sites. Subsequently, the Agency provided written consent for the return of the earmarked sites to government land reserves, to enable subsequent reallocation of this land to the Ministry of Energy, for the development of the Project.

Nevertheless, considering the proximity of designated archaeological sites, the Agency issued a recommendation for the oversight of construction works within the sites to ensure the protection and preservation of potentially resident tangible heritage. According to this directive, an expert from the Institute of Archaeology will be engaged to undertake an expert watching brief for the duration of construction activities. The expert will be responsible for providing due guidance for vigilant earthworks, the identification of suspected cultural heritage finds, and appropriate protocols for safeguard measures (i.e., avoidance, in-situ restoration or relocation for off-site preservation).

12.4 Receptors

The following table provides an overview of E&S impact receptors in the context of cultural heritage impacts within the Project's Areas of Influence (AoI). A sensitivity rating and corresponding description is further provided for each relevant receptor.

Table 12-2 E&S impact receptors – Cultural heritage

RECEPTOR	SENSITIVITY/ VALUE	JUSTIFICATION
Tangible cultural heritage resources	High	A number of cultural heritage sites are situated within one kilometre of the BESS site and the associated interconnection cable path. Kavardan is a historic site with ancient cultural objects which potentially include non-replicable elements of the local cultural heritage dating back to the 5th Century BC, and can be regarded as having a potentially high value to the national community. There is potential for the presence of similar cultural resources within the project sites.

RECEPTOR	SENSITIVITY/ VALUE	JUSTIFICATION
		Archaeological artefacts are also relatively delicate/ fragile, with a high potential vulnerability to structural damage and degradation.
Local customs	High	Local customs and cultural milieu are regarded as having a potentially high value to local communities within the project districts.

12.5 Potential Impacts and Impact Management Measures

12.5.1 Construction phase

12.5.1.1 Degradation and/ or loss of tangible cultural heritage resources

The project sites are located within a part of Tashkent region, where a number of archaeological sites have been established for protection of valuable tangible cultural heritage resources, and further exploration. Some of the physical heritage includes extensive and immovable structures (i.e., ancient city ruins and monuments), for which the sole means of preservation is avoidance. Existing cultural heritage sites and their 100-metre buffers are legally protected, as they feature historically and archaeologically important structures and artefacts dating back to the 5th century BC. A number of undeveloped areas located close to these sites have also been reserved for archaeological survey, with a view to identifying and conserving any additional tangible Cultural Heritage resources.

While identified several sites of archaeological importance are located a considerable distance away from the project sites and access routes, contingencies such as the off-roading of construction vehicles and trespassing can result in the destruction of legally protected cultural property. Additionally, there is potential for damage to undiscovered (buried) tangible heritage resources within the Project's construction footprint. Ground-disturbing construction activities such as earthworks, compaction, drilling and the movement of heavy construction machinery, can cause irreparable damage, or complete destruction and loss of potentially resident cultural heritage objects. In the event that earthworks are carried out with due vigilance, inadvertent damage to high-value heritage resources can also occur from attempts to relocate movable heritage objects within working areas, in a manner that is not consistent with expert approaches and preservation requirements.

12.5.1.2 Disruption of local customs and intangible cultural heritage

The influx of a considerably large migrant workforce into the Project's host communities poses the risk of cultural fissures, and the disruption of local cultural milieu.

The cultural distance between foreign workers and local residents, and a potentially lacking regard for social customs within host communities can create tensions and conflict, particularly within peri-urban communities offering rental accommodation to foreign construction workers.

Moreover, cultural influences from the interaction of local residents with foreign workers can erode cultural values and customs ingrained in well-preserved traditions within host communities and thereby undermine existing levels of social cohesion within these communities. This impact can be particularly significant within host communities comprising ethnic minorities.

Table 12-3 Overview of potential impacts relating to cultural heritage during construction

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Degradation and/ or loss of tangible cultural heritage resources	Designated cultural heritage sites and project sites nearby known tangible cultural heritage (i.e., BESS and interconnection cable sites)	Major	Tangible cultural heritage resources	High	**Major**	**Minor/ Moderate**
Disruption of local customs and intangible cultural heritage	Yukorichirchik and Parkent Districts and the wider Tashkent Region	Moderate	Local customs	High	**Moderate/ Major**	**Minor/ Moderate**

Impact avoidance, mitigation and offset measures

Degradation and/ or loss of tangible cultural heritage resources

- Construction works including land clearance, excavation, grading, and movement of heavy machinery will be restricted to demarcated construction zones within the project sites and designated transit corridors.
- Induction trainings for onboarding the EPC Contractor's construction workforce will include familiarization with cultural heritage sites located within 1 kilometre of the project sites, potential impacts on undiscovered tangible cultural heritage, related avoidance and mitigation measures, application of the Chance Find Procedure, and designated archaeological staff.
- Refresher trainings and toolbox talks for construction workers will include updated or reiterated information on measures to protect and preserve potentially resident tangible cultural heritage resources and expert staff dedicated to the management archaeological chance finds.
- The EPC Contractor's code of conduct and trainings on protection cultural heritage will include stringent prohibition of vandalism, theft, misappropriation, and negligent disturbance of suspected chance finds, in violation of the archaeological Chance Find Procedure.
- An archaeological 'Chance Find Procedure' will be developed for construction works within the BESS site.
- The Chance Find Procedure will include a (i) generic guide for the identification of cultural heritage finds, (ii) requirement for work stoppage in the event of chance finds, (iii) protocols for temporary demarcation and avoidance of further disturbance of chance finds, (iv) notification of designated archaeological experts, (v) watching brief for in-situ protection and/or subsequent expert extraction of cultural heritage finds for off-site preservation, (vi) increased vigilance and expert supervision upon confirmation of archaeological chance finds, and (vii) related reporting requirements.
- Pre-construction engagement with the Institute of Archaeology and the Cultural Heritage Agency will be implemented for prior approval of the Chance Find Procedure.

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
• A designated archaeologist from the Institute of Archaeology will be engaged for an archaeological watching brief (for the duration of construction works) and first response to the identification of potential chance finds. • Construction zones and working areas will be demarcated using temporary fence walls and barricading. • All construction activities will be restricted to demarcated construction zones within the project sites and designated transit corridors. • For the BESS site, visual inspection survey will be conducted before the start of any intensive compaction and pile-driving works close to nearby third-party buildings (i.e., within 200 metres), to facilitate future investigation into structural damage attributed to ground vibration from construction works. The survey should be repeated following the completion of such works to identify any unreported damages, for the same purposes. • Stockpiling zones and laydown areas outside of the main project sites (e.g., along the interconnection cable route) will be clearly demarcated to increase the visibility of designated working areas. • A traffic study will be carried out along transit corridors to be used for the transportation of abnormal loads to determine sufficient clearance. • The Traffic Management Plan will include measures to ensure that the movement of project vehicles and machinery is limited to dedicated access roads and construction sites, and off-roading will be prohibited. • Local communities based around the project sites and competent authorities will be familiarized with the Project's community GRM and other dedicated communication channels, to enable the collection of grievances and directives pertaining to the protection of tangible cultural heritage resources on platforms that are accessible to all constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. **Disruption of local customs and intangible cultural heritage** • Induction trainings for onboarding the EPC Contractor's workers (particularly foreign labourers) will include familiarization with any forms of intangible cultural heritage prevalent within the project-affected communities and the wider region and highlight the importance of preserving such heritage. • A project-level code of conduct will include stipulations regarding respect for local customs, religious values and cultural milieu of project-affected communities. The code of conduct will further underscore zero-tolerance for inappropriate and unlawful behaviour within host communities, with a clear set of disciplinary procedures and penal measures for non-compliance. • Local recruitment will be leveraged to ensure peer-led awareness creation around local customs and any prevalent forms of intangible cultural heritage with project-affected communities. • Dedicated residential facilities will be used for accommodating the Project's construction workforce, to the extent feasible. • Construction workers based within any centralized accommodation facilities that may be established during construction will be subject to restrictions on movement outside of designated work stations within the project sites during working hours. • Dedicated CLOs will perform sensitization engagements within the Project's host communities to create local awareness around the influx of						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
foreign workers, potential cultural differences and remedial initiatives to prevent and mitigate adverse impacts on local cultural sensitivities. • Local communities based around the project sites will be familiarized with the Project's community GRM, to enable the collection of grievances pertaining to adverse cultural influences on platforms that are accessible to all local constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality.						

12.5.2 Operations phase

Impacts on cultural heritage are not expected to occur in the Project's operational phase and have therefore been scoped out of the assessment.

12.5.3 Decommissioning phase

Project decommissioning will entail the deconstruction of project facilities, demobilization of related equipment and materials, as well as potential repurposing and/or rehabilitation works. At this stage, potential impacts relating to cultural heritage will be the degradation and/ or loss of tangible cultural heritage resources.

For the avoidance and mitigation of these impacts, relevant impact management measures specified in Section 12.5.1.1 will be implemented. Accordingly, the same pre-management and residual significance ratings are provisionally assigned to mutually relevant impacts on sensitive receptors.

12.6 Monitoring requirements

Table 11-4 below provides an overview of the key monitoring arrangements for evaluating performance against applicable standards relating to cultural heritage, in the Project's construction and operational phases. A more elaborate and comprehensive coverage of these requirements will be provided in the Construction- and Operations-phase Environmental and Social Management Plans (C-ESMP, O-ESMP) and Environmental and Social Monitoring Plans (ESMoPs).

Table 12-4 Monitoring arrangements for impacts and preventative and mitigation measures relating to cultural heritage

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
Degradation and/ or loss of tangible cultural heritage resources	Percentage of construction (earthworks) workers who have received induction trainings in local tangible cultural heritage and the archaeological Chance Find Procedure	- 100% of construction (earthworks) workers in the identification of tangible cultural heritage resources and the archaeological Chance Finds Procedure	- HSSE Training Report	Monthly	- Designated Archaeologist (from Institute of Archaeology) - EPC Contractor HSSE Trainer
	Vigilance of workers to potential cultural chance finds during earthworks	- Daily toolbox talks and on-site supervision for workers engaged in earthworks	- Earthworks sites	Daily during earthworks	- Designated Archaeologist EPC Contractor HSSE Trainer
Disruption of local customs and intangible cultural heritage	Grievances concerning project-related disruption of local customs intangible cultural heritage	- All related grievances are closed out within the shortest practicable duration	- Community Grievance Log	Ongoing	- EPC Contractor CLOs

13 SOCIOECONOMICS

13.1 Legal Requirements and Standards

13.1.1 National laws and regulations

The following legislation provides for relevant socioeconomic aspects, including land access:

The following land Laws are relevant to the Project:

- Civil Code of the Republic of Uzbekistan (1997) as amended on 8.11.2022.
- Land Code of the Republic of Uzbekistan (1998) as amended on 1.10.2022.
- Law of the Republic of Uzbekistan on State Land Cadastre No.666-I of 28.08.1998.
- Presidential Decree №. UP-5495. Decree "On measures on cardinal improvement of investment climate in the republic of Uzbekistan".
- Appendix No. 2 to the Resolution of the Cabinet of Ministers №. 146 (2011), regulation " On the Procedure for Compensation for Losses of Land Owners, Users, Tenants and Owners, as well as Losses of Agricultural and Forestry Production".
- Resolution №. 911 of the Cabinet of Ministers (2019) "On the Procedure for withdrawal of land plots and compensation to owners of immovable property located on the land plot.
- Law No 781 "On procedures for the withdrawal of land plots for public needs with compensation" October 1st, 2022. The Law specifies cases when the land plots can be acquired for public need among which construction (reconstruction) of roads and railways of national and local significance is also specified. Law No. 781 also prescribes procedures of land acquisition, communication with project affected people (PAPs), compensation calculation, and demolition of affected assets. From October 1st, 2022, all projects that require the acquisition of land for public needs should be managed following this Law.

13.1.2 Lender requirements

13.1.2.1 EBRD

Performance Requirement 1 outlines the need for assessing social impacts as part of ESIA. This is interpreted to include socio-economic effects to individuals/groups/populations that may be impacted by a project.

Performance Requirement 5 on land acquisition, involuntary resettlement and economic displacement refers to Involuntary resettlement as both physical displacement (relocation or loss of shelter) and economic displacement (loss of assets or resources, and/or loss of access

to assets or resources that leads to loss of income sources or means of livelihood) as a result of project-related land acquisition and/or restrictions on land use.

Where resettlement is government led, PS5 requires, 'the client (to) collaborate with the responsible government agency, to the extent permitted by the agency, to achieve outcomes that are consistent with the objectives of this PR.'

13.1.2.2 EPFIs

Several of the IFC Performance Standards have elements that relate to socio-economics. Key requirements for the assessment of socio-economic impacts are outlined in PS1, whilst PS5 on Land Acquisition and Involuntary Resettlement has important requirements relating to projects that acquire land or will necessitate physical or economic displacement to PAPs, including compensatory measures.

13.2 Baseline Conditions

13.2.1 General Socioeconomic Context

13.2.1.1 Administrative Boundaries

The project facilities will be developed within the districts of Parkent and Yuqorichirchik, which are amongst the 15 districts constituting Tashkent Region. According to publicly available statistics from the Tashkent Regional Department of Statistics, the population of Yuqorichirchik District reached 110,100 by 2021, while the population of the wider region was reported to be 2,975,900.

In Uzbekistan, the hierarchy local government authorities responsible for the coordination and oversight of development planning, delivery of social services and other administrative functions begins with the grassroots makhalla (community) leadership structures, which operate under district-level khokimiyats (administrative bodies). The district khokimiyats are constituted by multiple line departments, which are responsible for dedicated management within service domains such as land administration, agriculture, water resources, ecology and environmental protection, as well as social welfare. The district khokimiyats are subordinate to region-level khokimiyats, which are charged with the high-level coordination and implementation of regional plans under central government authorities, including the various sectoral ministries. In the context of the Project, local government stakeholders therefore potentially include Yuqorichirchik District and Parkent District Khokimiyats, as well the Tashkent Region Khokimiyat.

13.2.1.2 Affected communities

A total of nine communities (makhallas) are located nearby the PV plant and BESS sites. The table below provides an overview of these communities and their respective population statistics. The population of the districts has grown over the past decade, and development plans are underway to advance the economic growth of Kibray and Yukorichirchik Districts.

Table 13-1 List of makhallas based around the project areas

SN	AFFECTED COMMUNITY	DISTRICT	POPULATION
1.	Sergeli	Yuqorichirchik	2,082
2.	Tashtogizoq	Yuqorichirchik	2,067
3.	Yangiobod	Yuqorichirchik	3,774
4.	Gulobod	Yuqorichirchik	3,227
5.	Istiqbol	Yuqorichirchik	3,570
6.	Istiqlol	Yuqorichirchik	3,950
7.	Taraqqiyot	Yuqorichirchik	2,371
8.	Qirgizovul	Parkent	2,181
9.	Kavardan	Parkent	2,685

The extents and relative locations of the project-affected communities are indicated in below.

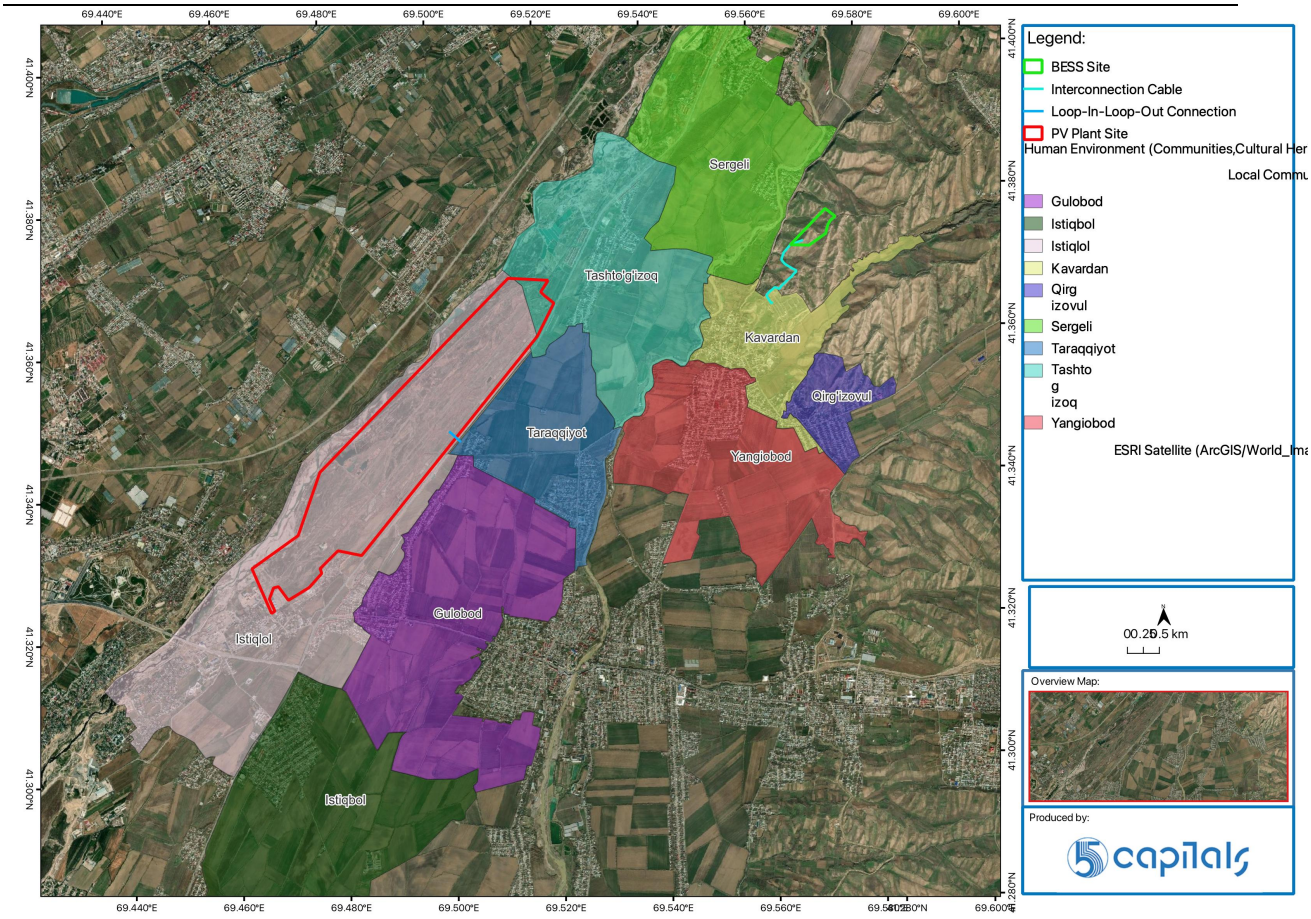


Figure 13-1 Project-affected communities within Yukorichirchik and Parkent District

13.2.1.3 Local livelihoods

Preliminary consultations with the local administration indicated that agriculture is the mainstay of local communities based around the project sites. Local agricultural livelihoods include the cultivation of cash and food crops, fish farming, livestock husbandry, and associated enterprises. The main crops farmed across the district include wheat, paddy and cottonwood. Fruit farming for cherry and apple harvesting is also prevalent within the district. A few agro-processing facilities are based around agricultural establishments. A number of commercial centres are also concentrated within resident community centres.



Figure 13-2 Crop farming (left) and herding (right) activities nearby the BESS site

13.2.1.4 Community infrastructure

PV PLANT SITE

The PV plant site is bordered by Chirchik River to the west, an agricultural zone (for aquaculture and fruit gardening) to the north, the 4R-12 highway overlooking Istikklol and Taraqqiyot communities to the east, a residential (Istiqlol) community to the south-east, and a chain of light-industry and commercial establishments to the south. Commercial entities located south of the site include a regional grain storage facility, cotton-processing factory and a developing recreational site that features aquaculture (for recreational fishery).

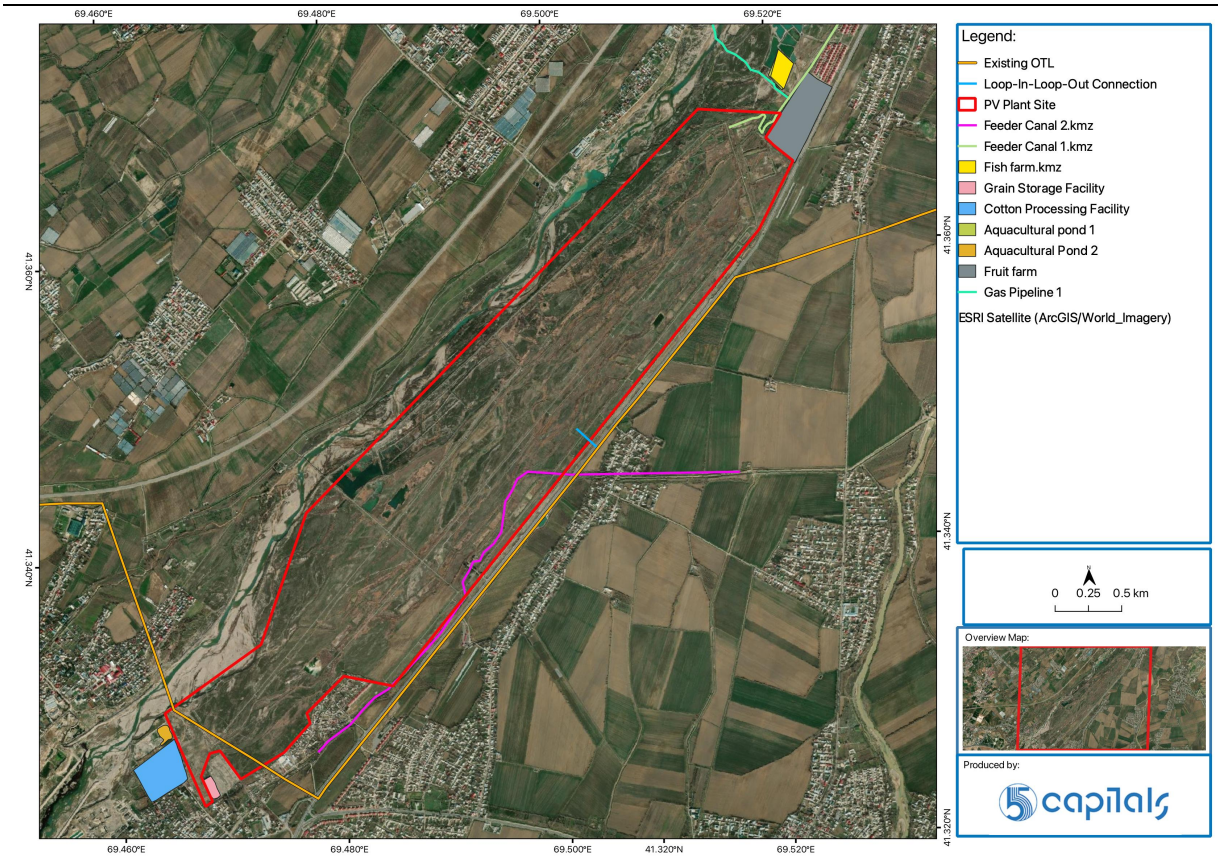


Figure 13-3 Private and public property around the PV plant site

In addition to being colocated with Uzsuvtaminot on the site, major utility assets nearby the PV plant, major utility assets nearby the PV plant site include the existing 220kV OTL (south and east of the site), a Class I operational gas pipeline located about 300 metres north of the site, as well as well as pipework stemming from the Uzsuvtaminot waterworks to the utility zone located on the western side of Chirchik River. Some of this property is shown in Figure 13-4 Uzsuvtaminot water pipe (clockwise from top left), cotton processing factory entrance, residential premises in Istiqlol district, as well as a recreational fishery business below.







Figure 13-4 Uzsuvtaminot water pipe (clockwise from top left), cotton processing factory entrance, residential premises in Istiqlol district, as well as a recreational fishery business

BESS SITE

The BESS site lies within a relatively less developed part of Parkent District. Nevertheless, one part time residence is located north of the site, and a farmstead are located south of the site (and closer to the interconnection route). Utility assets located close to the BESS site include the Parkent sub-station, a number of resident OTLs and another Category I gas pipeline, which lies more than 300 metres away from the site but potentially intersects with the route of the underground interconnection cable.

The residential facilities situated nearby the site are shown in below.



Figure 13-5 Residential facilities located nearby the BESS site

A burial site is also located about one kilometre southwest of the BESS site. The following map provides an overview of the limited private and communal property within 3 kilometres of the

site.

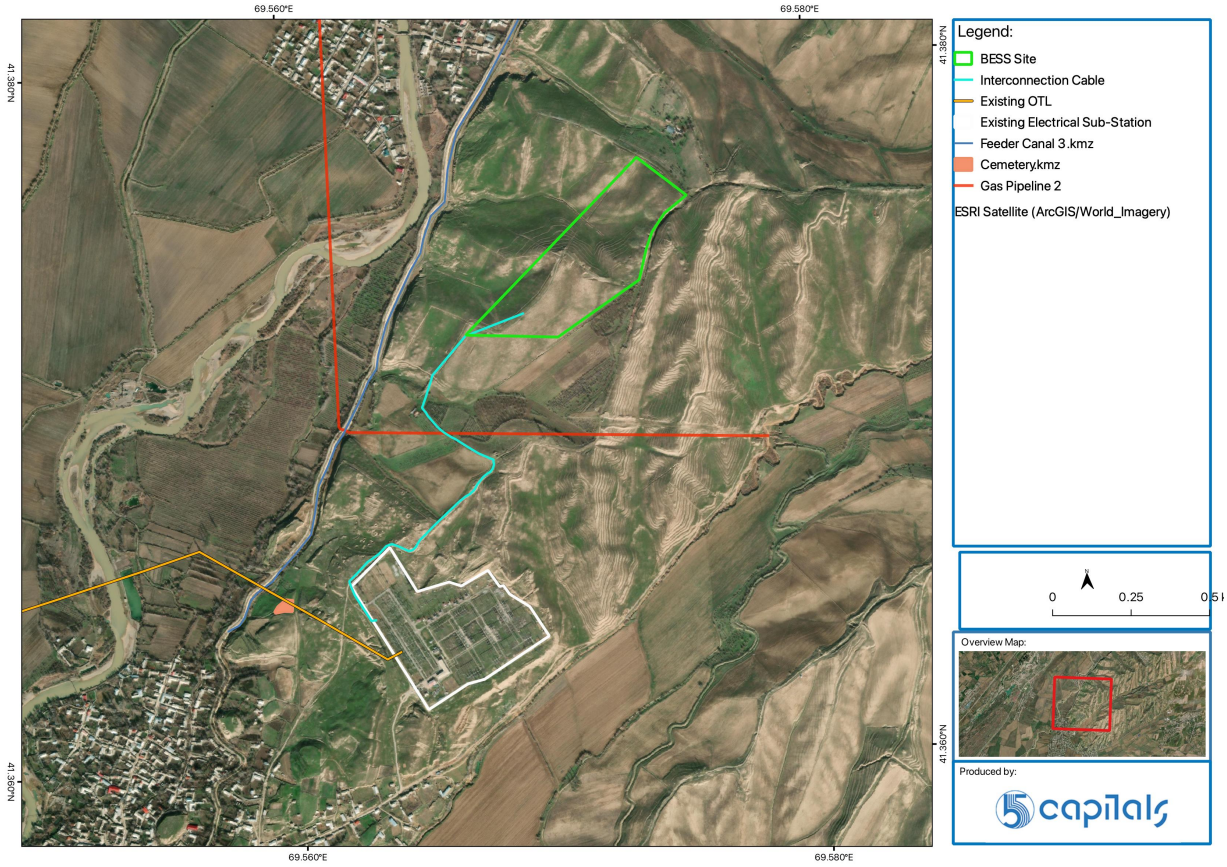


Figure 13-6 Private, utility and communal property around the BESS site

13.3 Survey of Project-Affected Communities

The closest community to the Project area is Istiklol community with 730 households. The total area of the Istiklol community is 63.5 ha. The total area of Gulobod community is 82 ha with the most households (833) among nine selected communities. The figure for the area of Istikbol community according to the information provided by the makhalla is 142 ha, and there are 810 households in the community. The total area of Sergeli community amounts to 111 ha with 569 households. The number of households in Tashtogizoq community is 505, and the total area is 98 ha. There are 584 households in Tarakkiyot community, and the area amounts to 101 ha. There are 508 households in 131.2 ha area of Kavardon community. The area of Yangiobod community amounts to 50.72 ha with 804 ha. There are 586 households in Kyrgyzovul community with the total area of 98 ha. All of these communities are considered to be directly impacted by the Project.

A socio-economic profile of the Project's primary Area of Influence was developed through a socio-economic survey of households in the project-affected communities, which was

undertaken on July 11-18, 2023. A total of 254 households were surveyed, and the findings of the survey are narrated below.

13.3.1 Demographics

At the beginning of 2023, the population of the Tashkent region totalled 2,993,400 people. For the same period the population of the Yukori-Chirchik district reached 137,400 people.[9] Yukori-Chirchik district is predominantly rural, in January 2023 the urban population of the district totalled 24,400 people (around 18% of the population) and the rural totalled 113,000 people (about 82% of the population). It should be noted that as of 1st July, 2022 the proportion of men and women in the district was almost equal – 67,900 women and 68000 men. The population of Parkent District, for the same period, was reported to be 176,400 residents, of whom 89,200 are men and 87,200 are women.

The following table shows the population of these nine communities.

Table 13-2 Population of the project-affected communities

No	Name of community	Total population	Households
1	Istiklol	3950	730
2	Gulobod	3227	833
3	Istikbol	3577	810
4	Sergeli	2082	569
5	Tashtogizoq	2067	505
6	Tarakkiyot	2371	584
7	Kavardon	2685	508
8	Yangiobod	3774	804
9	Kyrgyzovul	2181	586
	Total	**25914**[10]	5929

The gender distribution of the Project-affected communities, based on survey information showed that it is almost the same with the district statistics, with slightly more women (50.3%) than men (49.7%). The majority of the households in the surveyed communities are male headed households at 85.4%, with households headed by women making up just 14.6% of all surveyed households.

The members of the surveyed households aged between 0-6 years made up the largest individual age group (18.4%), as shown in the following figure

[9] https://www.toshvilstat.uz/uz/?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=292&id=2695&Itemid=1000000000000

[10] This data is taken from the passports of communities

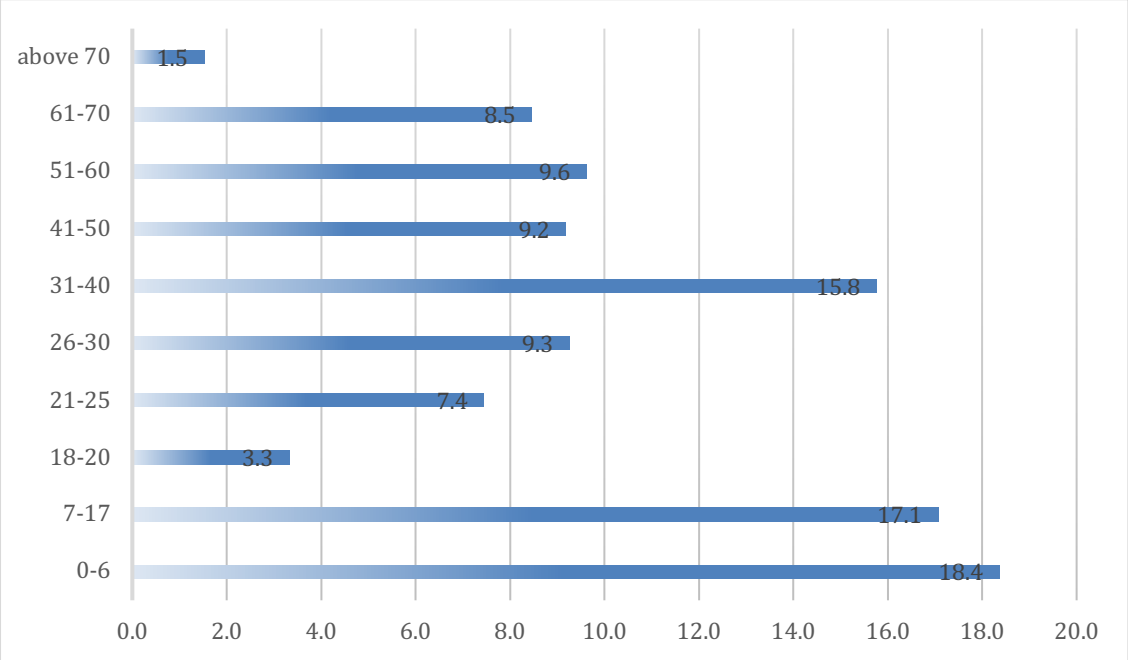


Figure 13-7 Age of surveyed household members

13.3.2 Economy

One of the most economically developed regions in the nation is the Tashkent Region. The industry of the region mainly includes energy production, mining, metallurgy, fertilizers, chemicals, electronics, textiles, cotton purification, food processing and footwear. Industrial products worth 93,935.1 billion UZS (nearly 8.1 billion USD) were produced in the region.

Agricultural industry is also highly developed in Tashkent region. The main crops are cotton and hemp, but the share of cereals, melons and gourds, fruit and vegetables and citrus fruits are increasing. As per the annual report of the Statistics Committee, the gross regional product (GRP) of the region for 2022 amounted to 93,433.1 billion UZS[11] (an increase of 5.1% from the previous year).

The economy of the Yukori-Chirchik district is mainly specialized in agricultural production, livestock husbandry and providing services. According to district passport, in 2022 the share of the district in the industry sector of the region's economy was so small – 2.4%, in service sector it made up 4.4%. The number of small business entities was 2052, and 426 of them are industrial enterprises. In 2022, 43 investment projects worth 91.6 million dollars were implemented.

[11] https://www.toshvilstat.uz/uz/?preview=1&option=com_dropfiles&format=&task=frontfile.download&catid=304&id=2778&Itemid=1000000000000

Data obtained as result of consultations with the communities revealed that the population is employed in diverse spheres, meaning that their economy is not exclusively reliant on one or two sectors.

13.3.3 Employment

In 2022 the number of officially unemployed people in the district was 5.1 thousand. 8.3 thousand people left the country to work in abroad.

The average monthly salary of a person living in Tashkent region amounted to 3,749,300 UZS (or approximately USD $350) as per statistics provided for January-March 2022. The average monthly salary of a person living in Yukori-Chirchik district amounted to 3,032,100 UZS (or nearly USD $280) in the same period[12]. The average family income reported by survey respondents was 6,735,600 UZS (about USD $575) with a per capita income of 1,213,400 UZS (or around USD $105).

The following figure provides information on the occupation of the household members in the surveyed households. It was revealed that the majority of female respondents are pensioners and homemakers (both 23.6%), whereas 22.6% of male respondents stated that they are employed in the governmental organizations, and 16.7% are seasonal workers. 14.3% male respondents are employed in private sector, while the figure for their female counterparts is 7%. In total 8.9% respondents are searching for a job but not registered at labour exchange.

[12] https://www.toshvilstat.uz/files/315/ch-n-2022-yanvar-mart/2012/Ortacha-oylik-nominal-hisoblangan-ish-haqi.pdf

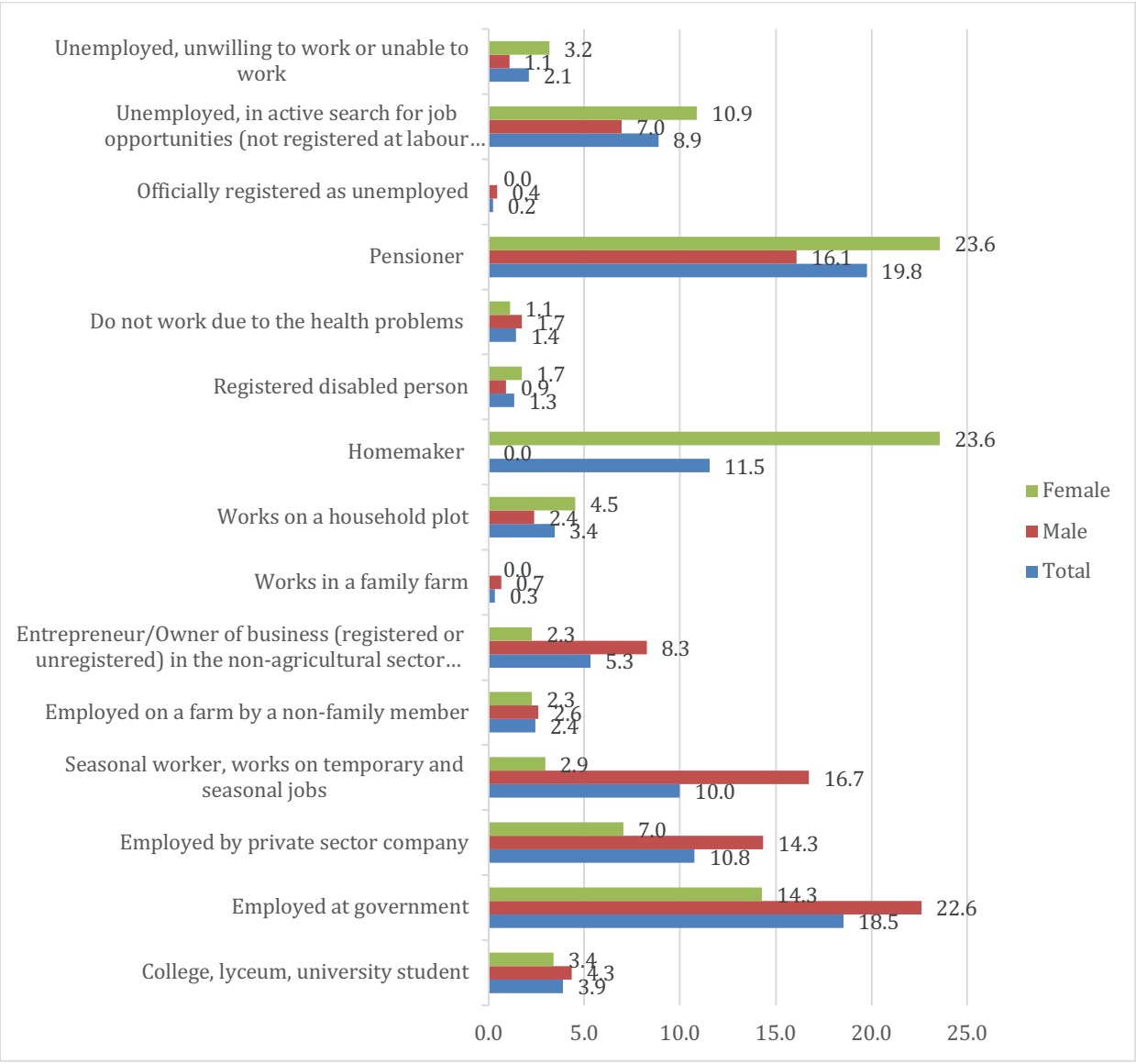


Figure 13-8 Occupations in surveyed communities

According to survey results 56.9% school children work. 3.1% of them work from 1 to 7 hours, 6.2% work 8-10 hours, 29.2% work between 11 and 15 hours, 30.8% work 16-20 hours, and the share of children who work 21-25 hours and more than 25 hours was the same (15.4%).

Approximately 7.9% of the surveyed households stated that they have household members who have migrated to work in other regions of Uzbekistan or abroad. In 95% surveyed households only one person migrated, while the category of 2 migrated people made up 5%.

Survey respondents were asked about the main threats that impact their income, 40.9% of all respondents have no threats, 40.2% of respondents indicated rising prices for consumer goods, unemployment was a concern for 24.8% of respondents, and 7.1% respondents are

concerned about the depletion of irrigation water. Respondents were allowed to select multiple answers. Table 13-3 below provides more information.

Table 13-3 Economic hardships with impact on income sources

ECONOMIC SHOCKS	%
No shocks	**40.9**
Decrease in prices for agricultural products	**3.9**
Lack of irrigation water	**7.1**
Rising prices for consumer goods	**40.2**
Unemployment	**24.8**
Low income	**2.4**
Environmental disturbance	**0.4**
Difficult to answer	**1.6**

Source: Socioeconomic survey, 2023.

*Multiple options could be selected

When respondents were asked about the main problems that women in their household face in society, especially in the workplace, almost half of respondents (48.4%) stated that no challenges were faced. Following that the main concerns raised were economic inequality (24.4%) and the lack of opportunities for career (18.5%). 13% respondents found unequal access to public services as one of the main challenges. Lack of respect and limited access to education, professional trainings are also causing difficulties for female household members at 8.7% and 7.5% respectively.

Table 1 Challenges faced by female household members in affected communities (%)

CHALLENGES FOR WOMEN	%
Economic inequality	**24.4**
Limited access to equal opportunities	**5.9**
Lack of respect	**8.7**
Unequal access to public services	**13.0**
No opportunities for career	**18.5**
Limited access to education, professional trainings	**7.5**
Poor participation in political life, governance and power	**2.8**
Unemployment	**2.4**
Low incomes	**0.4**
No problem	**48.4**
Early marriages	**0.4**

Source: Socioeconomic survey, 2023.

* Multiple options could be selected

13.3.4 Accommodation and Living Conditions

All of the respondents of the survey live in private houses, meaning that no one lives in multi-stored apartments. Approximately 98.8% live in their own homes, while 0.8% live in dedicated houses for work, and 0.4% live in rented house. 78.3% of the houses are registered (owned) under a male member of the household and the remaining 21.7% registered under a female member (usually the household head).

100% respondents live in their houses all year round except for the members of Kyrgyzovul community, only 8% respondents from Kyrgyzovul live there temporarily from January to July.

When respondents were asked how stable is the electricity supply in their community, 16.5% respondents stated that electricity supply is unstable in Winter, while 43.7% responded that electricity supply is unstable all year round. Remaining 39.8% respondents have stable electricity supply.

Regarding centralized water supply, 90% respondents from Tarakkiyot, 72.7% from Yangiobod, 68% Gulobod and 60% from Istiklol communities said that they have and it works. In Kavardon community, 39.4% respondents have access to centralized water supply and it works in their homes, while 36.4% stated that they have access, but it doesn't work. Centralized water supply is not available for 96.8% respondents from Tashtogizoq, 92.9% respondents from Istikbol, 90% from Sergeli and 72% respondents from Kyrgyzovul communities.

The following table provides information about the main sources of water for drinking and cooking if they do not have centralized water supply.

Table 13-4 The main sources of water for drinking and cooking

	Main sources of water for drinking and cooking					
	Electric or fuel pump in my or neighboring yard	Own well for underground water in the yard	Hand pump (rocker)	Water is delivered by a water carrier, for a fee	Water supply on the street or in other places of makhalla, district	Irrigation canal, ditches
%	15.4	9.4	38.3	1.3	20.8	14.8

The following table provides information about the main sources of water for other household needs if they do not have centralized water supply.

Table 13-5 The main sources of water for other household needs

	Main sources of water for other household needs				
	Electric or fuel pump in my or	Own well for underground water in the	Hand pump (rocker)	Water supply on the street or in other places of	Irrigation canal, ditches

	NEIGHBORING YARD	YARD		MAKHALLA, DISTRICT	
%	7.4	9.4	34.2	44.3	4.7

Most of the respondents are connected to the centralized gas system and it is working in 95.7% respondents' houses. 2% of the total respondents stated that they have access to centralized gas supply, but not working, while remaining 2.4% respondents are not connected to the central gas system.

There is no centralized heating in place. 100% respondents confirmed it. For heating 97.2% surveyed households use centralized gas supply, while wood or plant materials are used by 1.6%. Electricity is used by 0.8% respondents, dry manure, meanwhile, is the main source of heating for 0.4%.

For cooking, predominantly used source is again centralized gas (97.2%), while wood or plant materials are used by 2.4% and 0.4% respondents use electricity.

There is no central sewerage in these communities.

67.7% respondents said that their household waste is taken out by the state garbage company, while 14.6% and 9.4% respondents' household waste is collected by a private waste company and by the State waste processing company respectively. 7.9% respondents throw their waste in a special pit in their yard, and only 0.4% respondents throw their household waste to public trash cans on the street.

When they were asked how they solve household waste water disposal problems, 95.7% use special pit for used water, 3.5%, meanwhile, pour waste water into the yard. The proportion of respondents who choose to pour into irrigation canals and street is the same – 0.4%.

13.3.5 Land-use agriculture and natural resources

Most of the surveyed households have agricultural land plots. Of the total respondents 82.3% have only tomorka (household garden plots), while 2% have tomorka and other areas of land as well. Remaining 15.7% of the respondents reported that they do not have land.

In Kyrgyzovul community there are two farm lands, one is 1 ha and the another one is 10.2 ha.

The types of agricultural products respondents grew on their land plots in 2022 are provided in the figure below. Respondents were allowed to select multiple answers.

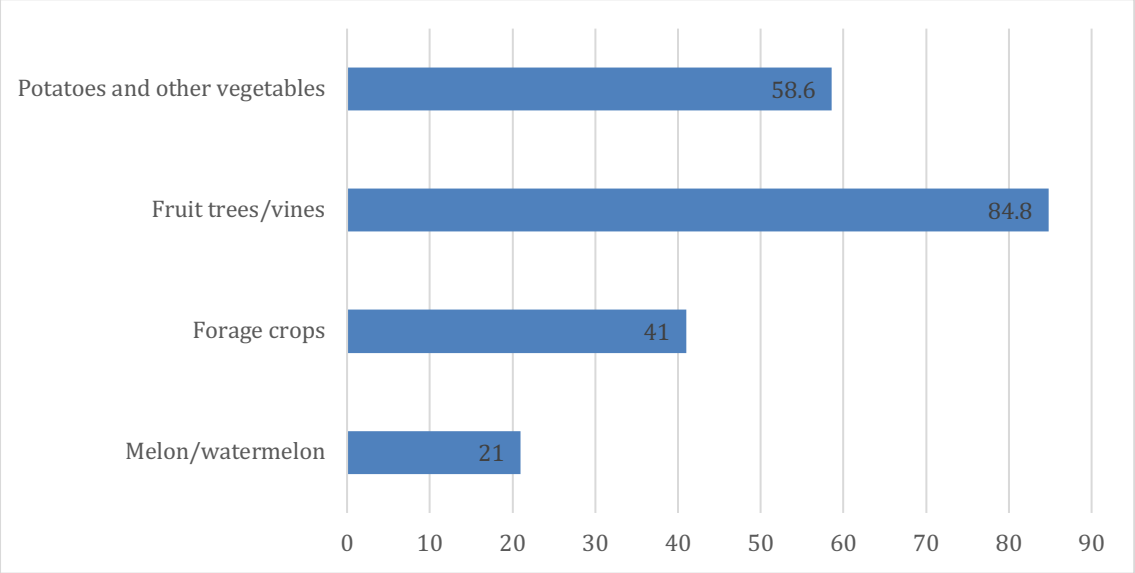


Figure 13-9 Types of agricultural crops grown on agricultural land plots

Respondents were asked about whether they farm throughout the year or during certain seasons of the year. 2.9% respondents engage in farming activities during the whole year, while 38.2% in Spring, 62.8% in Summer and 44.4% in Autumn.

1.9% respondents hire paid workers as a source of labour for their agricultural activities.

While 98.6% respondents employ their adult (not children) family members, 13% respondents use their children as a source of labour for their agricultural activities.

Most of the surveyed households farm in their land plots in terms of personal consumption only (87.7%), and 0.5% for selling and earning income, while the purpose of remaining 11.8% is both sale and personal consumption.

According to the survey results, male family members are a bit more involved in agricultural activities. The figure for them is 54.6%, while in 45.4% cases females are involved in farming.

Respondents of surveyed households were asked that does your household have livestock and poultry? 56.3% surveyed households have livestock and poultry, while 43.7% do not own.

Survey respondents from the Project-affected communities were asked if they used the Project site and if so, what they used it for. Four respondents (one from Istiklol, one from Sergeli and two from Tashtogizoq community) indicated that they use the Project area. Of the four respondents that said they were land users, one person from Istiklol community stated that he uses the land in terms of livestock grazing, while one from Sergeli uses the area for cultural/entertainment events. Regarding Tashtogizoq community, one grazes his livestock in the area, and another one uses the site for growing crops. None of them has

agreement with anyone for land use. People from Istiklol and Sergeli use the land once a week, while one from Tashtogizoq uses daily and another one uses the area once a month.

According to survey results, Chirchik river and its bank is not used by many households in the Project-affected communities. 86.2% respondents do not use the river and its bank, while 8.3% use its water for irrigating purposes. 3.1% use for domestic purposes, and the share of users in terms of grazing and fishing is the same at 1.2%.

32.4% of the total users use the water from the Chirchik river almost every day for household or other needs, 11.8% use 2-3 times in a week, 11.8% use once a month or less, and 44.1% use its water 2-3 times in a month.

A person from Istiklol community, two people from Istikbol and one from Sergeli fish in the river. One from Istiklol community does not have license for fishing, while remaining three people have. A person fishes 10 kg, two people fish 20 kg and one fishes 30 kg annually. The purpose of all them is providing their family with fish, not selling. They mainly catch 3 types of fish: silver carp, grass carp and carp.

Also, respondents were asked about whether their family use the canals and their banks that take water from the Chirchik River. 89.8% do not use the canals, while 9.4% use it for irrigation, 2.8% take water for household needs, and 0.4% graze their livestock on the banks of the canals.

If they use the canals of Chirchik and Korasuv rivers, they were asked about the frequency of usage. 82.6% respondents use the canals once a month or less, 8.7% use them 2-3 times in a month, and the share of respondents who use the canals daily and 2-3 times in a week is the same – 4.3%.

During the surveys, respondents were asked if they had witnessed floods, mudslides and other similar situations in the Chirchik and Korasuv rivers or canals that receive water from them. 92.4% respondents have not witnessed such cases, whereas 4.4% have.

13.3.6 Education

The right to education is guaranteed to all citizens of the Republic of Uzbekistan under the Constitution, where it states that "[e]very person has a right to education". The State oversees education and provides free education up to secondary school. Almost 100% of the Uzbek population has at least a secondary education with women and men both at an equal ratio of 99.9%[13] .

As of 1st January 2023, there were 907 schools in Tashkent region and 40 schools in Yukori-Chirchik district[14]. In the end of 2021, the number of kindergartens in the region was 607, and 35 of them are located in Yukori-Chirchik district[15].

Respondents were asked how many educational organizations exist in their neighbourhoods and how far is the nearest one from their home (approximate distance). The tables below give information about them.

Table 13-6 The number of kindergartens in the communities

THE NUMBER OF KINDERGARTENS	1	2	3	TOTAL
Istiklol	88.9	11.1	0.0	100.0
Gulobod	33.3	50.0	16.7	100.0
Istikbol	7.7	0.0	92.3	100.0
Tashtogizoq	57.1	42.9	0.0	100.0
Tarakkiyot	100.0	0.0	0.0	100.0
Yangiobod	0.0	100.0	0.0	100.0
Total	**41.9**	**27.9**	**30.2**	**100.0**

Table 13-7 The number of schools in the communities

THE NUMBER OF SCHOOLS	1	2	TOTAL
Istiklol	95.0	5.0	100.0
Gulobod	92.0	8.0	100.0
Istikbol	100.0	0.0	100.0
Sergeli	100.0	0.0	100.0
Tashtogizoq	100.0	0.0	100.0
Tarakkiyot	100.0	0.0	100.0
Yangiobod	100.0	0.0	100.0
Kyrgyzovul	100.0	0.0	100.0
Total	**98.2**	**1.8**	**100.0**

Table 13-8 Approximate distance to nearest kindergarten

DISTANCE	UP TO 500 M	501-1000 M	1001-5000 M	MORE THAN 5000 M	TOTAL
Istiklol	44.4	33.3	22.2	0.0	100.0

[13] UNDP "Human Development Report", 2016

[14]https://stat.uz/uz/matbuot-markazi/qo-mita-yangiliklar/35900-toshkent-viloyatida-nechta-maktab-bor

[15] https://toshvilstat.uz/uploads/docs/pres%20reliz%202022/Maktabgacha%20ta%E2%80%98limning%20asosiy%20ko%E2%80%98rsatkichlari.pdf

Gulobod	50.0	33.3	16.7	0.0	100.0
Istikbol	53.8	46.2	0.0	0.0	100.0
Tashtogizoq	5.6	38.9	33.3	22.2	100.0
Tarakkiyot	30.8	0.0	69.2	0.0	100.0
Kavardon	6.7	40.0	46.7	6.7	100.0
Yangiobod	25.0	6.3	56.3	12.5	100.0
Total	**26.7**	**27.8**	**37.8**	**7.8**	**100.0**

Table 13-9 Approximate distance to nearest school

	UP TO 500 M	501-1000 M	1001-5000 M	MORE THAN 5000 M	TOTAL
Istiklol	35.0	27.5	37.5	0.0	100.0
Gulobod	66.7	12.5	20.8	0.0	100.0
Istikbol	10.7	53.6	35.7	0.0	100.0
Sergeli	29.4	47.1	23.5	0.0	100.0
Tashtogizoq	51.6	38.7	9.7	0.0	100.0
Tarakkiyot	56.7	30.0	13.3	0.0	100.0
Kavardon	3.4	55.2	41.4	0.0	100.0
Yangiobod	45.5	40.9	13.6	0.0	100.0
Kyrgyzovul	12.0	40.0	44.0	4.0	100.0
Total	**34.6**	**37.8**	**27.2**	**0.4**	**100.0**

The approximate distance that pupils have to travel from their home to the nearest educational facility is less than 1 km for most of the schoolchildren. However, almost half of the pre-schoolers have to travel more than 1 km to reach their kindergartens.

Also, there is one college in Istikbol community. 25% students have to travel up to 500 m, while remaining 75% travel around 500-1000 m to reach the college from their home.

Survey respondents were asked that is the school equipped with the necessary equipment. 37.8% respondents stated that the school has everything students need, while 39.4% stated that the school is equipped with only essentials. The share of respondents who stated that schools are poorly equipped is 10.6%, and 6.3% found it difficult to answer.

Survey responses show that only 0.7% of household members were recorded as illiterate. However, the, rate of attending higher education is also low (3.7%) in the surveyed area.

Table 13-10 Levels of education excluding schoolchildren and pre-schoolers

LEVEL OF EDUCATION	%
Illiterate	1.9
Incomplete secondary (grades 8-9)	9.3

LEVEL OF EDUCATION	%
Complete secondary education (grades 10-11)	31.5
Graduated from secondary special (college, lyceum, technical school)	45.4
Higher education (bachelor) / postgraduate (Master's/PhD)	11.9
Total	100.0

Source: Socioeconomic survey, 2023.

Of the total surveyed population 97.2% students (both boys and girls) eligible to attend schools/colleges/lyceums were attending these types of schools located in their communities. Only 2.8% children of school age do not go to school.

13.3.7 Language and ethnicity

The survey identified that 44.9% are Uzbek, 36.6% are Kazakh, 8.7% are Kyrgyz and 9.9% respondents' nationality is Tajik.

The socioeconomic survey did not include questions related to religion due to sensitivity to this type of question for people in the region. However, in general, people practise Islam. Site observations as well as consultations conducted with local communities did not reveal presence of attributes of other religions that could cause conflict or cause individuals to be more vulnerable to Project impacts.

13.3.8 Indigenous Peoples

The policy framework and legislation of the Government of Uzbekistan do not recognize any section of the national population that can be considered 'Indigenous Peoples' (IPs). The EBRD PR7 and IFC PS7 prescribe the following qualification criteria for IPs in the characterization of project-affected communities:

- Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others.
- Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories.
- Customary cultural, economic, social, or political institutions that are separate from those of the mainstream society or culture.
- A distinct language or dialect, often different from the official language or languages of the country or region in which they reside.

According to this guidance, all of the above criteria must be met for any project-affected groupings to be identified as IPs requiring avoidance, mitigation and off-setting measures specified in the EBRD PR7 and IFC PS7.

A review of the national policies and legislation of Uzbekistan, literature survey and consultation with the community development departments of the district- and regional khokimiyats, as well as consultations with the national Cultural Heritage Agency (CHA) indicated that no IPs are presented within the project-affected districts.

On the community level, the ESIA-stage household socioeconomic survey and FGDs with the project-affected communities did not identify any ethnic residents and groupings that qualify as IPs.

The ethnic minority resident within the Istiqlol community (makhalla) are identify as third-generation gypsy peoples, who trace their historical origins to India. Over decades, this demographic assimilated the local cultures of Uzbekistan and Tajikistan, to a certain extent. The resident gypsy community specifically has maintained certain customs and lifestyles that do not conform to the mainstream culture and remained tight-knit (e.g., informal business activities, begging etc.). Household surveys and FGDs within Istiqlol community have indicated that the community members are registered citizens and not asylum seekers.

The leadership structure within the ethnic community in Istiqlol is not different from that of th surrounding local communities. The local leaders coordinate with the district khokimiyat administration on various socioeconomic issues and development projects within the community.

During initial disclosure of project information and subsequent rounds of consultation (i.e., during national EIA hearings, socioeconomic household survey, FGDs with men and women), the ethnic residents within Istiqlol did not raise or suggest a need for a specialized (or targeted) GRM on account of cultural restrictions. The community members did not express any disadvantages or inconveniences with using the various established communication channels to contact project CLOs for grievances, concerns and requests in relation to the Project.

13.3.9 Roads and transportation

Respondents were asked how often they use the roads next to the project site. 68.9% respondents do not use the road, while 20.1% use it seasonally, and 5.9% use once a month. 2.8% responded that they use 2-3 times in a week, and 2.4% use the road daily. For 43.9% respondents there are other alternative roads.

Table 13-11

	Yangibozor road	Kuylik road	Yangibozor-Chirchik road	Tashkent-Bostonlik road	Parkent road	Tashkent-Chorvok road	Road through Kibray	Chirchik-Gazalkent road	Chotkol road	Difficult to answer

	Yangibozor road	Kuylik road	Yangibozor-Chirchik road	Tashkent-Bostonlik road	Parkent road	Tashkent-Chorvok road	Road through Kibray	Chirchik-Gazalkent road	Chotkol road	Difficult to answer
Istiklol	83.3	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gulobod	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Istikbol	90.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sergeli	61.5	0.0	38.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tashtogizoq	56.3	0.0	25.0	6.3	0.0	0.0	0.0	0.0	0.0	12.5
Tarakkiyot	50.0	0.0	22.2	0.0	5.6	5.6	0,0	0.0	0.0	16.7
Kavardon	64.3	0.0	14.3	0.0	0.0	0.0	7.1	7.1	0.0	7.1
Yangiobod	50.0	0.0	10.0	10.0	0.0	0.0	20.0	0.0	0.0	10.0
Kyrgyzovul	50.0	0.0	0.0	0.0	10.0	0.0	0.0	0.0	20.0	10.0
Total	**64.5**	**0.9**	**15.9**	**1.9**	**1.9**	**1.9**	**2.8**	**0.9**	**1.9**	**7.5**

13.3.10 Culture, tourism and recreation

Respondents were asked about any cultural sites of international, national or local importance located within the Project area or within a 5 km radius if they know. 7.5% said that they know, while 76% do not know, and 16.5% found it difficult to answer. And they were asked that if yes, please indicate what it is.

Table 13-12 Cultural sites mentioned by respondents

	Ancient cemetery in Kavardan archaeological site	Beshbola shrine	Sakson ota Mosque	Total
Istikbol	100.0	0.0	0.0	100.0
Tashtogizoq	83.3	0.0	16.7	100.0
Tarakkiyot	80.0	20.0	0.0	100.0
Kavardon	100.0	0.0	0.0	100.0
Yangiobod	100.0	0.0	0.0	100.0
Kyrgyzovul	100.0	0.0	0.0	100.0
Total	**89.5**	**5.3**	**5.3**	**100.0**

13.3.11 Poverty and income inequality

According to the Asian Development Bank (ADB), as of 2020 a total of 11.5% of the population of Uzbekistan lived under the national poverty line. A total of 6.5% of the working population earned less than the $1.90 using the purchasing power parity poverty indicator as of 2021. Poverty levels in Uzbekistan had been decreasing, however they have been negatively impacted by the COVID-19 pandemic. In 2020 it was determined that 1.3% of the population (approximately 448,000 people) may have fallen into poverty as a result of COVID-19 .

In Uzbekistan, the minimum consumption expenditure index is used as the poverty line. According to the State Statistics Committee, the minimum consumer spending amounted to 568 thousand soums per month per person. The share of surveyed HHs whose income does not exceed 568 thousand soums per capita is given in the following table.

Table 13-13 The share of respondents whose income is below the poverty line

COMMUNITY	NUMBER OF HOUSEHOLDS LIVING BELOW THE POVERTY LINE
Istiklol	22.5
Gulobod	16.0
Istikbol	3.6
Sergeli	10.0
Tashtogizoq	9.7
Tarakkiyot	6.7
Kavardon	12.1
Yangiobod	9.1
Kyrgyzovul	16.0
Total	**11.0**

Respondents of the socioeconomic survey were asked whether their income is sufficient or not. The majority of respondents indicated that their income is only enough for basic needs such as food, clothing, taxes and utilities (43.7%). Of all of the of respondents in the Project-affected communities, 21.7% stated their income was not enough to cover basic needs, and 0.4% said their income is not enough to cover expenses even for food. 32.7% respondents stated that their income is enough for more than just basic needs, but not enough to buy anything, while 1.2% of the total respondents believe that their income is more than enough, can buy anything.

The following table provides information about main household assets of the respondents. The majority of respondents own a mobile phone and a TV (98.4% and 96.1% respectively), the next most owned item is a refrigerator (91.3%). Almost half of the surveyed households have cars (43.3%).

Table 13-14 Main household assets of the respondents

	YES	NO
Car	43.3	56.7
TV	96.1	3.9
Satellite dish	8.3	91.7
Washing machine	57.5	42.5
Refrigerator	91.3	8.7
Air conditioner	15.0	85.0
Greenhouse	1.2	98.8
Personal computer	14.2	85.8
Mobile phone	98.4	1.6

13.3.12 Vulnerable groups

Among surveyed households, 8.3% of them have disabled family members. Of the total identified disabled people, 81% of them are physical disabled, 4.8% are mentally disabled, and 14.3% are suffering from chronic illness.

Eligibility for welfare schemes is also a measure of vulnerability. Respondents were asked if they receive a monthly low-income allowance, 2% respondents said yes, while 33.1% indicated that they should receive an allowance, but it is not provided. The remainder of respondents do not receive an allowance as their families are not deemed eligible.

When respondents were asked whether they receive monthly child allowances from the mahalla, 20.1% surveyed respondents confirmed that they receive a child allowance, while 20.9% stated that they should receive an allowance, but none is provided. 38.9% do not meet the criteria to receive a monthly child allowance, while the remaining 20.1% have no children under 17.

13.4 Receptors

The following table provides an overview of E&S impact receptors in the context of potential impacts on livelihoods and social infrastructure within the Project's Areas of Influence (AoI). A sensitivity rating and corresponding description is further provided for each relevant receptor.

Table 13-15 E&S impact receptors – Livelihood and social infrastructure (socioeconomics)

RECEPTOR	SENSITIVITY	JUSTIFICATION
Herders	High	Herders from Sergeli community are subject to economic displacement associated with permanent land acquisition and potential construction-phase severance. This set of Project-Affected Persons (PAPs) have a potentially high sensitivity to project-related livelihood impacts as herding is their primary source of income.
Residents within project-affected communities, districts and regions	Moderate	Residents within the project-affected communities located around the project sites, access roads and off-site labour accommodation facilities, as well residents of the broader host districts and affected regions. The makhallas of Sergeli, Tashtogizoq, Yangiobod, Gulobod, Istiqbol, Istiqlol, Taraqqiyot, Qirgizovul and Kavardan, amongst others, have a potentially high sensitivity to socioeconomic risks associated with construction activities and the influx of construction labour.
Utilities and social service providers	High	Utilities and social service providers operating within Yukorichirchik and Parkent Districts and the wider Tashkent Region.

13.5 Potential Impacts and Impact Management Measures

13.5.1 Construction phase

13.5.1.1 Economic displacement

PV PLANT AND LOOP-IN-LOOP-OUT CONNECTION

In June 2023, a Presidential Resolution No. PQ189 was issued to mandate the implementation of the Project and requisite land acquisition under eminent domain. In the Resolution, a total of 660 hectares within the earmarked site in Yukorichirchik District are allocated for the establishment of the PV plant and the associated LILO connection.

The PV plant facilities will be developed with a plot of land that is currently owned and operated by Uzsuvtaminot (i.e., water supply utility). Uzsuvtaminot acquired total ownership of the site in 1955, at which time historical paddy cultivation and aquacultural developments within waterlogged (westward) parts of the site were discontinued. Due to the sensitivity of the hydraulic capture zone and related waterworks, structural and procedural measures were established to secure and isolate the site, following the development of the resident water supply infrastructure. Another two Uzsuvtaminot water abstraction and treatment zones are located west of the PV plant site, across Chirchik River, and similar security and access restrictions are in effect within these zones. The planned 200metre overhead LILO will be installed across a short stretch of land within the PV plant, and to a less extent, across the site and 4R-12 highway wayleaves outside of the site fence.

The ESIA-stage socioeconomic surveys and LALRP-stage land use investigations established that no formal, informal, permanent, or seasonal land use exists within the footprint of the PV plant site and the interconnection LILO. Therefore, no livelihood impacts will arise from the acquisition of allocated land, reinforcement of site security and the enforcement of grid security and Health Protection Zones (HPZs).

BESS AND INTERCONNECTION CABLE

The Presidential Decree No. PQ-189 further provides for the establishment of the BESS and associated interconnection cable, with a mandate for the acquisition of 660 hectares of land within the earmarked sites in Parkent District.

The permanent footprint of the BESS and interconnection cable footprint falls within an expansive tract of land that was under the ownership of the Cultural Heritage Agency (CHA)[16], prior to the issue of the Presidential Resolution. According to consultations with relevant authorities, the undeveloped landholdings were acquired by the Cultural Heritage Agency of Uzbekistan and reserved for future archaeological surveys, following the issuance of a Presidential Resolution in 2019, which called for the completion of archaeological surveys within select undeveloped areas.

Due to this designation, no further land-use and tenure was legally permissible within the project sites and the wider land plot. Nevertheless, in the absence of active archaeological exploration surveys within the wider CHA-held tract (prior to the Project), portions of the land tract were informally utilized by a number of local professional herders for seasonal grazing. LALRP-stage consultations indicated that herding is concentrated within eastward sections of grassland where abundant pastures are seasonally available for rotated herds of cattle and sheep.

In general, livestock herded within the overall tract is owned by households in the nearby communities of Sergeli and Kavardan. For the BESS and interconnection cable sites specifically, land-use investigation surveys and consultations with makhalla leadership in Sergeli and Kavardan indicated that two professional herders use the BESS site for herding. The LALRP-stage census and socioeconomic household surveys with these PAPs (namely, H01 and H02) revealed that the sites are utilized for grazing on a seasonal basis and to a limited extent. Each herder typically uses less than a third of the site for supplementary feed, as the site does not offer high-quality pastures relative to other nearby hotspots.

[16] The Cultural Heritage Agency operates under the Ministry of Tourism and Cultural Heritage of Uzbekistan

Consultations with the Parkent District agricultural department and Committee for the Development of the Silk and Woolen Industry (SWID) indicated that no official pastural landholdings are located within the district. Nevertheless, remnant sources of livestock feed potentially include approximately 200 hectares of surrounding undeveloped grassland, as well as cultivated fodder from nearby farmland. Besides in-field walkovers and surveillance, the following modes of engagement were used to obtain information on potential livelihood impacts associated with the permanent access restrictions to the BESS area (totalling 16.9 hectares) and potential construction-phase access severance to pastural sites east of the BESS and interconnection cable sites:

- ESIA-stage consultation and disclosure hearings (community meetings)
- ESIA-stage socioeconomic household surveys with residents of affected makhallas
- ESIA-stage consultations with regional and district-level cadastral, agricultural and community development khokimiyat departments
- LALRP-oriented Focus Group Discussions (FGDs), including consultation with makhalla leadership.
- LALRP-oriented socioeconomic household surveys

The above lines of consultation did not reveal any existing pressures on the common pastural resources within the wider undeveloped tract of land. Further, upon the introduction of the project footprint, scale of land-take and access restrictions, no major concerns were raised with regard to potential shortages of livestock pastures as a result of the Project. Further, feedback from the community leaders and other locally based professional herders did not indicate the potential for severed access to pastural resources on the eastern side of the BESS and associated interconnection cable (from the eastern side),

Notwithstanding the availability of remnant and alternative communal pastural resources, the project land-take will result in a minor diminution of supplementary grazing areas for the two potentially impacted professional herders.

13.5.1.2 Accidental damage to public property and utility service interruptions

The Project's construction phase will involve a varied range of construction operations, including transportation of workers and haulage of heavy machinery and materials, land clearance, and earthworks. A number of specific construction activities present a high risk of inadvertent physical damage to private and public property, outside of the areas demarcated for construction works, which potentially include:

- Intensive compaction works can generate ground-borne vibration at a magnitude that can result in discernible damage to built-up structures. The probability of these damages occurring is primarily dependent on the intensity of ground compaction and intervening distance to nearby buildings, as elaborate in Section 0 of this report. The risk

of structural damage is potentially higher for buildings with compromised structural integrity from other underlying factors.

- Ground excavation works can also result in accidental damage to private and public/ utility property. Such damages can occur in instances where marginal deviations from excavation perimeters encounter underground utility assets (e.g., water pipes, underground gas pipelines, telecommunication cabling) and private assets (i.e., crop farms and resident trees etc.). Any impact with high-pressure gas pipeline during trenching works for the installation of the BESS interconnection cable poses the risk of casualties, catastrophic damage, utility service interruptions, and associated economic losses.
- Civil works involving the alteration and/or construction of drainage systems potentiate inadvertent overflows that can extend towards nearby (off-site) establishments such as communal dirt roads, crop farms and residential facilities.
- Stockpiling and unloading of aggregates and debris within laydown areas and dumping sites can cause inadvertent damage to nearby property (e.g., crop farms, water sources etc.), especially in instances where the property boundaries are inconspicuous and immediately adjacent to working areas.
- Traffic-related property damage, which includes potential damage to private and public property due to accidental impact from off-roading incidents involving project vehicles, or accidental damage to overhead cabling during the transportation of high-rise (bulky) equipment. This impact also includes potential damage to unpaved roads and culverts due to the passage of heavy haulage vehicles.

Besides H&S risks to construction workers and third parties, accidental property damage from the above-mentioned activities can result in the loss of productive assets, resources, and economic losses. Depending on the severity of impact, potential receptors can be subjected to a disruption of essential social and industrial services (e.g., water, gas and telecommunication) and economic shocks.

13.5.1.3 Increased pressure on public infrastructure and resources

The Project's construction phase poses the risk of heightened pressure on public infrastructure and communal resources, as a result of the following:

- Direct demand for construction resources and facilities for the management of construction waste, to provide for construction works
- Indirect demand for accommodation facilities and basic social services, as a result of construction-phase labour influx

Construction activities will demand a substantial amount of water, fuel and power. The provisioning of these resources for construction purposes may put a strain on locally available sources of high-quality water, fuel stations and power grid, particularly in the winter season. Project construction works are also estimated to generate a total of 169,000 kilograms of waste, which may overwhelm local capacity for waste management within project-affected districts and Tashkent Region at large.

Further to the direct infrastructural demands during construction, the in-migration of foreign construction workers and local jobseekers from neighbouring districts and regions can compound the pressure of locally available social services. Specifically, access to housing and healthcare facilities may become strained in the event that a significant fraction of the construction workforce settles within accommodation in the host communities.

Water supplies for construction activities will be sourced from Chirchik River and Karasu River and/or the adjacent Khandam canal for the PV power plant and BESS respectively, and tankered to construction sites. Water abstraction from these water channels will not have a significant impact on discharge and local water availability considering the high discharge of these perennial channels.

Potential impacts on waste management and transportation infrastructure are discussed in Section 6.4.1 and Section 11.6.1 of this report respectively.

13.5.1.4 Transient inflation within host communities

The Project's construction phase will create an appreciable demand for construction materials, sustenance products (including fresh produce), and miscellaneous support services that can be sourced from local communities at a relatively low cost.

A sustained increase in demand for locally available products and services raises the potential for commercialization of the subsistence-oriented economies existent in some of the project-affected communities. Besides potential increases in the pricing of in-demand commodities and facilities, the responsive transition to a cash-based economy may lead to the emergence of profit-maximizing markets. While these market conditions may benefit the project organization and SMEs, the resultant rise in local living costs poses conversely adverse implications for low-income residents within host communities. Housing inflation can potentially add to the economic hardship of financially insecure households and thereby contribute to further impoverishment.

13.5.1.5 Employment creation and capacity transfer

The Project's construction phase is set to employ a peak workforce of ~700 workers, with Uzbekistan nationals anticipated to constitute about 30% of the labour. Beyond the extension of skilled and semi-skilled employment on a direct basis, the project will engage numerous local service providers (i.e., contractors) and petty traders (i.e., secondary supply chain), and thereby incentivize the formalization of local SMEs. Potential demand for local offerings within the project-affected communities will further alleviate unemployment and contribute to local economic development through income generation and tax returns.

Furthermore, the dissemination of transferable and specialist skills over the course of construction-phase employment will enable capacity transfer, which is anticipated to boost

the employability of local recruits and create spill-over benefits for other developments within the project-affected districts, Tashkent Region and the country at large.

Table 13-16 Overview of potential impacts relating to local livelihoods and social infrastructure (socioeconomics) during construction

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Economic displacement	Sergeli community (makhalla) within Parkent District	Moderate	Herders	High	**Moderate/ Major**	**Minor/ moderate**
Accidental damage to public property and utility service interruptions	Yukorichirchik District and Parkent District, and the wider Tashkent Region	Major	Residents within project-affected communities, districts, and broader Tashkent Region	Medium	**Moderate/ Major**	**Minor/ moderate**
		Moderate	Utilities and social service providers	High	**Moderate/ Major**	**Minor/ moderate**
Increased pressure on public infrastructure and resources	Yukorichirchik District and Parkent District, and the wider Tashkent Region	Moderate	Residents within project-affected communities, districts, and broader Tashkent Region	Medium	**Moderate**	**Minor**
			Utilities and social service providers	High	**Moderate/ Major**	**Minor/ Moderate**
Transient inflation within host communities	Yukorichirchik District and Parkent District, and the wider Tashkent Region	Moderate	Residents within project-affected communities, districts, and broader Tashkent Region	Medium	**Moderate**	**Minor**
Employment creation and capacity transfer	Yukorichirchik District and Parkent District, the wider Tashkent Region and Uzbekistan at large	Major	Residents within project-affected communities, districts, and broader Tashkent Region	Medium	**Moderate/ Major**	**Major**
Impact avoidance, mitigation and offset measures **<u>Economic displacement</u>** • The assessment of impacts associated with project-induced physical and economic displacement and due livelihood restoration planning will be						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
carried out by means of a Land Acquisition and Livelihood Restoration Plan (LALRP). • The assessment of the Project's resettlement (physical and economic) impacts for parcels of land to be acquired under eminent domain will be based on a full-scale LALRP census, socio-economic survey, and asset survey. • The above-mentioned LALRP surveys will seek to identify all permanent, seasonal, formal, semi-formal, informal, private and communal/public land-use within the full extent of potentially acquired land. • The LALRP census and asset inventory surveys will be implemented with a widely publicized cut-off date to minimize potential livelihood impacts on any subsequent opportunistic settlers or claimants who will not be considered eligible for compensation based on spurious claims. • Based on the full inventory of potentially impacted land rights holders, the LALRP will make adequate provisions for compensation entitlements and supplementary assistance. • While economically displaced entities will be offered both cash and in-kind compensation, vulnerable PAHs and PAHs whose affected livelihoods are centrally dependent on land and natural resources will be offered in-kind compensation by default. • Livelihood restoration measures will include all practicable means to ensure full and equitable delivery of LALRP benefits to married men and women residing in joint households. • LALRP provisions will be needs-based and gender-informed, to ensure that the living conditions, income status and overall welfare of entities subject to economic displacement are enhanced, or at least sustained to an equivalent extent, relative to pre-project levels. • Compensation and/or transitional support for potentially impacted physical assets, ecosystem services (common resources) and income streams will be provided prior to the onset of impacts and at full replacement value. • Any communal property potentially displaced by the Project will be re-established at suitably situated locations, in close consultation with affected residents and local administration within affected makhallas and districts. • The LALRP will further provide for the monitoring and evaluation of livelihood restoration commitments, to ensure that any shortfalls in implementation outputs, outcomes and impacts relative to pre-set Key Performance Indicator (KPI)targets are identified and remediated. • The Stakeholder Engagement Plan (SEP) for the project will be aligned with the LRP to inform potentially project-affected households and communities about the land acquisition and livelihood restoration process. • The Project's community GRM and relevant sensitization efforts should also be aligned with the LALRP to enable the collection of grievances pertaining to land access and livelihood restoration on platforms that are accessible to all local constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. The GRM will include at least one female CLO to enable dedicated channels for reporting gender-sensitive issues. **<u>Accidental damage to public infrastructure and utility service interruptions</u>** • Construction zones and working areas will be demarcated using temporary fence walls and barricading.						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
• All construction activities will be restricted to demarcated construction zones within the project sites and designated transit corridors. • Continual stakeholder engagement during construction will seek to ensure that communities based around the project sites and nearby residences in particular are notified regarding imminent high-impact noise or vibration, in advance of construction work. • For the BESS site, visual inspection survey will be conducted before the start of any intensive compaction and pile-driving works close to nearby third-party buildings (i.e., within 200 metres), to facilitate future investigation into structural damage attributed to ground vibration from construction works. The survey should be repeated following the completion of such works to identify any unreported damages, for the same purposes. • Utility and drainage clearance surveys based on visual inspections and consultations with local authorities (and where necessary, radar equipment) will be undertaken prior to the establishment of excavation, stockpiling, and construction zones, to identify any buried and above-ground utility assets and drainage infrastructure. Particular attention will be given to the gas pipelines and existing electricity transmission and distribution facilities located within the project sites and their vicinity. • Stockpiling zones and laydown areas outside of the main project sites (e.g., along the interconnection cable route) will be clearly demarcated to increase the visibility of designated working areas. • A traffic study will be carried out along transit corridors to be used for the transportation of abnormal loads to determine sufficient clearance. • Any temporary blockage of existing drainage and irrigation channels to enable construction works will be scheduled for dry periods to the extent feasible, and drainage bypasses will be constructed where necessary. • In the event that the EPC Contractor is mandated to carry out the transportation of waste consignments to off-site waste management facilities, the EPC Contractor shall apply due care in preventing damage to third party waste management assets (e.g., municipal waste management facility assets) and any disruption of associated waste processing operations. • In the event that the EPC Contractor is mandated to carry out the transportation of waste consignments to off-site waste management facilities and accidental damage to any assets within the recipient facility occurs (i.e., upon transit and discharge), the EPC Contractor shall notify all relevant authorities of the incident immediately and coordinate with the operators/ owners of the facilities for immediate repair of damaged assets. • All grievances, claims and observations pertaining to incidental damages associated with construction activities will be recorded and investigated by expert representatives from the EPC Contractor's construction units, local government authorities and utilities (as appropriate). Follow-up valuation will be undertaken by a qualified government valuer and due monetary or in-kind compensation will be issued at full replacement value. • Local communities based around the project sites will be familiarized with the Project's community GRM, to enable the collection of grievances pertaining to incidental property damage on platforms that are accessible to all local constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse.						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Increased pressure on public infrastructure and resources • Water abstraction permits will be obtained from relevant authorities during the Project's construction and operational phase (i.e., for water abstraction from Chirchik River and/ or Khandam Canal). • Water will not be abstracted from irrigation channels close to the project sites, particularly during low-flow periods. • Dewatering for any deep excavation works will be controlled and minimized within the PV plant site working areas in which resultant drawdown can impact on the yield of nearby utility boreholes. • Water conservation measures will be implemented, including the use of water-efficient toilets and faucets, maintenance checks to identify and prevent water distribution system losses, and rainwater harvesting where possible. • Soil, surface water and groundwater pollution prevention and control measures (i.e. including the isolation of waste and chemical storage areas, controlled handover to waste management contractors and effective spill response procedures etc.) will be implemented to avoid and mitigate accidental contamination of sensitive aquifers, drainage channels, irrigation canals and rivers). • Local recruitment will be leveraged (for semi-skilled labour in particular) to minimize the pressure on local accommodation, healthcare, water and power supply facilities. • Follow-up engagement will be carried out with Yuqorichirchik and Parkent district khokimiyats and relevant utilities to ensure that utility and communal infrastructure utilized for the Project's construction phase (i.e., including medical service centres, water supply utilities, waste management service providers and law enforcement agencies) have sufficient capacity to address the Project's demand for social and utility services. • Medical service facilities (i.e., project clinics) will be established to provide basic medical services to construction workers, prior to ad-hoc referral to well-equipped and nearby hospitals. • Private hospitals with advanced medical facilities will be utilized to the extent feasible, in preference to public clinics and hospitals located nearby the project sites and labour accommodation centres. • Off-grid power sources will be utilized during periods power shortages and power rationing on the BESS site exclusively. • Dedicated access roads will be established within the Project's transit corridor to isolate project traffic, to the extent feasible. • Project traffic will be organized to avoid peak traffic hours and traffic congestion hotspots to the extent feasible, in consultation with relevant local authorities. • Project logistics will be implemented to ensure convoys of construction vehicles (and Heavy Goods Vehicles in particular) are dispatched with maximal load to minimize the number of consignments/ delivery trips to the project sites. • Transit service for construction labour will include staff buses, to curb the volume of project traffic. • Commuting assistance (i.e., staff buses) will be provided to workers based within a considerable radial distance from the project sites to reduce the pressure on accommodation facilities within local communities located nearby the project sites.						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
• Subsequent engagement with Local Government Authorities (i.e., district and regional khokimiyats) will be carried out to identify municipal and commercial waste management facilities with adequate capacity for the treatment and/or disposal of various construction waste streams. • Subsequent engagement with Local Government Authorities (i.e., district and regional khokimiyats) will be carried out to identify registered and licensed municipal and commercial waste management contractors. • Municipal and commercial waste recycling contractors within the affected districts and Tashkent Region at large will be identified and engaged for the recovery of materials from recyclable construction waste. • Regular monitoring of municipal and commercial waste management service providers will be undertaken to ensure the entities are licensed throughout the duration of services, and the license details of any such service providers will be documented in the Project's E&S permit register and waste transfer log. • A Waste transfer log will be maintained to record and track the generation, storage and segregation of various construction waste streams, as well as the dispatch of waste consignments for off-site treatment and/or disposal, with details on waste management contractors, chain of custody, transportation route to the designated waste management facilities. • Water conservation measures will be implemented, including the use of water-efficient toilets and faucets, maintenance checks to identify and prevent water distribution system losses, and rainwater harvesting where possible. • Water abstraction permits (and any requisite prior risk assessment) will be obtained from the Ministry of Water Resources (i.e., district and regional offices) and Ministry of Ecology, Environmental Protection and Climate Change. • Excavated soil will be stockpiled and preserved within dedicated sites to enable its reuse in backfilling excavations and landscaping as part of site rehabilitation post the completion of construction works. • Induction and refresher trainings for all direct and contracted construction workers will include sensitization to conservation of water and other raw materials, re-use of various products and materials, segregation of waste at source to enable subsequent composting, recycling, treatment, energy recovery and disposal at designated (off-site) waste management facilities. • Regular coordination will be made with relevant authorities on permitting requirements and H&S measures for any instances of on-site storage and project-related transportation of hazardous materials and waste in quantities that exceed regulatory thresholds. • A dedicated Water Management Plan, Soil Management and Erosion Control Plan, Hazardous Materials and Waste Management Plan, Waste Management Plan, Traffic Management Plan, Worker Accommodation Management Plan, Community Health and Safety Plan, Local Recruitment Plan, Influx Management Plan, and Emergency Preparedness and Response Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented. • Local communities based around the project sites will be familiarized with the Project's community GRM, to enable the collection of grievances pertaining to overburdened utility or communal infrastructure and common resources on platforms that are accessible to all local constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. • Affected communities will be notified about any interruptions to social services resulting from the project, and informed about when any such						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance

interruptions are resolved. The project CLOs will engage with local communities on a regular basis to identify any issues/ grievances not submitted through the GRM.

Transient inflation within host communities

- Local communities based around the project sites will be familiarized with the Project's community GRM, to enable the collection of grievances pertaining to project-induced inflation within host communities on platforms that are accessible to all local constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality.
- If substantial project-induced inflation is reported as a major (frequent) grievance, the project will consider alternative markets and service providers that are based outside of the project-affected communities.
- The procurement process for locally based supply chains will involve qualification criteria focused on index-based pricing.
- Commuting assistance (i.e., staff buses) will be provided to workers based within a considerable radial distance from the project sites to reduce the pressure on accommodation facilities within local communities located nearby the project sites.

Employment creation and capacity transfer

- A Human Resources (HR) Policy will be instituted for the project. The policy will highlight a commitment to local content.
- The Project's HR Policy will be contractually cascaded from the Project Company down to the EPC Contractor, and any first-tier and/or second-tier recruitment agencies, to ensure that the policy provisions are applied to all contracted labour and supply chains associated with the Project's core business processes during construction.
- Employment for the Project's direct and contracted labour as well as the procurement of services from supply chains will be implemented at the community, district, regional and national levels, in order of decreasing priority.
- The promulgation of employment opportunities within project-affected communities, districts and the wider region will be undertaken by means of (i) newspaper advertisements, (ii) public announcements by relevant LGAs, (iii) posts at vocational training institutions, (iv) posts at project site entry points, and (v) local community engagements by dedicated CLOs.
- Construction-phase recruitment will involve equal-opportunity eligibility criteria based around inherent job requirements (e.g., educational attainment, professional experience, fitness for work etc.), with priority consideration for Uzbekistan nationals. The recruitment process will be free of discrimination on the grounds of gender, ethnicity, religion, income status and other attributes of no bearing on inherent job requirements.
- A minimum (threshold) set of employment vacancies will be reserved for female job candidates from local communities, based on feedback recorded in the project SEP, and these opportunities will be publicized within the project-affected communities such that women are encouraged to apply for suitable jobs under the Project.
- Suitably qualified service providers based within the project-affected communities, districts, Tashkent Region, and wider national markets (in order of decreasing priority) will be identified, evaluated and listed in an internal procurement database. Procurement of construction goods and

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
services will provide priority consideration for local service providers. • All project employees and contracted workers will have equitable access to relevant on-the-job trainings, which will enable the dissemination of specialist and transferable skills within the Project's construction phase. • The project HR policy and procurement plans and procedures will include provisions for retaining staff post demobilization/ completion of contract terms, where possible. • Career development programs such as internships, mentorships and professional development plans will be provided for various tiers and sections of project employees and contracted workers, particularly skilled workers paired with expatriate experts not readily available in Uzbekistan. • A Local Recruitment Plan, Labour and Working Conditions Management Plan and Sub-Contractor and Supplier Management Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented.						

13.5.2 Operations phase

13.5.2.1 Augmented power supply and associated economic growth

Over its operational lifetime, the Project will deliver a total 11,861,233 MWh of electricity to the national grid. The added power generation and storage capacity will play a crucial role in addressing the power emergency within Uzbekistan and Tashkent Region in particular.

With this contribution, the project is further anticipated to facilitate the expansion and development of the peri-urban reaches of Tashkent Region. Beyond the project-affected districts, the Project will improve living conditions by reducing dire power outages and provide additional power increased commercial and industrial productivity.

Table 13-17 Overview of potential impacts relating to local livelihoods and social infrastructure (socioeconomics) during operations

E&S IMPACT	AREA OF INFLUENCE	IMPACT MAGNITUDE	POTENTIAL RECEPTORS (DIRECT AND INDIRECT RECEPTORS)	RECEPTOR SENSITIVITY	PRE-MANAGEMENT IMPACT SIGNIFICANCE	RESIDUAL IMPACT SIGNIFICANCE
Augmented power supply and associated economic growth	Grid service areas within Tashkent Region and Uzbekistan at large	Major	Beneficiaries within grid service areas (i.e., residential, commercial, industrial, and institutional establishments)	Medium	**Moderate/ Major**	**Major**
IMPACT AVOIDANCE, MITIGATION AND OFFSET MEASURES **Augmented power supply and associated economic growth** • Maintenance programs will be developed and executed to ensure efficient power generation for the duration of the Project's operational phase, and equipment will be replaced as prescribed by manufacturers.						

13.5.1 Decommissioning phase

Project decommissioning will entail the deconstruction of project facilities, demobilization of related equipment and materials, as well as potential repurposing and/or rehabilitation works. At this stage, several potential impacts relating to local livelihoods and social infrastructure will be similar to those in the construction phase. Specifically, this set of impacts potentially includes:

- Accidental damage to public infrastructure and utility service interruptions
- Increased pressure on public infrastructure and resources
- Employment creation and capacity transfer

For the avoidance and mitigation of these impacts, relevant impact management measures specified in Section 13.5.1will be implemented. Accordingly, the same pre-management and residual significance ratings are provisionally assigned to mutually relevant impacts on sensitive receptors.

13.6 Monitoring requirements

Table 13-18 below provides an overview of the key monitoring arrangements for evaluating performance against applicable standards relating to local livelihoods and social infrastructure, in the Project's construction and operational phases. A more elaborate and comprehensive coverage of these requirements will be provided in the Construction- and Operations-phase Environmental and Social Management Plans (C-ESMP, O-ESMP) and Environmental and Social Monitoring Plans (ESMoPs).

Table 13-18 Monitoring arrangements for impacts and preventative and mitigation measures relating to local livelihoods and social services

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
Resettlement impacts (i.e., economic displacement)	**Please refer to the Project's Land Acquisition and Livelihood Restoration Plan (LALRP) for relevant monitoring requirements**				
Incidental damage to third party property	Grievances concerning incidental damage to public or private (third party) property	- All related grievances are closed out within the shortest practicable duration	- Community Grievance Log	Ongoing	- EPC Contractor CLOs
Increased pressure on public infrastructure and resources	Grievances concerning project-related burden on utility and communal infrastructure and resources	- All related grievances are closed out within the shortest practicable duration	- Community Grievance Log	Ongoing	- EPC Contractor CLOs
All socioeconomic impacts	Percentage of community engagements (e.g., FGDs, community meetings) completed in line with the SEP and quarterly schedule.	- 100% of planned community engagements have been completed in line with the SEP	- Stakeholder Engagement log - Meeting minutes and attendance sheets	Ongoing	- Project Company CLOs - EPC Contractor CLOs

14 COMMUNITY HEALTH, SAFETY AND SECURITY

14.1 Legal Requirements and Standards

14.1.1 National laws and regulations

RESOLUTION OF CABINET OF MINISTERS OF REPUBLIC OF UZBEKISTAN NO.95 "ON APPROVAL OF GENERAL TECHNICAL REGULATIONS OF ENVIRONMENTAL SAFETY" (2020)

- Requires the implementation of environmental safety measures for the protection of flora and fauna. This includes the prevention of death of wildlife species due to magnetic fields of power transmission lines and sanitary protection zones.
- Requires transformer substations in power transmission lines, their grids to have equipment (barriers, fences etc.,) to prevent animals from entering the territory of the substation.

DECREE OF THE CABINET OF MINISTERS OF THE REPUBLIC OF UZBEKISTAN NO.1050 "ON APPROVAL OF RULES FOR PROTECTION OF POWER GRID FACILITIES, 2018"

- This determines the procedure for establishing protected zones for power grid facilities, as well as special conditions for using land located within the protected zones and ensure the functioning and operation of the said facilities.
- Construction of power grid facilities with 110, 220 or 500kV in protected areas of state nature reserves, protected areas of nature parks and state biosphere reserves etc shall be allowed with the permission of the Cabinet of Ministers of the Republic of Uzbekistan.
- Protected zones of power grid facilities shall be established on both sides of the power transmission line from the outermost wires and along the perimeter of substations at the following distances for voltages;
    - 110kV: 20 meters;
    - 220kV: 25 meters; and
    - 500kV: 30 meters.

SAN RULES & NORMS NO. 0236-07 "SANITARY NORMS AND RULES TO ENSURE SAFETY FOR PEOPLE LIVING NEAR HIGH VOLTAGE POWER TRANSMISSION LINES, 2007"

- This regulation sets the requirements for ensuring public safety when overhead power lines pass over populated, unpopulated or inaccessible territories.
- It requires sanitary norms and rules to be followed in the design, construction and operation of overhead power lines.
- The distances corresponding to the projection onto the ground of the outer phase wires in a direction perpendicular to the overhead line as follows:
    - Up to 110kV/m: 10 meters.
    - Up to 220kV/m: 15 meters.
    - Up to 330kV/m: 20 meters.

- Up to 500kV/m: 30 meters.
- Up to 570kV/m: 40 meters.

14.1.2 Lender requirements

14.1.2.1 EBRD

Performance Requirement 4 establishes the importance of avoiding or mitigating adverse health and safety impacts and issues associated with project activities on workers, project affected communities and consumers. The objectives of EBRD PR4 are:

- To protect and promote the safety & health of workers by ensuring safe and healthy working conditions and implementing a health and safety management system, appropriate to the relevant issues and risks associated with the Project.
- To anticipate, assess and prevent or minimise adverse impacts on the health and safety of project affected communities and consumers during the project lifecycle from both routine and non-routine circumstances.

14.1.2.2 EPFIs

IFC Performance Standard 4 establishes requirements to safeguard local communities from potential risks associated with the Project including impacts associated with introduction of communicable disease, site access and operation, material use etc. The key objectives of PS4 are:

- To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances.
- To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities.

14.2 Baseline Conditions

ESIA-stage literature review, household socioeconomic survey, and consultations with relevant authorities at the makhalla, district, regional and state levels were carried out to obtain information on the health, safety and security context of the project-affected communities and the broader host region. The findings of these studies and consultations are discussed in the sub-sections below.

14.2.1 Public health and local morbidity

14.2.1.1 Local morbidity

At the time of this assessment, information on the prevalence of diseases within the project within the host districts of Yukorichirchik and Parkent and Tashkent City was not publicly

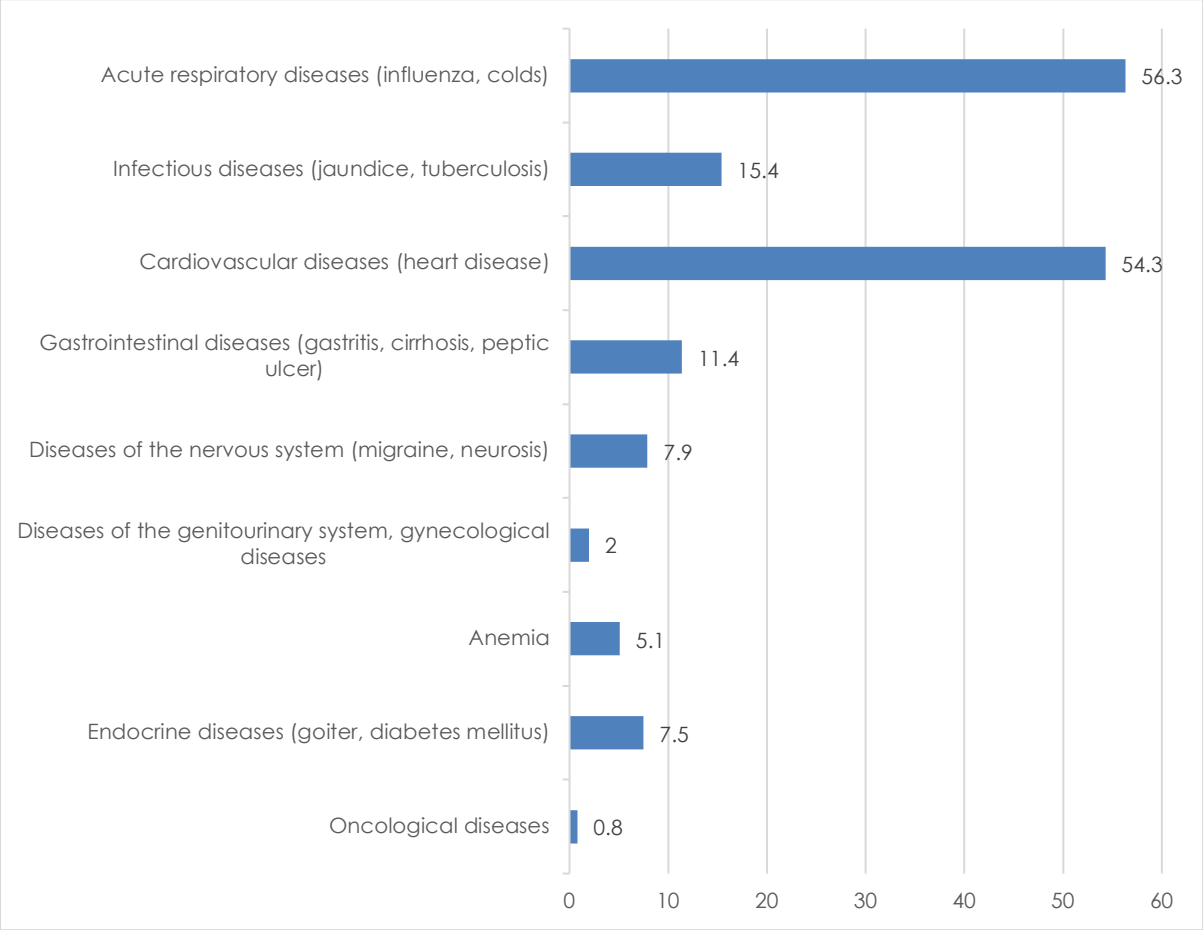
available. Table 14-1 below presents national statistics for the most prevalent communicable and parasitic diseases in Uzbekistan, over the period 2020-2023.

Table 14-1 Prevalence of infectious and parasitic diseases in Uzbekistan

DISEASES	PREVALENCE (CASES PER 1,000 PAX)		
	2020	2021	2022
Acute intestinal infections	18.9	31.6	58.4
bacterial dysentery	0.3	0.7	0.9
Salmonella infections	0.4	0.5	0.7
Typhoid fever and paratyphoid A, B, C	1	-	2
Respiratory infections	432	525	659
Viral hepatitis	11.5	7.9	29.5
Scarlet fever	1	0.9	3.9
Pertussis cases	39	2	3
Measles, cases	4.3	-	7
Meningococcal infection, cases	7	7	4
Brucellosis	418	548	546

As shown in the table, respiratory, gastro-intestinal and zoonotic infections as well as viral hepatitis account for the majority of communicable and parasitic diseases reported within the country.

With regards to morbidity within the nine project-affected communities, the ESIA-stage socioeconomic survey (including a total of 254 households) revealed that the most common diseases within the communities include respiratory infections and cardiovascular conditions. The chart below indicates the relative frequencies of diseases and medical conditions reported by surveyed households.



14.2.1.2 Access to healthcare

In 2022, a total of 426 health clinics were operational in Tashkent region, the number of clinics registered in Yukorichirchik and Parkent Districts being 13 and 15 respectively. According to national statistics, Uzbekistan's health sector is beset by a shortage of medical service resources. For the country at large, for every 1,000 residents, the ratio of general doctors to patients is 1:358, while the ratio of average medical workers to residents is 1:94. Access to medical facilities in rural and peri-urban areas is also limited, with the general number of public polyclinics with first aid and basic medical services being one per village. For specialized medical services, patients are referred to district and regional hospitals.

Survey results indicate that only 40% of surveyed households within the project-affected communities have access to medical facilities within a distance of 5km. The remainder of the households travel longer distances to reach medical facilities, as shown in the table below.

Table 14-2 Distribution of households (by percentage) by distance to nearest medical facility

DISTANCE TO NEAREST HEALTH CLINIC	WITHIN 1 KM	1-2 KM	2-3 KM	3-5 KM	5-10 KM	MORE THAN 10 KM	TOTAL PERCENTAGE
Istiklol	0	13	21	54	13	0	100
Gulobod	4	4	29	54	8	0	100
Istikbol	4	4	4	32	56	0	100
Sergeli	68	11	21	0	0	0	100
Tashtogizoq	3	7	10	81	0	0	100
Tarakkiyot	0	28	24	45	3	0	100
Kavardon	53	25	9	9	3	0	100
Yangiobod	40	20	0	20	20	0	100
Kyrgyzovul	17	4	8	33	25	13	100
Total percentage	**18**	**13**	**15**	**39**	**13**	**1**	**100**

14.2.2 Sanitation and Waste Management

Information on existing facilities for sanitation and waste management with the project-affected communities, districts and the broader Tashkent Region is provided in Section 6.2 and Section 13.2 of this report.

14.2.3 Crime and security

According to national statistics, Tashkent Region has had the highest crime rates in Uzbekistan, with Fergana and Samarkand Regions ranking second and third respectively. The majority of recorded crimes in 2022 were perpetrated by men, as shown in the gender-disaggregated statistical summary for crime rates across the country within the reporting period. According to the United Nations Office on Drugs and Crime, delinquent youth account for 20-30% of crimes recorded in recent years.

Table 14-3 Gender-disaggregated crimes recorded in Uzbekistan in 2022

CRIME CATEGORIES	FREQUENCY (2022)	
	MEN	WOMEN
Murder and attempted murder	358	39
Intentional grievous bodily harm	1,326	119
Extortion	308	97
Rape and attempted rape	351	3
Thefts	8,867	1,550
Robbery	1,312	65

CRIME CATEGORIES	FREQUENCY (2022)	
	MEN	WOMEN
Fraud	13,298	2,467
Hooliganism	3,656	372
Drug trafficking and use	4,698	197
Corruption	15,056	2,503
Other types of crime	29,479	4,048

Authorities responsible for law enforcement, maintenance of order and investigation of crimes within the host region, districts and makhallas include the local police force, operating under the Ministry of Internal Affairs and the National Security Service.

The National Guard provides security service for the entirety of the PV power plant site, and these services will extend into the Project's operational phase, without the need for additional security facilities. The BESS site will also be guarded by the National Guard for the duration of operations. Nevertheless, a private security service provider may be engaged for security services at the BESS site during construction.

14.2.4 Emergency response and rescue services

In Uzbekistan, training, planning and emergency response to fire, floods and other disasters is coordinated by the Ministry of Emergency Situations. Civil emergency warning, response and rescue service providers include:

- Regional departments for emergency response and rescue services and district fire brigades, which operate directly under the Ministry of Emergency Situations.
- Territorial operational management centres for forecasting emergency (natural disasters) and monitoring public safety, which operate under the National Centre for Management and Response to Emergency Situations.

A number of commercial fire response and rescue entities also provide fire emergency services, particularly within urban centres and Tashkent Region.

14.2.5 Gender-based violence, harassment, and exploitation

The cultural context of Uzbekistan is characterized by patriarchal customs, which have historically influenced gender equality in the spheres of education, employment, and national politics. With regard to the prevalence of gender-based human rights violations within the country, various forms of violence, harassment and exploitation have been reported in recent years. A rise in the incidence of Gender-Based Violence (GBV) was reported in the wake of the COVID-19 pandemic and the period leading up to economic

resurgence. The most recent GBV survey under the Ministry of Internal Affairs indicates that in 2020, local law enforcement agencies issued more than 8,430 protection orders to ensure the security of GBV victims. Law enforcement records showed that 4,330 of these cases involved physical abuse, with emotional abuse accounting for the remainder of the cases.

Over the past decade, the Government of Uzbekistan has implemented a number of legal reforms and interventions geared towards the protection of women's rights and the elimination of GBV. An overview of the key executed initiatives to this end is provided in the table below.

Table 14-4 Reforms and initiatives for protection of women's rights and broad-based support for victims of GBV

INTERVENTION	OBJECTIVES
Establishment of the Law on Protection of Women from Harassment and Abuse (2019)	The national law provides for the protection of women from all forms of harassment and abuse. While violence against women is recognized in the Criminal Code of Uzbekistan, provisions for the registration, investigation, and prosecution of GBV are not prescribed in the Code. In furtherance of the Code, the Act established specific procedures for the management of GBV cases for relevant law enforcement authorities and mandates the provision of medical, psychological, legal, economic, and humanitarian support to victims of GBV. In 2020, systems for the issuance of protection orders for victims of GBV were fully instituted across the country.
Establishment of the Resolution on Measures to Improve the System of Social Rehabilitation and Adaptation, and the Prevention of Domestic Violence (2018)	The Resolution No. PP-3827 of the Head of the State dated 07.02.2018 "On measures to improve the system of social rehabilitation and adaptation, as well as the prevention of domestic violence" identifies priority areas for improving the system of social rehabilitation and adaptation, prevention of family and domestic violence, and approved the program of practical measures to improve the system of social rehabilitation and adaptation, as well as the prevention of domestic violence. The Resolution provides for the following key measures: • Priority areas include improving the social system of rehabilitation, adaptation and preventative measures against domestic violence. • A program of practical measures to improve the system of social rehabilitation, adaptation and prevention of domestic violence. • A Center for Rehabilitation and Adaptation for victims of violence, as well as the prevention of suicides in territorial divisions of the Women's Committee of Uzbekistan. • Public "hot line" on number "1146", for provision of emergency psychological, psycho-therapeutic and legal support and information about organizations that may provide additional assistance.

14.3 Receptors

The following table provides an overview of E&S impact receptors in the context of potential impacts on community health and safety within the Project's Areas of Influence (AoI). A sensitivity rating and corresponding description is further provided for each relevant receptor.

Table 14-5 E&S impact receptors – Community health and safety

RECEPTOR	SENSITIVITY	JUSTIFICATION
Residents within project-affected communities	High	Residents within the project-affected communities located around the project sites, access roads and off-site labour accommodation facilities. The makhallas of Sergeli, Tashtogizoq, Yangiobod, Gulobod, Istiqbol, Istiqlol, Taraqqiyot, Qirgizovul and Kavardan have a potentially high sensitivity to health, safety and security risks associated with construction activities and the influx of construction labour.
Uzsuvtaminot workers within the PV plant site	High	Uzsuvtaminot workers operating within the PV plant site will be located in relatively close proximity to construction working areas, facilities, and labour. These third-party receptors has a potentially high sensitivity to health, safety and security risks associated with co-located construction activities.

14.4 Potential Impacts and Impact Management Measures

14.4.1 Construction phase

14.4.1.1 Spread of communicable diseases and increased local morbidity

Review of national statistics and the ESIA-stage household surveys indicate that the most prevalent diseases within the project-affected districts include various respiratory infections as well as water-borne and water-based infections. Underlying contributors to the local morbidity with the project-affected districts include inadequate access to healthcare facilities.

The influx of migrant male workers from distant locations in and out of Uzbekistan, and the lack of dedicated on-site labour accommodation camps can establish a close interface between the labourers and residents of host communities based around the project sites and off-site labour accommodation facilities. Worker-community intermingling will be particularly common within makhallas offering rental housing for construction workers.

The influx of migrant workers into local communities poses the risk of cross-infections and increased incidence of communicable diseases. Disease groupings of particular relevance include:

- Respiratory infections, such as tuberculosis and COVID-19, which can break out due to overcrowding and close interactions within public or shared spaces.

- Water-borne diseases, including diarrhoea, typhoid, cholera, dysentery, which can erupt as a result of improper disposal of construction office sewage and faecal contamination of domestically utilized surfacers and ground water resources (i.e., within the PV plant site).
- Sexually Transmitted Infections (STIs), including HIV/AIDS. High prevalence groups of particular concern potentially include commercial sex workers and long-haul truck drivers.

The in-migration of workers from relatively urban and foreign locations into local communities is also likely to alter local disease profiles, with an increased prevalence of non-communicable diseases such as cardio-vascular disease, hypertension, diabetes, and cancer. This epidemiological shift can heighten the burden on existing healthcare facilities serving these communities and public clinics in particular.

14.4.1.2 Community health and safety incidents

Areas designated for construction activities pose a broad range of physical, chemical, and biological hazards associated with construction activities, materials, equipment and machinery. The majority of these hazards pose health and safety risks to construction workers. Nevertheless, a number of construction-phase activities and contingencies present H&S risks to third parties, such as residents within local communities based around the project sites and access tracks, Uzsuvtaminot workers stationed within the PV plant site, as well as the general public. In the context of H&S risks, third party receptors such as local community members are predisposed to H&S accidents, due to the lack of Personal Protection Equipment and limited construction H&S awareness for this at-risk category of receptors.

An overview of the key construction-phase H&S risks to third party receptors potentially situated in and around the project sites and transit corridors is provided below:

- Road traffic accidents

  The Project's construction phase will necessitate frequent and extensive transportation of equipment, materials, and construction workers. Large volumes of construction traffic along public and project-dedicated access roads carries the risk of road traffic accidents including vehicular collisions and accidents involving vehicular impact on pedestrians, which can result in property damage, injury, and fatalities. Potential risk factors for this category of accidents include (but are not limited to) limited visibility due to road dust, equipment failure for inadequately serviced vehicles, lack of traffic safety signage along access roads and negligence of project vehicle drivers or road users.

- Elevated levels of ambient dust

  Construction activities such as vehicular transit along unpaved access roads, land clearing, excavation, and grading (including potential cut-and-fill operations), loading, offloading and stockpiling of aggregates pose the potential for the

generation and dispersal of dust. Substantially elevated levels of ambient dust and particulate matter can adversely impact the health of residential and commercial establishments located within the immediate vicinity of dust-prone construction zones within the project sites (as elaborate in Section 9.5.1.1 of this report).

- Accidental exposure to hazardous materials

  The Project's construction phase will entail the transportation, handling and storage of hazardous construction materials and waste (e.g., sewage, fuel, solvents, used oils etc.). Third party (Uzsuvtaminot workers, community members and the general public) may be exposed to hazardous substances through accidental discharges (e.g., traffic accidents involving haulage vehicles, spills, combustion products from accidental fires etc.), trespassing and unauthorized access to materials/waste storage facilities. An elaboration on the exposure pathways of off-site human receptors to soil, groundwater, and surface water contamination, as a result of inadvertent spills, is provided in Section 0 of this report. Contingencies involving the exposure of third-party receptors to hazardous substances can culminate in acute sickness, chronic disease and/or fatalities.

- Fire hazards and related accidents

  Construction works the PV plant and BESS site will involve activities that may involve accidental damage to utility assets with a fire/ explosion hazard. For the BESS sites in particular, construction works will entail trenching works for the installation of the underground interconnection cable will intersect the location of an existing buried pipeline. Accidental encroachment of utility clearance zones and introduction of ignition sources (e.g., hot works, smoking) close to flammable materials and/or gas leakages can result in explosion, deflagration and fire outbreaks. Such events may result in third-party casualties (i.e., severe injury and fatalities) outside of designated construction zones and site boundaries.

Besides the risks discussed above, trespassing, and unauthorized access to project sites and facilities during construction can further lead to H&S accidents from impact with moving (on-site) construction machinery, falls into excavations, and electrocution from contact with live conductors, amongst other potential impacts.

14.4.1.3 Criminal and abusive offences against local community members

GENERAL RISKS

The project's construction phase will involve extensive work over a planned duration of two years. The breadth and scale of construction phase activities are anticipated to proliferate employment and commercial opportunities within communities based around the project, and thereby expand local cash-based economies.

The rise in commercial activity and the influx of a diverse construction workforce is likely to drive an uptrend in unlawful activities within the project sites and host communities. Based on information on crimes within the region, illicit activities that can expected to increase at the height of construction include theft, as well as personal violence, harassment, and

intimidation in worker-community interactions. In the context of the project, groupings with a propensity to use force in perpetrating crime or addressing actual or perceived security incidents include the poor and unemployed youth (particularly those with delinquent backgrounds) as well as the project's security personnel. The Project may employ poorly trained security workers who can inflict excessive force on community members in the event of minor misdemeanours, borderline incidents, and self-defence from undue assault. The Project's security personnel can also abuse their powers and commit acts of crime, abuse, and intimidation against community members on a more covert and corrupt basis. In addition, the intermix of foreign workers and residents within recreational, commercial, and residential facilities within the project-affected communities can result in events which may instigate hate crimes.

Nevertheless, the risk of excessive use of force by security personnel is very low as a national, well-trained security force will provide security services during construction, based on mandates and protocols which broadly align with both national (constitutional and statutory) and international (UN) standards for the protection of human rights. The same agency (National Guard) has been stationed at the PV plant site for the duration of Uzsuvtaminot's water abstraction and supply operations, and no incidents regarding undue and illegitimate use of force on civilians have been reported.

In the unlikely event that a private security company is hired by the EPC Contractor/ Project Company for security services for the BESS site during construction, the risk of abusive misconduct and undue assault on civilians will be managed by a number of safeguard measures including pre-employment background checks for security companies and individual candidates, as well as specialized trainings on the use of force.

Project-induced pressure on local resources and infrastructure can also give rise to related strife and criminal acts of aggression.

GENDER-BASED VIOLENCE, HARASSMENT, AND EXPLOITATION

The advent of a male-dominated construction workforce potentially including high-earning migrant workers can compound the existing imbalance of power between men and women within the project-affected communities. Prevalent elements of patriarchal traditions can result in the financial exploitation of women engaged in the project workforce, particularly within informal supply chains.

Additionally, women from socioeconomically vulnerable households are particularly prone to various forms of exploitation, harassment, and assault from project workers. Worker groupings that are often associated with acts of aggression against women include security guards and long-haul truck drivers, as these labourers are more likely to encounter women in

isolation (i.e., away from crowded locations and/ or during night shifts). Moreover, a sizeable fraction of the male workforce potentially includes migrant male workers with circumscribed work routines and lack of conventional socialization. This further potentiates the sexual exploitation of locally based women, some of whom may gravitate towards project-spurred micro-enterprises.

The project also presents the risk of domestic/ intimate partner GBV. These incidents can arise as a result of spousal or familial disapproval of women's employment in project work, and discord resulting from any project-induced adverse impacts on local livelihoods (i.e., declining household income from the diminution of grazing lands).

Women at a higher risk of exposure to project related GBV and SEA include women belonging to marginalized and/or vulnerable groups (i.e., extremely poor, refugees, minors etc.), as they typically incur social ostracism, possess little to no wherewithal for judicial remedies, and are disproportionally dependent on menial work rendered by large projects. Commercial sex workers are also predisposed to GBV and SEA due to their social persecution and the demeaning attitudes held towards them, particularly within conservative, patriarchal societies.

Table 14-6 Overview of potential impacts relating to community health and safety during construction

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Spread of communicable diseases and increased local morbidity	• For direct impacts – project sites and transit corridors including access roads • For indirect impacts – Yuqorichirchik and Parkent Districts and wider Tashkent Region	Major	Project-affected communities nearby the project sites, access roads and off-site labour accommodation facilities	High	**Major**	**Minor/ Moderate**
			Uzsuvtaminot workers	High	**Major**	**Minor/ Moderate**
Community health and safety incidents	• For direct impacts – project sites and transit corridors including access roads • For indirect impacts – Yuqorichirchik and Parkent Districts and wider Tashkent Region	Major	Project-affected communities and the general public in and around the project sites, transit corridors and off-site labour accommodation facilities	High	**Major**	**Minor/ Moderate**
			Uzsuvtaminot workers	High	**Major**	**Minor/ Moderate**
Criminal and abusive offences against local community members	• For direct impacts – project sites and transit corridors including access roads • For indirect impacts – Yuqorichirchik and Parkent Districts and wider Tashkent Region	Major	Project-affected communities nearby the project sites, access roads and off-site labour accommodation facilities	High	**Major**	**Minor/ Moderate**

Impact avoidance, mitigation and offset measures

<u>Spread of communicable diseases and increased local morbidity</u>

- Induction trainings focused on the prevention and control of communicable diseases and Sexually Transmitted Infections (STIs) in particular will be delivered to the Project's construction workforce, and refresher trainings will be provided periodically.
- Periodic wellness campaigns will be organized to sensitize the construction workers and local communities based around labour accommodation facilities and project sites to potential transmission of communicable diseases as a result of construction-induced influx of labour and economic

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
scavengers. These campaigns will offer free diagnostic services for diseases of key concern, counselling services and information on healthcare services for further medical attention, in collaboration with relevant local NGOs where possible. • Construction workers showing symptoms of sickness will be allowed leave from duty and directed to the Project's medical facilities or hospitals for testing and treatment as appropriate. Workers with serious respiratory diseases will be quarantined or provided with face masks as necessary, to reduce the spread of air borne infections that can spread to host communities. • Dedicated residential facilities will be used for accommodating the Project's contracted workforce, to the extent feasible. • Residential facilities for the Project's construction workers will be selected based on the welfare and safety criteria specified in local legislation and the IFC/EBRD guidelines for workers' accommodation. Self-sufficient residential facilities with various sanitary conveniences and dedicated (internal) recreational amenities will be given priority consideration. • Gatherings for job solicitation at the entry points to construction sites will not be permitted, and all project employment applications will be channelled through a local recruitment agency and the EPC Contractor's procurement office. • Community members will receive briefings/ sensitization to project employment applications, and suitable job openings, over the course of stakeholder engagement during construction (and occasionally during operations).. • The project's code of conduct will proscribe the use of alcohol, drugs and commercial sex activities within labour accommodation areas and working areas, which can reduce the spread of sexually transmitted infections (STIs) within host communities. • The construction workforce will receive indication and refresher trainings on measures for proper sanitation, management of waste and hazardous materials, and emergency response to chemical and waste spills. • Local communities based around the project sites will be familiarized with the Project's community GRM, to enable the collection of grievances pertaining to increased incidence of communicable diseases within host communities on platforms that are accessible to all local constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. • A Water Management Plan, Hazardous Materials and Waste Management Plan, Worker Accommodation Management Plan, Community Health and Safety Plan, Local Recruitment Plan, Influx Management Plan, and Emergency Preparedness and Response Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented. **Community health and safety incidents** • Induction and refresher trainings on construction-related health and safety hazards to community/ public health and safety will be delivered to the Project's construction workforce. • A traffic study will be undertaken prior to mobilization of construction resources to identify transportation constraints including traffic congestion hotspots and inadequate road conditions. • Follow-up engagement with transportation and traffic safety authorities (i.e., district khokimiyats, Ministry of Transportation, traffic police) will be undertaken as part of H&S risk assessments in relation to project traffic and the development of related safeguards, including traffic accident						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
emergency response plans. • All construction activities will be restricted to demarcated construction zones within the project sites and designated transit corridors. • Project traffic and non-project traffic will be segregated, to the extent feasible, using traffic flagmen and signage.. • Public access to the project sites will be restricted using procedural and engineering controls including site fencing, issuance of administrative identification documents to all direct and contracted construction workers, security checks at entry gates, as well as electronic access control systems and video surveillance for any high-risk or high-value facilities within project sites. • Public access to the Project's dedicated access roads will be restricted to the extent feasible (i.e., using dedicated traffic signage, reflective barricading and flagmen). • Project traffic will be subject to differential speed limits and the speed of all project vehicles along road sections within settlements will not exceed 30 km/hr. • Subject to the outcomes of the Project's traffic study and related H&S risk assessment, speed bumps and cautionary signposts will be installed along any access road sections cutting across sensitive communal locations, in addition to speed limits (e.g., crossing points, crowded social service centres, marketplaces etc.). • Creation of local awareness around construction-related health and safety hazards will be implemented through routine community H&S sensitization and periodic traffic safety campaigns involving local authorities. • Project vehicles will be serviced regularly to prevent breakdown and failure that can potentiate traffic accidents involving members of the general public along the Project's transit corridor. • Recruitment of project vehicle drivers and industrial/ heavy goods vehicles in particular will involve qualification criteria such as license status, adequate experience, familiarity with traffic H&S safety, visual tests and professional references. • Drivers will receive induction trainings in defensive driving and precautions against protracted shifts and fatigue that can result in impaired performance and traffic accidents. • A dedicated code of conduct will include a total proscription of work under the influence of alcohol and substance abuse for the Project's construction workforce. • Regular construction health and safety sensitization for the project-affected communities will include familiarization with project traffic and related H&S risks and incidents. • Frequent and random alcohol testing should be undertaken for project vehicle drivers on duty. • Subject to the outcomes of the Project's traffic study and related H&S risk assessment, traffic safety measures will include spot checks using radar equipment and/or the engagement of fleet management service for GPS-enabled speed tracking for high-risk and long-distance trips. • Night-time trips should be limited to the extent feasible, and journey management plans should be prepared and approved for any such trips. • Suitable by-passes, traffic control signage and personnel (i.e., flagmen etc.) will be established to divert vehicular and pedestrian traffic in the						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
event of upgrading and/or maintenance works along existing public roads that will be utilized for access to the project sites, in consultation with relevant local authorities (i.e., regional and district khokimiyats, road maintenance agencies). • Public access to all construction zones within the project sites will be restricted by means of fencing, barricading, prominent signage and notice boards. • the EPC contractor will mobilize adequate Health and Safety (H&S) workers for the Project, including H&S training personnel, inspectors, traffic controllers and medical aid providers, amongst other personnel. • Dust suppression measures, including but not limited to wetting down access road surfaces (using water bowsers), covering trucked aggregate loads, implementation of various speed controls, and the siting of any concrete batching plants downwind of unavoidable community receptors with a sufficient buffer. • The installation of the underground interconnection cable will comply with technical conditions issued by Uztranzgas and only be carried out under a watching brief by an expert designated by Uzsuvtaminot. All activities within two metres of the pipe will be carried out manually and a 1 metre distance setback will be maintained between the final position of the cable and the gas pipeline. Induced current measurements for the pipeline will be conducted as prescribed in the technical conditions. • The construction workforce will receive indication and refresher trainings on measures for proper sanitation, management of waste and hazardous materials, and emergency response to chemical and waste spills. • The EPC Contractor's Health and Safety (H&S) team will include specially trained first aid providers and fire emergency responders. • Regular H&S monitoring will be carried out by the Project Company's and EPC Contractor's relevant H&S staff. This line of monitoring will include (i) inspections to ensure the implementation of H&S safeguards in work procedures/ activities, and (ii) maintenance inspections and testing to ensure the structural integrity, mechanical integrity and overall operability of construction equipment and engineering controls for prevention of on-site and off-site H&S accidents. • Local communities based around the project sites will be familiarized with the Project's community GRM, to enable the collection of grievances pertaining to H&S incidents within host communities on platforms that are accessible to all local constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. • Uzsuvtaminot staff and management based in the PV plant site will be familiarized with the Project's HSSE policy, engaged in HSSE induction and refresher trainings, involved in the Project's HSSE committee, and be subject to external monitoring to ensure that third party C-ESMP oblogations are being fulfilled in collaboration with the Project Company, EPC Contractor, and O&M Company. • Uzsuvtaminot workers based in the PV power plant site will follow the same OHS guidance as far as practicable, in absence of a formal agreement with the Project Company, for management of the PV site and project associated HSSE risks during construction. • A dedicated Traffic and Transportation Management Plan, Hazardous Materials and Waste Management Plan, Community Health and Safety Plan, and Emergency Preparedness and Response Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented.						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
<u>Criminal and abusive offences against local community members</u> • A project-level code of conduct will underscore the Project's commitment to the protection of human rights and zero-tolerance for inappropriate and unlawful behaviour within host communities, with a clear set of disciplinary procedures and penal measures for non-compliance. • Reasonable efforts will be made to sensitize dedicated site security management teams to the standards set out in the National Guard to the UN Code of Conduct for Law Enforcement Officials and Voluntary Principles on Security and Human Rights (i.e., exceptional conditions for the application of force as a last resort, in a manner that is (i) cautious, (ii) proportionate to the extent of a given threat to project workers and assets and (iii) compliant with national laws on the use of lethal force). • The recruitment of the project's security personnel will involve a vetting or screening procedure to ensure that candidates under consideration have no record of implication in unlawful use of force and other forms of human rights violations (including gender-based violence). • The EPC Contractor's security department will regularly engage with the local police force and relevant Local Government Authority (LGA) units to obtain information on the incidence of crime within local communities based around the project sites and the wider host districts and develop the Project's security arrangements. • Emergency medical response and ambulatory hospital transfers will be provided for any injuries and casualties resulting from security incidents. • Local law enforcement authorities will be notified immediately, upon the occurrence of security incidents, to enable authoritative response, official investigation, apprehension, and prosecution. • A gender policy or policy statement integrating into the Project's overarching HSSE Policy will be instituted for the project. The policy will highlight the definition and prohibition of gender-based exploitation, harassment, and violence. • Thorough induction and refresher trainings on gender-based exploitation, harassment and violence will be delivered to the Project's construction workforce. • The Project's CLOs will undertake routine awareness creation and trainings to sensitize local communities to the project's gender policy commitments, appropriate reporting channels for gender-based exploitation, harassment and violence, and specialized recourse in the event of any such violations being reported. • Local communities based around the project sites will be familiarized with the Project's community GRM, to enable the collection of grievances pertaining to security incidents and huma • n rights violations within host communities on platforms that are accessible to all local constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. • For all incidents involving gender-based exploitation, harassment and violence within local communities, the EPC contractor will extend immediate professional, survivor-centred, and free-of-charge support to victims, with efforts to ensure that victims are afforded total security, dignified treatment and volition with regard to confidentiality and legal action. Support to victims of GBV or SEA will include medical, psychological, and financial support, as well legal advisory assistance, and voluntary engagement of law enforcement authorities, for official						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
investigation and prosecution. • The Project's community GRMs will include at least one female CLO and other focal points (e.g., makhalla leaders and district-level community development and gender sections) as to ensure that dedicated channels exist for reporting gender-sensitive concerns as well as incidents involving gender-based exploitation, harassment and violence. • A dedicated Community Health and Safety Plan, and Emergency Preparedness and Response Plan, Influx Management Plan, Hazardous Materials and Waste Management Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented, in coordination with relevant LGA departments and the local police force.						

14.4.2 Operations phase

14.4.2.1 Community health and safety incidents

The Project's operational phase will involve commissioning and commercial operation of the PV plant, BESS and interconnection facilities. These operations present a number of health and safety risks to communities based around the project sites, Uzsuvtaminot staff stationed within the PV plant site and the general public situated in and around the project sites and transit corridors:

- Electrocution accidents

  At the operational stage, the Project's power generation, storage and transmission infrastructure will be energized and operated on a full-time basis. Unauthorized public access to restricted operational facilities may result in electrocution accidents due to inadvertent contact with conductors. Electrocution from live components constituting high-voltage equipment can culminate in severe injury and fatalities. Accidental direct or indirect contact with the buried BESS interconnection cable conductors can also result in severely injurious and/or fatal electrocution incidents.

- Electromagnetic Field (EMF) hazards and related incidents

  The energization and operation of the (i) 200meter long overhead 220 kV Loop-In-Loop-Out (LILO) connection for the PV plant and the (ii) 2 kilometre long underground interconnection cable interconnection cable will result in the emission of electromagnetic radiation around the high-voltage conductors. The strength of the EMF around powerlines decreases with increasing distance from the lines and with attenuation from intervening media such as concrete/metallic shielding structures and trench overburden. A number of studies have linked extended exposure to EMF underneath and close to high-voltage overhead powerlines to adverse health effects, which include chronic and potentially fatal conditions such as cancers (i.e., Leukemia etc.). The violation of mandatory Health Protection Zones (HPZs) for the Project's OTL therefore poses negative potential impacts on human health, taking into account operation-phase land-use/ activities in and around the LILO.

- Traffic accidents

  The Project's operational phase will entail the daily transportation of O&M workers, and occasional transfer of equipment and materials for maintenance purposes. The movement of project vehicles along transit corridors and the access routes associated with the BESS site in particular presents the inherent risk of road traffic accidents which may result in injury, fatalities, property damage and road kill (involving herded livestock).

- Fire hazards and related accidents

  The PV plant and BESS facilities include a wide range of electrical equipment which is subject to overheating from current overloads and thermal runaway. Fire contingencies can occur in the unlikely event of protracted overheating within the PV plant and BESS sites. Uncontrolled fire can spread to sensitive utility assets and

other third-party establishments located nearby the PV plant and BESS sites, and thereby result in significant H&S accidents, property damage and associated economic losses. Faulty maintenance works at the intersection of the Category I gas pipeline and the BESS interconnection cable can also lead to explosive fire outbreak with third-party casualties (i.e., severe injury and fatalities) outside of designated construction zones and site boundaries.

Table 14-7 Overview of potential impacts relating to community health and safety during operations

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Community health and safety incidents	• For direct impacts – project sites and transit corridors including access roads • For indirect impacts – Yuqorichirchik and Parkent Districts and wider Tashkent Region	Major	Project-affected communities and the general public in and around the project sites, transit corridors and off-site labour accommodation facilities	High	**Major**	**Minor/ Moderate**
			Uzsuvtaminot workers	High	**Major**	**Minor/ Moderate**

Impact avoidance, mitigation and offset measures

Community health and safety incidents

- Induction and refresher trainings on operational health and safety hazards to community/ public health and safety will be delivered to the Project's contracted O&M workforce.
- All O&M activities will be restricted to the project sites and designated Rights of Way.
- Public access to the project sites will be restricted using procedural and engineering controls including site fencing, issuance of administrative identification documents to all direct and contracted O&M workers, security checks at entry gates, as well as electronic access control systems and video surveillance for any high-risk or high-value facilities within project sites.
- Creation of local awareness around operational health and safety hazards will be implemented through periodic community H&S sensitization.
- Project vehicles will be serviced regularly to prevent breakdown and failure that can potentiate traffic accidents involving members of the general public along the Project's transit corridor.
- Recruitment of project vehicle drivers and industrial/ heavy goods vehicles in particular will involve qualification criteria such as license status, adequate experience, familiarity with traffic H&S safety, visual tests and professional references.
- Drivers will receive induction trainings in defensive driving and precautions against protracted shifts and fatigue that can result in impaired performance and traffic accidents.
- A dedicated code of conduct will include a total proscription of work under the influence of alcohol and substance abuse for the Project's construction workforce.
- Suitable by-passes, traffic control signage and personnel (i.e., flagmen etc.) will be established to divert vehicular and pedestrian traffic in the

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
event of upgrading and/or maintenance works along existing public roads that will be utilized for access to the project sites, in consultation with relevant local authorities (i.e., regional and district khokimiyats, road maintenance agencies). • The O&M Contractor will employ Health and Safety (H&S) staff for the Project's operational phase. • The O&M Contractor's Health and Safety (H&S) team will include specially trained first aid providers and fire emergency responders. • The O&M workforce will receive induction and refresher trainings on measures for proper sanitation, management of waste and hazardous materials, and emergency response to chemical and waste spills. • Regular H&S monitoring will be carried out by the relevant H&S staff under the Project Company and O&M Contractor. This line of monitoring will include (i) inspections to ensure the implementation of H&S safeguards in work procedures/ activities, and (ii) maintenance inspections and testing to ensure the structural integrity, mechanical integrity and overall operability of O&M equipment, and engineering controls for prevention of on-site and off-site H&S accidents. • The overhead transmission line components beyond the Project sites will be monitored to ensure full compliance with the Health Protection Zone (i.e., 15 meters from each outer most conductor for 220 kV powerlines) and the grid protection zone (i.e., 25 metres from each outer most conductors for 220 kV powerlines). • Local communities based around the project sites will be familiarized with the Project's community GRM, to enable the collection of grievances pertaining to H&S incidents within host communities on platforms that are accessible to all local constituencies and free of manipulation, interference, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. • A dedicated Hazardous Materials and Waste Management Plan, Community Health and Safety Plan, and Emergency Preparedness and Response Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented.						

14.4.3 Decommissioning phase

Project decommissioning will entail the deconstruction of project facilities, demobilization of related equipment and materials, as well as potential repurposing and/or rehabilitation works. At this stage, potential impacts relating to community health and safety will be similar to the above-described construction-phase impacts. Specifically, this set of impacts potentially includes community health and safety incidents.

For the avoidance and mitigation of these impacts, relevant impact management measures specified in Section 14.4.1.2 will be implemented. Accordingly, the same pre-management and residual significance ratings are provisionally assigned to mutually relevant impacts on sensitive receptors.

14.5 Monitoring requirements

Table 14-8 below provides an overview of the key monitoring arrangements for evaluating performance against applicable standards relating to community health and safety in the Project's construction and operational phases. A more elaborate and comprehensive coverage of these requirements will be provided in the Construction- and Operations-phase Environmental and Social Management Plans (C-ESMP, O-ESMP) and Environmental and Social Monitoring Plans (ESMoPs).

Table 14-8 Monitoring arrangements for impacts and preventative and mitigation measures relating to community health and safety

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
Construction phase					
Spread of communicable diseases	Grievances concerning project-related incidence of communicable diseases	- No positive trends for grievances concerning project-related incidence of communicable diseases	- Community Grievance Log	Ongoing	- EPC Contractor CLOs
Community health and safety incidents	Percentage of local sensitization engagements on construction-related health and safety for local communities completed in line with SEP/ CHSP	- 100% of local sensitization engagements on construction-related health and safety for local communities, completed in line with SEP/ CHSP	- Stakeholder Engagement Log/ Meeting Minutes	Quarterly	- EPC Contractor CLOs
	Number of significant H&S accidents involving third parties	- Zero significant H&S accidents involving third parties	- H&S Accidents Log	Ongoing	- EPC Contractor H&S Officer
Criminal and abusive offences against local community members	Percentage of direct and/or contracted security personnel who have been screened for past implications in inappropriate use of force and/or abuse of power	- 100% of direct and/or contracted security personnel have been screened for past implications in inappropriate use of force and/or abuse of power	- Recruitment records	Upon recruitment	- EPC Contractor HR Officer
	Grievances concerning project-related crimes and/or violation of human	- Related grievances are closed out within the shortest practicable	- Community Grievance Log	Ongoing	- EPC Contractor CLOs

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
	rights	duration			
All community health, safety and security risks and impacts	Percentage of community engagements and sensitization to construction health and safety (e.g., FGDs, community meetings) completed in line with the SEP and quarterly schedule.	- 100% of planned community engagements have been completed in line with the SEP	- Stakeholder Engagement log - Meeting minutes and attendance sheets	Ongoing	- Project Company CLOs - EPC Contractor CLOs
Operational phase					
Community health and safety incidents	Percentage of H&S accidents involving third parties (e.g., local communities) investigated and addressed through corrective (remedial and preventative) actions within the shortest practicable duration	- 100% of accidents involving third parties (e.g., local communities) have been investigated and addressed through corrective (remedial and preventative) actions, within the shortest practicable duration	- H&S Accidents Log - Police Report - Medical Report - Significant Accident Notification Report - Significant Accident Investigation Report - Corrective Action Plan (CAP)	Upon occurrence	- O&M Contractor H&S Officer

15 LABOUR CONDITIONS AND OCCUPATIONAL HEALTH AND SAFETY

15.1 Legal Requirements and Standards

15.1.1 National laws and regulations

- Labour Code of the Republic of Uzbekistan (1995 as amended in 03.08.2021).
    - This is the key national labour focused legislation which takes into account the interests of the employees, employers and the state. Its main aim is to promote fair and safe working conditions and protect the labour rights and the health of employees. The main health and safety provisions in the labour law include H&S requirements, employees' obligation to comply with H&S standards, procedures and use of PPE, additional H&S measures for disabled employees, reporting and investigating accidents etc.
    - The labour code also specifies collective bargaining through collective contracts and agreements as a way of regulating labour relations and harmonising social and economic interests of both the employer and the employees.
- Law "On the Employment of the Population" No. 642 of 20.10.2020
- Joint Decree of the Ministry of Labour and Social Protection of the Population (No. 7) and the Ministry of Healthcare (No. 13) "On approval of the list of jobs with unfavourable working conditions, where the employment of persons under 18 years is prohibited" registered by the Ministry of Justice of the Republic Uzbekistan, dated July 29 2009, No. 1990
- Decree of the Cabinet No. 133 of 11 March 1997 to approve normative acts necessary for the realization of the Labour Code of the Republic of Uzbekistan.
- Decree of the Cabinet of the Ministers No. 1011 of 22 December 2017 "On Perfection of the Methodology of Definition of Number of People in Need of Job Placement, including the Methodology for Observing Households with Regard to Employment Issues, also for the Development of Balance of Labour Resources, Employment and Job Placement of Population".
- Decree of the Cabinet of the Ministers No. 965 of 5 December 2017 "On the Measures of Further Perfection of the Procedure of Establishment and Reservation of Minimum Number of Job Places for the Job Placement of Persons who are in need of Social Protection and Face Difficulties in Searching Employment and Incapable of Competing in Labour Market with Equal Conditions".
- Decree No. 964 of 5 December 2017 "On the Measures for Perfection of the Activity of Self-Government Bodies Aimed at Ensuring Employment, Firstly for the Youth and Women".

15.1.2 Lender requirements

15.1.2.1 EBRD

PR2 is applicable to Labour and Working Conditions and has the following key objectives:

- Respect and protect the fundamental principles and rights of workers;
- Promote the decent work agenda, including fair treatment, non-discrimination and equal opportunities of workers;
- Establish, maintain and improve a sound worker-management relationship;
- Promote compliance with any collective agreements to which the client is a party, national labour and employment laws;
- Protect and promote the safety and health of workers, especially by promoting safe and healthy working conditions; and
- Prevent the use of forced labour and child labour (as defined by the ILO) as it relates to project activities.
- According to EBRD's Environmental and Social Policy, EBRD is committed to the respect of human rights in the Project they finance. EBRD is also guided by the International Bill of Human Rights and the eight core conventions of the International Labour Organization.

15.1.2.2 EPFIs

The following applicable IFC Performance Standards aim to identify and ensure that social and economic impacts of a project are addressed in the relevant areas, in particular:

- Performance Standard 2: Labour and Working Conditions;

In accordance with IFC Performance Standard 2 (Labor and Working Conditions) there is a requirement to align with the following conventions:

- ILO Convention 29 on Forced Labor;
- ILO Convention 87 on Freedom of Association and Protection of the Right to Organize;
- ILO Convention 98 on the Right to Organize and Collective Bargaining;
- ILO Convention 100 on Equal Remuneration;
- ILO Convention 105 on the Abolition of Forced Labor;
- ILO Convention 138 on Minimum Age (of Employment);
- ILO Convention 182 on the Worst Forms of Child Labor;
- ILO Convention 111 on Discrimination (Employment and Occupation);
- UN Convention on the Rights of the Child, Article 32.1; and
- UN Convention on the Protection of the Rights of all Migrant Workers and Members of their Families.

15.2 Baseline Conditions

15.2.1 Forced labour

The following sections provide a preliminary account of the labour rights context in Uzbekistan, with high-level coverage of emerging labour rights issues in the globally dominant solar manufacturing industry in China.

CHINA

Recent literature highlights notable incidents and regional trends involving the infringement of institutional and internationally chartered human rights, notably those related to labour and working conditions, in China. In the context of the solar manufacturing industry, the main PV products on the global markets include the following:

- Polysilicon and aluminium.
- Ingots.
- Wafers.
- Cells.
- Modules.

Official statistics reported for the year 2021 indicate that Chinese manufacturing companies account for the majority of the global manufacturing capacity for solar PV products. Specifically, Chinese-based producers have dominated the markets for metallurgic grade polysilicon, PV wafers, cells and modules.

Recent studies report that a sizeable fraction of established manufacturers and suppliers constituting international solar PV panel supply chains have favoured cost competitive upstream producers of polysilicon, which is the main raw material for the production of nested PV panel components. The cost advantage of these producers is reported to lie in industrial policies and labour transfer programs that involve forced labour within the Xinjiang Ughur Autonomous Region (XUAR).

A recent literature review published by the Breakthrough Institute indicates the existence of systemic oppression of Ughur, Kazakh and Kyrgyz minorities in China. Developing research by frontline NGOs in the human rights advocacy arena avers that these ethnic communities have historically been subjected to persecution and coercive labour programs, which allocate these demographics to exploitative and repressive industrial complexes located in XUAR. Documented research further indicates that minorities targeted to forced labour in XUAR are employed in quartzite rock mining and the production of polysilicon, aluminium, metallization pastes as well as coal-fired electricity for metallurgical factories. Reported violations of human rights within XUAR include the involuntary recruitment of targeted

minorities, the detention of labourers in worker camps located far from their communities, abject exploitation, poor living and working conditions, political indoctrination, and extreme penal measures for acts of resistance and insubordination.

UZBEKISTAN

According to the latest Trafficking in Persons Report issued by the United States Department of State, Uzbekistan has not yet attained full compliance with minimum standards for the elimination of human trafficking, although significant progress towards these standards has been realized. In 2019, there were 95 reported victims of human trafficking, 89 of whom were victims of sexual exploitation. While most of the victims were exploited abroad, 15 endured exploitations within the country. The report highlights that Uzbekistan's efforts include steps to end to the systematic mobilization of students, teachers, and health care personnel for the annual cotton harvest, and granting international, third-party observers' unimpeded access for monitoring purposes. There has been a steady decline in reported human trafficking cases, compared to 208 in 2018, 440 in 2017 and 714 in 2016.

In July 2019, a Decree of the President of the Republic of Uzbekistan titled Additional Measures to Further Improve the System of Combating Trafficking in Persons and Forced Labour, entered into force. It transformed the Interdepartmental Commission of the Republic for Combating Human Trafficking into a National Commission under the guidance of the President of the Senate. The Commission comprises two sub-committees chaired by the Ministry of Internal Affairs and the Ministry of Employment respectively. Regional commissions were created in each of the Country's regions and a national rapporteur was eventually appointed.

In August 2020, the country's 2008 law on human trafficking was amended as new concepts, preventive measures, and a procedure to identify victims of human trafficking (including minors and their rights), were introduced. While listing the main policy lines in this sector, the law provides a specific definition of the status of the National and Territorial Commissions for combating human trafficking and forced labour, as well as the powers of the Council of Ministers. The relevant government agencies include the General Prosecutor's Office and the Ministry of Employment and Labour Relations. A new chapter on human trafficking prevention has been introduced in the legislation, with measures ranging from ongoing monitoring and awareness raising campaigns on dangerous situations to the development and implementation of educational programs in public and private educational establishments. The Ministry of Internal Affairs will create a unified database for human trafficking crimes, with information on traffickers, victims and the various types of exploitation. The new law introduces a two-stage procedure to identify the victims of human trafficking. When individuals are granted the status of victim of human trafficking they are entitled to rehabilitation and social integration programs, according to the outcome of the final

investigation carried out by the Territorial Committee (United States Department of State, 2021).

15.2.2 Child labour

In 2019, Uzbekistan achieved appreciable progress in action towards the elimination of the worst forms of child labour. The government took active measures to prevent the use of child labour in the cotton harvest, including by introducing criminal penalties for repeat violations of hazardous work prohibitions, doubling the number of labour inspectors, and conducting extensive awareness-raising on child labour laws and penalties for violations. The government also established a new National Commission on Combating Trafficking in Persons and Forced Labour and adopted a new roadmap to combat trafficking in persons and forced labour. However, children in Uzbekistan engage in the worst forms of child labour, including in commercial sexual exploitation. Although the government made meaningful efforts in all relevant areas, laws prohibiting the commercial sexual exploitation of children do not meet international standards. Uzbekistan also has not carried out a national child labour survey to determine the prevalence of child labour in sectors other than cotton production.

Surveys conducted by UNESCO and ILO have shown that about 5% of children in Uzbekistan are engaged in work during studies, and 4.3% are fully devoted to employment. Whilst the surveys have indicated that children below the age of 18 years are chiefly employed in the agricultural and service industries, children were also shown to engage in sex trafficking transnationally, and also internally in brothels, clubs, and private residences. Children in institutions were also shown to be vulnerable to sex trafficking. The table below provides an overview of the sectors and occupations reported to employ minors in Uzbekistan.

Table 15-1 Sectors and Work Streams Employing Child Labour in Uzbekistan

Sector/ Category of Labour	Activity
Agriculture	• Cultivating silk cocoons. • Preparing land for crop planting.
Services	• Vending. • Car washing. • Collection of scrap metals. • Refurbishing school grounds and facilities. • Vending in markets.
Categorical Worst Forms of Child Labour	• Commercial sexual exploitation, sometimes as a result of human trafficking. • Forced labour in cultivating silk cocoons. • Forced labour in construction, non-cotton agriculture, and cleaning parks, streets, and buildings.

With regards to child labour in agriculture and the cotton cultivation sub-sector in particular, the Government of Uzbekistan abolished the oppressive quota system that governed cotton production in some parts of Uzbekistan in 2020. Under the pre-existing cotton production

quota system, regional and local officials were mandated to mobilize sufficient labour to meet production targets assigned to farmers, and child workers were recruited with onerous working conditions. Vestiges of child labour in cotton farming are reported to employ children in a supporting capacity, whereby older children assist in harvesting to supplement household income (United States Embassy in Uzbekistan, 2022).

The following table provides a summary of key mechanisms for the Government's coordination of efforts towards the eradication of child labour in Uzbekistan.

Table 15-2 Mechanisms for Governmental Coordination of Child Labour Eradication Requirements Set out in Uzbekistan's Legal Framework

SECTOR/ CATEGORY OF LABOUR	ACTIVITY
National Commission on Combating Trafficking in Persons and Forced Labour (National Commission)	• Coordinates state and local entities' efforts to combat trafficking in persons and forced labour; • Analyses and monitors efficacy of government programs to address trafficking in persons and forced labour; • Organizes international cooperation on combating human trafficking and forced labour; • Provides legal and policy recommendations for improvement of government efforts in these areas. Chaired by the National Rapporteur on Combating Trafficking in Persons and Forced Labour. Comprises the two sub-commissions on combating human trafficking and on forced labour, respectively. The Minister of Internal Affairs heads the Sub-Commission on Combating Trafficking in Persons and the Minister of Labour heads the Sub-Commission on Combating Forced Labour. In 2019, the National Commission drafted and adopted a roadmap to combat trafficking in persons and forced labour, and roadmaps for the cotton harvest, a national plan for work with international organizations, and a media plan.
National Rapporteur on Combating Trafficking in Persons and Forced Labour (National Rapporteur)	Chairs the National Commission on Combating Trafficking in Persons and Forced Labour. • Reports annually to the President on trafficking in persons and forced labor issues, government efforts to punish perpetrators, and services for victims of human trafficking and forced labor crimes. • Conducts public awareness-raising activities related to human trafficking and forced labor. (35) In 2019, the National Rapporteur convened the National Commission monthly.
Local Commissions for Combating Human Trafficking and Forced Labour (Local Commissions)	• Ensure timely and rigorous implementation of all laws and regulations, including those issued by the National Commission, related to trafficking in persons and forced labour. Local Commissions mirror the structure of the National Commission, with sub-commissions on trafficking in persons and on forced labor, respectively. Local Commissions are chaired by the regional hokim (governor) and provide monthly reports to the National Commission.

Sector/ Category of Labour	Activity

15.2.3 Construction labour

Uzbekistan has achieved steady economic development over the past few decades, with the expansion of private sector businesses and progressive policy reforms geared towards the country's transition to a market-based economy. The country's labour force has grown at a rate of 350,000 to 370,000 people per year. Moreover, work and education draw many rural residents to the cities, especially Tashkent and Andijan. Daily migration has been reported to influence the employment rate and culture of rural residents, besides improving the ties between rural and urban communities.

The construction industry is amongst the leading labour-intensive contributors to the national economy, other such sectors being agriculture and manufacturing. In addition, the cross-cutting service sector holds the most potential for job creation. The construction sector, along with agriculture and industry employ about 60% of the labor force accounting for Small to Medium Enterprises (SMEs), with the remainder of labour engaged in the services sector. The leading demographics for informal labour within the country's construction sector and other industries are males, rural residents, and workers with relatively low educational attainment. With regards to the gender distribution, construction represents the second most dominant sector for male recruitment, with 25% of the national male labour employed in construction. Conversely, only 0.6% of the national female labour have been shown to hold occupations within the construction sector (Anderson *et al*, 2020).

15.2.4 Inadequate working conditions

The prevalence of indecent working conditions across different economic sectors in Uzbekistan is not well documented. The law provides for a national minimum wage and establishes a standard workweek of 40 hours and requires a 24-hour rest period. The law further provides for paid annual holidays and overtime compensation as specified in employment contracts or as agreed with an employee's trade union. Such compensation may be provided in the form of additional pay or leave. The law states that overtime compensation should not be less than 200 percent of the employee's average monthly salary rate. Additional leave time should not be less than the length of actual overtime work. An employee may not work more than 120 hours of overtime per year, but this limitation was not generally observed, particularly in the public sector. The law prohibits compulsory overtime. According to a national human rights report issued by the United States Department of State for the year 2020, Government effectively enforced these laws in the

formal economy. Penalties for violations of wage and overtime laws were not commensurate with those for similar crimes, such as fraud.

The Ministry of Employment and Labor Relations establishes and enforces occupational health and safety standards in consultation with unions. According to the law, health and safety standards should be applied in all sectors. The government effectively enforced these laws in the formal economy. No data was available on enforcement of these laws in the informal economy. Penalties for violations of occupational health and safety laws were not commensurate with those for crimes, such as negligence.

The most common violations committed by private sector employers were violations of wage, overtime, and occupational health and safety standards. Although regulations provide standards for workplace safety, workers reportedly worked without necessary protective clothing and equipment at some hazardous job sites. More specific information was not available on sectors in which occupational safety violations were common, as well as on specific groups of workers who worked in dangerous conditions or without needed safety equipment. In July media reported doctors, nurses, and workers at quarantine centers were being forced to sign waiver letters promising not to make claims against the government if they contracted COVID-19. In March the country joined the Commonwealth of Independent States' Interstate Council for Industrial Safety to improve its industry safety standards. The government did not provide statistics on industrial accidents (United States Department of State, 2020)..

15.2.5 Occupational health and safety

The most common violations committed by private sector employers were violations of wage, overtime, and occupational health and safety standards. Although regulations provide standards for workplace safety, workers reportedly worked without necessary protective clothing and equipment at some hazardous job sites. More specific information was not available on sectors in which occupational safety violations were common, as well as on specific groups of workers who worked in dangerous conditions or without needed safety equipment. In March 2020 the country joined the Commonwealth of Independent States' Interstate Council for Industrial Safety to improve its industry safety standards (United States Department of State, 2021).

15.2.6 Collective Bargaining

The Labour Code of Uzbekistan allows workers to form and join independent unions and bargain collectively. According to a national human rights report issued by the United States Department of State for the year 2020, despite the legal status of these laws, no independent labour unions were reported to operate in the country, by 2020. The law neither provides for nor prohibits the right to strike, but it prohibits antiunion discrimination. The law on trade

unions states that workers may not be fired due to trade union membership, but it does not clearly state whether workers fired for union activity must be reinstated. Volunteers in public works and workers employed by individuals without documented contracts do not have strong legal protections of their rights.

There was no public information available regarding government enforcement of applicable laws, since there were no known cases of attempts to form independent unions. The law provides penalties for violating freedom of association laws. Penalties were not commensurate with those for other laws involving denials of civil rights, such as discrimination. The government amended the law on "professional unions, rights, and guarantees of their activities." Despite legal protections for profession unions, workers had not successfully formed or joined independent unions. Workers continued to worry that attempts to create independent alternative unions would be repressed. Unions remained centralized, controlled by, and dependent on the government.

The state-run Federation of Trade Unions of Uzbekistan included in its ranks more than 35,000 primary organizations and 14 regional trade unions, according to official reports. Regional and industrial trade unions remained state managed. In addition, Government-organized unions did not undertake independent bargaining on behalf of their members. Government ministries, including the Ministry of Agriculture, in consultation with the Federation of Trade Unions, continued to set wages for government employees and production quotas in certain sectors. The government moved toward letting the market determine prices in a larger number of sectors than in previous years. In the emerging private sector, management established wages or negotiated them individually with persons who contracted for employment. Labour arbitration agencies within Uzbekistan were also found to have significant capacity gaps along the development process (United States Department of State, 2020)[17].

15.3 Receptors

The following table provides an overview of E&S impact receptors in the context of potential impacts relating to labour and working conditions within the Project's Areas of Influence (AoI). A sensitivity rating and corresponding description is further provided for each relevant receptor.

[17] Bureau of Democracy, Human Rights and Labour, United States Department of State. 2020. Country Report on Human Rights Practices (Uzbekistan)

Table 15-3 E&S impact receptors – Labour and working conditions

RECEPTOR	SENSITIVITY	JUSTIFICATION
Job candidates	High	Job candidates within host communities, districts, wider Uzbekistan and Chinese-based labour markets have a potentially high sensitivity to risks associated with exclusion from employment opportunities.
Direct and contracted workers	High	Direct and contracted workers employed by the Project Company, EPC Contractors and sub-contractors have a potentially high sensitivity to risks associated with exploitative, abusive and harmful working terms and conditions, and those relating to indecent living conditions.
Supply chain workers	HIgh	Supply chain workers have the highest sensitivity to critical labour risks, including forced and child labour and unsafe working conditions, due to the foreign location of supply chain enterprises and Project Developer's limited leverage over globally dominant PV module suppliers.

15.4 Potential Impacts and Impact Management Measures

15.4.1 Construction phase

15.4.1.1 Unequal access to employment opportunities and benefits due to discriminatory and/or exploitative recruitment practices

The Project's construction phase is set to employ an estimated total of 700 workers. About 30-60% of the direct and contracted construction labour will be sourced locally. As the designated EPC Contractor is Chinese based, the majority of the remaining contracted workforce will be expatriated from China, however foreign recruitment will be limited to specialized labour.

While most of the Project Company's direct workers will be recruited internally, a combination of recruitment channels will be used for the procurement of the substantially larger contracted workforce, both with Uzbekistan and abroad. Depending on the accessibility of in-demand contracted labour, the EPC Contractor (and sub-contractors) will undertake employment for certain labour sections internally and outsource the remainder of labour procurement to recruitment agencies within Uzbekistan and China, as appropriate.

Recruitment mechanisms for construction-phase labour may involve discriminatory and/or exploitative practices which may inhibit fair and equitable access to job opportunities and employment terms/ benefits. This risk potentially applies to recruitment agencies with unscrupulous recruitment procedures. Discriminatory recruitment practices may deny suitably qualified job candidates equitable access to employment on the basis of bribery, nepotism,

sexual harassment, and/or biased consideration on the basis of personal attributes of no bearing on inherent job requirements (e.g., gender, religion, ethnicity etc.).

Likewise, exploitative recruitment practices may deny job candidates and recruits equitable employment benefits or legal entitlements (e.g., remuneration, overtime compensation, health insurance professional development, leave entitlements, freedom of association and right to engage in traetc.). In addition, workers may be recruited without the establishment of transparent, comprehensive, and mutually accessible employment contracts to document mutual obligations (i.e., job requirements, length of employment, related legal entitlements) and ensure satisfactory performance and sound employee-management relationships.

15.4.1.2 Poor working and living conditions

Upon recruitment, construction workers and contracted labourers in particular may be subjected to working and living conditions that do not meet minimum welfare requirements prescribed in relevant national legislation (i.e., national constitution, Labour Code), binding ILO conventions and lender requirements. Workers may be afflicted with onerous routines with protracted working durations, absence of rest breaks, and lacking access to dining and potable water facilities/ supplies, and insufficient sanitary facilities, amongst other inadequacies.

In addition, any potential facilities for centralized worker accommodation may not meet national and international standards for the accommodation of construction labour (including Law on Occupational Safety and Health, the IFC/EBRD guidelines for workers' accommodation etc.), on account of cramped conditions, poor ventilation, lacking sanitation facilities and gendered in-house facilities. Burdensome and inconvenient working and living conditions may impinge on workers' rest, stress levels, capacity for satisfactory performance, job satisfaction and general wellbeing.

15.4.1.3 Occupational health and safety incidents

Construction workers, particularly contracted workers and labourers engaged in on-site construction activities are subject to a wide range of occupational physical, chemical, and biological hazards which potentiate injury, sickness, and fatalities. Key construction-phase hazards within the project sites and transit corridors include (but are not limited to):

- Work at height (i.e., for sub-station installations)
- Lifting and manual handling of heavy objects
- Pinch points and moving parts
- Moving vehicles

- Fire and explosion
- Electrocution
- Slips, trips and falls
- Heat stress
- Exposure to airborne dust
- Exposure to hazardous materials (i.e., via inhalation, skin contact)
- Snake bites
- Communicable diseases (e.g., airborne respiratory infections etc.).

The lack of H&S risk assessment to eliminate critical hazards, comprehensive H&S training oriented to general and specific areas of work, provision of Personal Protective Equipment (PPE), H&S monitoring for contracted and sub-contracted workers, emergency response plans and other crucial safeguards may result in H&S accidents, which may culminate in severe injury, sickness, and fatalities.

The type of hazards attributable to construction sites will vary significantly depending on the construction methods employed and the degree of control implemented by the EPC Contractor and affiliated sub-contractor. It is therefore important that the EPC and affiliated sub-contractors demonstrate full consideration of health and safety risks as part of the selection process for construction methods (to be established in method statements) and that these risks are appropriately mitigated. This will also necessitate systematic processes to be implemented on-site to ensure that such risks are adequately managed and that workers have competency to undertake their works safely.

15.4.1.4 Forced labour

The use of independent recruitment agencies to facilitate the employment and management of construction labour and contracted workers (under EPC Contractor and sub-contractors) in particular poses the risk of unscrupulous and exploitative recruitment and management practices. Further to the risks outlined in Section 15.4.1.1, corrupt recruitment practices may involve surreptitious arrangements for forced labour in form of work that is:

- Bonded
- Subject to unlawful and exploitative deposits, penal charges and terminal wage deductions
- Imposed or bound through confiscation of valuable personal documentation or property
- Coerced through intimidation and/or assault

- Characterized by late payments and/or non-monetary payments
- Characterized by restrictions on freedom of movement

Forced labour typically targets marginalized and/or repressed communities and individuals, such as trafficked persons, asylum seekers and prisoners. It is characterized by repressive and exploitative schemes to sustain worker dependency and enable profiteering.

The Project's reliance on a Chinese-based solar panel supply chain poses a high risk of forced labour within its upstream supply chain. JA Solar is the main solar module supplier engaged by the Project's EPC Contractor (CEEEC). The global manufacturer operates in a Tier 1, 2 and 3 module supply capacity, with internal production lines for PV cells, wafers and ingots. According to the supply chain map for the Bill of Materials (BOM) stipulated in the module sourcing contract, JA Solar has engaged Xingte, Zhongneng, and Asia Silicon for Tier 4 (processed polysilicon) supply. The Tier 4 suppliers are headquartered within the cities of Baotous, Xuzhou, Qinghai, and Yongxiang, in China.

According to a recent study[18], there is no evidence to indicate that JA operates solar module manufacturing facilities in the XUAR. Nevertheless, published studies allege that the manufacturer owns a number of power generation facilities in the region, with previous linkages to Tier 4 PV module suppliers (including Daqo, Xinte and GCL Poly) that are currently implicated in the XUAR labour transfer programs.

15.4.1.5 Child labour

Until recently, the employment of minors (i.e., individuals below the age of 18 years) was prevalent in Uzbekistan's cotton production sector. While targeted governmental interventions have eliminated this form of child labour to a large extent. Nevertheless, the national Labour Code of Uzbekistan allows the employment of minors in labour that is not economically exploitative, hazardous, or detrimental to children's health, physical, mental, spiritual, moral, or social development. As described in the sub-section above, the engagement of in-country recruitment agencies presents the potential of unscrupulous and exploitative recruitment practices, which may involve minors below the age of 18 and unlawful employment arrangements for minor recruits.

The risk of child labour is comparatively high for the Project's foreign contracted and supply-chain workforce, particularly for the Tier 4 PV module supply chain workforce. The elevated risk of forced labour within this tier of PV module supply presents a commensurate likelihood

[18] Murphy. L. T., Elima. N. 2021. In Broad Daylight: Uyghur Foreced Labour and Global Solar Supply Chains

for the worst form of child labour, including debt bondage, slavery, trafficking and other modes of forced labour.

15.4.1.6 Workplace harassment, violence and other security incidents involving project workers

Project workers, particularly contracted and supply chain labourers are subject to a range of human rights violations, in the form of workplace intimidation, harassment and assault. Female workers are further at risk of sexual violence, harassment and exploitation in the workplace. Acts of workplace aggression and other hostile transgressions representing the violation of human rights can be perpetrated by co-workers, particularly those in superior positions. Sexual exploitation and abuse are also typically involve female workers in subservient roles, particularly migrant workers who have lesser support systems and awareness of in-country legal recourse.

Further, the criminal and abusive acts towards project workers can also be inflicted by outsiders. Attacks on project workers can occur in the event of theft, robbery and rape. Personal violence and hate crimes involving project workers can also occur in the unlikely event of community protests.

Table 15-4 Overview of potential impacts relating to labour and working conditions during construction

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Unequal access to employment opportunities and benefits due to discriminatory and/or exploitative recruitment practices	Host communities in Yukorichirchik and Parknt Districts, Tashkent Region, wider Uzbekistan, and foreign labour markets	Moderate	Job candidates	High	**Moderate/ Major**	**Minor**
Poor working and living conditions	Project sites and off-site accommodation facilities	Major	Direct and contracted workers	High	**Major**	**Minor/ Moderate**
Occupational health and safety incidents	Project sites and off-site accommodation facilities	Major	Direct and contracted workers	High	**Major**	**Minor/ Moderate**
Forced labour	Uzbekistan and China	Major	Direct and contracted workers	High	**Major**	**Minor/ Moderate**
			Supply chain workers	High	**Major**	**Minor/ Moderate**
Child labour	Uzbekistan and China	Mjor	Direct and contracted workers	High	**Major**	**Minor/ Moderate**
			Supply chain workers	High	**Major**	**Minor/ Moderate**
Workplace harassment, violence and other security incidents involving project workers	Project sites and off-site accommodation facilities	Major	Direct and contracted workers	High	**Major**	**Minor/ Moderate**

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Impact avoidance, mitigation and offset measures						
<u>Unequal access to employment opportunities and benefits due to discriminatory and/or exploitative recruitment practices</u> • A Human Resources (HR) Policy will be instituted for the project. The policy will highlight a commitment to equal-opportunity recruitment and fair employment terms, in addition to promoting gender equality and local content in this respect. • The Project's HR Policy will be contractually cascaded from the Project Company down to the EPC Contractor, and any first-tier and/or second-tier recruitment agencies, to ensure that the policy provisions are applied to all contracted workers. • Induction trainings for all direct and contracted construction workers will include familiarization with the Project's HR Policy, the workers' legal rights and the Grievance Redress Mechanism (GRM) for project workers. • The recruitment of all project workers will involve equal-opportunity eligibility criteria based around inherent job requirements (e.g., educational attainment, professional experience, fitness for work etc.). The recruitment process will be free of discrimination on the grounds of gender, ethnicity, religion, income status and other attributes of no bearing on inherent job requirements. • Employment for the Project's direct and contracted labour as well as the procurement of services from supply chains will be implemented at the community, district, regional and national levels, in order of decreasing priority. • Employment terms and benefits with all direct and contracted workers will be stipulated in form of bilateral employment contracts, which will be documented in Uzbek, Russian, Chinese and English, as appropriate. • Bilateral employment contracts for all direct and contracted workers will expressly state the workers' legal rights and entitlements, which are to include (but not be limited to) the duration of employment, workstation(s), working hours, description of duties or general responsibilities, remuneration and overtime compensation, health insurance, leave and pension entitlements, as well as the notice period for termination of the contract agreement. • Bilateral employment contracts for all direct and contracted workers will not infringe the workers' legal rights to collective bargaining through registered trade unions, and any negotiated agreements with relevant trade unions will be incorporated into the employment contracts of all affected workers. • Remuneration packages for direct and contracted workers will be provided on a fair and equitable basis, taking into account legally established minimum wage, benchmarks for similar jobs within the relevant sector and project location, the cost of living, provisions for health insurance and other fringe benefits, as well as level of experience. • Any changes to employment contract agreements for direct and contracted workers will be discussed and mutually agreed upon, prior to the contract changes being officially documented and effected. • The promulgation of employment opportunities within project-affected communities, districts and the wider region will be undertaken by means of (i) newspaper advertisements, (ii) public announcements by relevant LGAs, (iii) posts at vocational training institutions, (iv) posts at project site						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
entry points, and (v) local community engagements by dedicated CLOs. • Suitably qualified service providers based within the project-affected communities, districts, Tashkent Region and wider national markets (in order of decreasing priority) will be identified, evaluated and listed in an internal procurement database. Procurement of construction goods and services will provide priority consideration for local service providers. • All project employees and contracted workers will have equitable access to relevant on-the-job trainings, which will enable the dissemination of specialist and transferable skills within the Project's construction phase. • Career development programs such as internships, mentorships and professional development plans will be provided for various tiers and sections of project employees and contracted workers, particularly skilled workers paired with expatriate experts not readily available in Uzbekistan.. • The gender profile of the Project's direct and contracted workforce will be reviewed on a regular basis, with a view to ensuring a sufficient representation of women within construction labour to the extent feasible. • The nationality profile of the Project's direct and contracted workforce will be reviewed on a regular basis, with a view to ensuring a sufficient representation of Uzbekistan nationals within construction labour to the extent feasible. • A Labour and Working Conditions Management Plan and Sub-Contractor and Supplier Management Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented. • A worker GRM will be instituted for the Project and disclosed to the Project's direct and contracted workers to enable the collection of workplace grievances on platforms that are accessible to the workers and free of manipulation, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. **Poor working and living conditions** • A Human Resources (HR) Policy will be instituted for the project. The policy will highlight a commitment to equal-opportunity recruitment and fair employment terms. • The Project's HR Policy will be contractually cascaded from the Project Company down to the EPC Contractor, and any first-tier and/or second-tier recruitment agencies, to ensure that the policy provisions are applied to all contracted workers. • A code of conduct will be developed alongside the HR Policy and cascaded accordingly. • Induction trainings for all direct and contracted construction workers will include familiarization with the Project's HR Policy, the workers' legal rights and the Grievance Redress Mechanism (GRM) for project workers. • Remuneration packages for direct and contracted workers will be provided on a fair and equitable basis, taking into account legally established minimum wage, benchmarks for similar jobs within the relevant sector and project location, the cost of living, provisions for health insurance and other fringe benefits, as well as level of experience. • Remuneration will be discharged to all workers in a timely manner, as specified in employment contracts.						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
• Residential facilities that meet the EBRD/ IFC guidance for labour accommodation will be used for accommodating the Project's contracted workforce. • Welfare facilities and basic workplace services will be provided free of charge (i.e., drinking water, food, on-site medical services, transportation between accommodation facilities and work stations). • Residential facilities for the Project's construction workers will be selected based on the welfare and safety criteria specified in local legislation and the IFC/EBRD guidelines for workers' accommodation. Self-sufficient residential facilities with various sanitary conveniences and dedicated (internal) recreational amenities will be selected. • Routine inspections and audits will be undertaken to demonstrate adequate maintenance of the Project's accommodation and welfare facilities, and continual performance on relevant housing and safety standards. • Food catering and potable water supply services will be provisioned for direct and contracted workers during working hours within the project sites, through the engagement of accredited personnel or vendors. • Dedicated medical facilities will be established on project sites to enable the provision of first aid and basic medical check-ups, prior to referral to nearby hospitals for further diagnostic and treatment service. • Construction workers showing symptoms of sickness will be allowed leave from duty and directed to the Project's medical facilities or hospitals for testing and treatment as appropriate. Workers with serious respiratory diseases will be quarantined or provided with face masks as necessary, to reduce the spread of air borne infections that can spread to host communities. • Adequate and conveniently located sanitation facilities, including toilets, ablution, drenching, handwashing and sanitizing facilities will be provided within the project sites. • Adequate and conveniently located facilities for the disposal of domestic and medical waste will be provided within the project sites. • Transit service for construction labour will include staff buses, culturally appropriate living and working conditions for women. • Worship facilities (e.g., prayer rooms) will be provided for the Project's direct and contracted workforce within the project sites, particularly for Muslim workers. • A Worker Accommodation Management Plan, Community Health and Safety Plan, Labour and Working Conditions Management Plan, Labour Working Conditions Management Plan, and Occupational Health and Safety Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented. • A worker GRM will be instituted for the Project and disclosed to the Project's direct and contracted workers to enable the collection of workplace grievances on platforms that are accessible to the workers and free of manipulation, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. **Occupational health and safety incidents** • A Health Safety Security and Environmental (HSSE) Policy will be instituted for the project. The policy will highlight a commitment to preventive and						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
protective measures to safeguard the health, safety and security of the Project's construction workforce. • The Project's HSSE Policy will be contractually cascaded from the Project Company down to the EPC Contractor and any sub-contractors, to ensure that the policy provisions are applied to all contracted workers. • Construction workers will be provided with a safe and healthy work environment, taking into account inherent risks and specific classes of hazards associated with the project. • An Occupational Health and Safety (OHS) management system taking into account specific risks associated with the project, legal requirements and duty of care will be developed and implemented. • Safeguard measures to ensure the health and safety of direct and contracted workers will include default efforts to eliminate workplace hazards that pose the risk significant Health and Safety (H&S) incidents (i.e., serious injury, chronic occupational disease and/or fatalities). • Where complete elimination of major workplace hazards is not feasible, subsequent consideration will be given to substituting high-risk facilities with safer technology or modifying the working environment and processes to lessen the hazards. • Efficient disposition of facilities within construction working areas, provision of adequate equipment to minimize manual labour, job rotations and resting breaks will be implemented to prevent and mitigate against over-exertion. • Efficient disposition of facilities within construction working areas, adequate housekeeping and designation of unobstructed walkways across working areas will be implemented to prevent and mitigate against slips and at-grade falls. • Provision of ladders, scaffolding, railing, and fall arrest equipment such as full-body harness (where necessary), as well as demarcation, timely covering and backfilling of fall hazard zones, will be implemented to prevent and mitigate against falls from a heights. • Designation of exclusive roads for the movement of construction machinery, dedicated walkway, marked crossing points, on-site traffic controllers and machine guards, establishment of buffer/ clearance zones from unloading/ discharge zones and provision of Personal Protective Equipment (PPE) such as helmets and safety goggles will be implemented to prevent and mitigate against impact from fast-moving objects. • Designation of exclusive zones for the operation/movement of construction machinery, dedicated walkways, marked crossing points, on-site traffic controllers, establishment of clearance zones from heavy moving machinery, use of reflective vests for personnel operating nearby heavy moving machinery, use of back-up alarms for heavy mobile machinery and use of adequate certified lifting machinery will be implemented to prevent and mitigate against impact from moving machinery. • Measures for ensuring sufficient ventilation in areas with evaporative, fugitive, aerosol and exhaust emissions will be implemented, and dust suppression measures will be commensurate to dust generation. • Excavation safety measures (i.e., shoring, sloping and benching) will be implemented for any deep and/or unstable excavations. • Preventative and mitigating measures for the handling, storage and transportation of hazardous (i.e., toxic, flammable or explosive) materials will be implemented as part of relevant Standard Operating Procedures (SOPs), based on continual hazard assessment. • Material Safety Data Sheets (MSDSs) for any hazardous materials that will be stored, handled and transferred within the project sites will be communicated to relevant workers in a clear and understandable manner, as part of targeted trainings and SOPs. Copies of the MSDSs will also						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
be made readily accessible in any on-site HAZMAT storage facilities, with efforts to ensure that precautionary signage and descriptions are provided in Uzbek, Russian, Chinese and English. • Fire detection and suppression systems as well as the establishment of emergency exits, assembly points and emergency medical response, will be implemented. • Regular fire emergency response and spill emergency drills will be organized to ensure sufficient preparedness for incidents of fire outbreak and chemical/ waste spills. • Sufficient and specialized Personal Protection Equipment (PPE) including (but not limited to) safety boots, helmets, ear plugs/ mufflers, eye protection, overalls and gloves will be provided for construction workers engaged in various risk-presenting activities, in conjunction with regular training on the proper use of the PPE. • Recruitment of project vehicle drivers and industrial/ heavy goods vehicles in particular will involve qualification criteria such as driving license status, adequate experience, familiarity with traffic H&S safety, visual tests and professional references. • Utility and drainage clearance surveys based on visual inspections and consultations with local authorities (and where necessary, radar equipment) will be undertaken prior to the establishment of excavation, stockpiling and construction zones, to identify any buried and above-ground utility assets and drainage infrastructure. Particular attention will be given to the gas pipelines and existing electricity transmission and distribution facilities located within the project sites and respective 200 metre buffers. • All energized facilities and system components will be labelled accordingly to indicate the hazard of electrocution. • High-voltage equipment will be placed on hard-standings above ground level and housed with access controls and clear warning signage. • Routine maintenance checks will be carried out to ensure the integrity and insulation of power system components and electrical equipment. • Electrical systems, equipment and metallic enclosures for heavy electrical machinery will be grounded accordingly. • Regulatory vertical clearance will be observed for any construction activities carried out underneath existing (operational) overhead powerlines, including the passage of heavy goods vehicles and high-rise structures underneath OTLs. • All workplace H&S incidents (i.e., accidents and near-misses) will be reported and documented for expert investigation and root-cause analysis, and subsequent remedial action to prevent re-occurrence. • Food catering and potable water supply services will be provisioned for direct and contracted workers during working hours within the project sites, through the engagement of accredited personnel or vendors. • Dedicated medical facilities will be established on project sites to enable the provision of first aid and basic medical check-ups, prior to referral and transfer to nearby hospitals for further diagnostic and treatment services. • Construction workers showing symptoms of sickness will be allowed leave from duty and directed to the Project's medical facilities or hospitals for testing and treatment as appropriate. Workers with serious respiratory diseases will be quarantined or provided with face masks as necessary, to prevent or control the transmission of air borne infections within host communities. • Adequate and conveniently located sanitation and welfare facilities, including toilets, ablution, drenching, handwashing, and sanitizing facilities						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
will be provided within the project sites. • An adequate number of waste bins will be placed for the collection of non-hazardous construction waste to minimize littering. • Dedicated bins will be placed around any on-site kitchen, office and resting facilities to enable the collection and temporary storage of putrescible waste. On-site bins and skips dedicated to this waste stream will be covered and regularly emptied/ replaced to prevent the pest infestation. • The EPC Contractor's Health and Safety (H&S) team will include specially trained first aid providers and fire emergency responders. • Regular H&S monitoring will be carried out by the Project Company's and EPC Contractor's relevant H&S staff. This line of monitoring will include (i) inspections to ensure the implementation of H&S safeguards in work procedures/ activities, and (ii) maintenance inspections and testing to ensure the structural integrity, mechanical integrity and overall operability of construction equipment and engineering controls for prevention of on-site and off-site H&S accidents. • Induction trainings for all direct and contracted construction workers will include familiarization with a safety-oriented workplace culture, construction workplace H&S hazards and safeguards, essential PPE, hygienic requirements, emergency preparedness and response, H&S incident reporting requirements, as well as various obligations and prohibitions related to the prevention of significant H&S incidents. • Periodic refresher trainings and daily tool-box talks will be provided updated or reiterated information on (i) general workplace H&S hazards and safeguards, and (ii) targeted H&S instruction for specific construction activities. • Induction and refresher trainings for all direct and contracted construction workers will cover hygiene, housekeeping and sanitation, the waste management hierarchy, construction-related waste streams, relevant categories of hazardous materials and waste, the impacts of hazardous materials and waste on human health and ecosystems, as well as requirements and safeguards for the handling, storage and transposition of various hazardous and non-hazardous construction materials and waste streams. • A Waste Management Plan, Hazardous Materials and Waste Management Plan, Occupational Health and Safety Plan, Emergency Preparedness and Response Plan, and Sub-Contractor and Supplier Management Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented. • A worker GRM will be instituted for the Project and disclosed to the Project's direct and contracted workers to enable the collection of workplace grievances on platforms that are accessible to the workers and free of manipulation, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. **Forced labour** • A Human Resources (HR) Policy and Supplier Code of Conduct will be instituted for the project. The policy will highlight zero tolerance for any forms of forced labour within the Project's direct, contracted and primary supply-chain workforce. • The Project's HR Policy and Supplier Code of Conduct will be contractually cascaded from the Project Company down to the EPC Contractor, sub-contractors, suppliers and any directly contracted and/or sub-contracted recruitment agencies, to ensure that the policy provisions are						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
applied to the to all workers associated with the Project's core business processes during construction. • The recruitment of all project workers will involve equal-opportunity eligibility criteria based around inherent job requirements (e.g., educational attainment, professional experience, fitness for work etc.), with priority consideration for Uzbekistan nationals. The recruitment process will be free of discrimination on the grounds of gender, ethnicity, religion, income status and other attributes of no bearing on inherent job requirements. • Employment terms and benefits with all direct and contracted workers will be stipulated in form of bilateral employment contracts, which will be documented in Uzbek, Russian, Chinese and English, as appropriate. • Bilateral employment contracts for all direct and contracted workers will expressly state the workers' legal rights and entitlements, which are to include (but not be limited to) the duration of employment, workstation(s), working hours, description of duties or general responsibilities, remuneration and overtime compensation, legally mandated health insurance, leave and pension entitlements, as well as the notice period for termination of the contract agreement. • Bilateral employment contracts for all direct and contracted workers will not infringe the workers' legal rights to collective bargaining through registered trade unions, and any negotiated agreements with relevant trade unions will be incorporated into the employment contracts of all affected workers. • Remuneration packages for direct and contracted workers will be provided on a fair and equitable basis, taking into account legally established minimum wage, benchmarks for similar jobs within the relevant sector and project location, the cost of living, provisions for health insurance and other fringe benefits, as well as level of experience. • Any changes to employment contract agreements for direct and contracted workers will be discussed and mutually agreed upon, prior to the contract changes being officially documented and effected. • Induction trainings for all direct and contracted construction workers will include familiarization with the Project's HR Policy, the workers' legal rights and the Grievance Redress Mechanism (GRM) for project workers. • The EPC Contractor's CLOs will communicate to project-affected communities the general eligibility criteria for the employment of direct and contracted project workers and the Project's zero tolerance policy on forced labour, as part of continual local engagement during construction. • The procurement process for the Project's EPC Contractor contractual stipulations for initiatory and annual supply chain due diligence for the full term of the EPC contract. Supply chain due diligence efforts will include (i) supply chain mapping and high-level labour risk screening, (ii) Self-Assessment (SA) audits, (iii) traceability audits for sourcing contracts for specific Bills of Materials (BoMs), and ad-hoc on-site audits for high-risk supply chain businesses. • The EPC Contractor will develop and implement a Corrective Action Plan (CAP) for any verified incidents of non-compliance with the Project's policy requirements and standards for forced labour, such that relevant performance gaps are remediated within the remedial timeframe specified in the CAP. • A Sub-Contractor and Supplier Management Plan, Supply Chain Management Plan (or Responsible Sourcing Procedure, as appropriate) including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented.						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
• A worker GRM will be instituted for the Project and disclosed to the Project's direct and contracted workers to enable the collection of workplace grievances on platforms that are accessible to the workers and free of manipulation, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. **Child labour** • A Human Resources (HR) Policy and Supplier Code of Conduct will be instituted for the project. The policy will highlight labour restrictions for workers under the age of 18 and prohibition of labour for workers under the age of 16 within the Project's direct, contracted and primary supply-chain workforce. • The Project's HR Policy and Supplier Code of Conduct will be contractually cascaded from the Project Company down to the EPC Contractor, sub-contractors, suppliers and any directly contracted and/or sub-contracted recruitment agencies, to ensure that the policy provisions are applied to the to all workers associated with the Project's core business processes during construction. • The recruitment process for the Project's direct and contracted workers will involve the screening of official personal identification documents (i.e., national ID, passport etc.) for the purposes of age verification. • Induction trainings for all direct and contracted construction workers will include familiarization with the Project's HR Policy, the workers' legal rights and the Grievance Redress Mechanism (GRM) for project workers. • The EPC Contractor's CLOs will communicate to project-affected communities the general eligibility criteria for the employment of direct and contracted project workers and the Project's policy restrictions on child labour, as part of continual local engagement during construction. • The procurement process for the Project's EPC Contractor contractual stipulations for initiatory and annual supply chain due diligence for the full term of the EPC contract. Supply chain due diligence efforts will include (i) supply chain mapping and high-level labour risk screening, (ii) Self-Assessment Questionnaire (SAQ) audits, and ad-hoc on-site audits for high-risk supply chain businesses. • The EPC Contractor will develop and implement a Corrective Action Plan (CAP) for any verified incidents of non-compliance with the Project's policy requirements and standards for child labour, such that relevant performance gaps are remediated within the remedial timeframe specified in the CAP. • A Sub-Contractor and Supplier Management Plan, Supply Chain Management Plan (or Responsible Sourcing Procedure, as appropriate) including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented. • A worker GRM will be instituted for the Project and disclosed to the Project's direct and contracted workers to enable the collection of workplace grievances on platforms that are accessible to the workers and free of manipulation, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. **Workplace harassment, violence and other security incidents involving project workers** • Public access to the project sites will be restricted using procedural and engineering controls including site fencing, issuance of administrative						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
identification documents to all direct and contracted construction workers, security checks at entry gates, as well as electronic access control systems and video surveillance for any high-risk and/or high-value facilities within project sites. • Professional security personnel will be hired to undertake on-site security monitoring including CCTV surveillance, site entry checks, and patrols for high-risk and/or high-value facilities within the project sites. • The recruitment of the project's security personnel will involve a vetting or screening procedure to ensure that candidates under consideration have no record of implication in unlawful use of force and other forms of human rights violations (including gender-based violence). • Reasonable efforts will be made to sensitize dedicated site security management teams to the standards set out in the National Guard to the UN Code of Conduct for Law Enforcement Officials and Voluntary Principles on Security and Human Rights (i.e., exceptional conditions for the application of force as a last resort, in a manner that is (i) cautious, (ii) proportionate to the extent of a given threat to project workers and assets and (iii) compliant with national laws on the use of lethal force). • The EPC Contractor's security department will regularly engage with the local police force and relevant Local Government Authority (LGA) units to obtain information on the incidence of crime within local communities based around the project sites and the wider host districts and develop the Project's security arrangements. • Emergency medical response and ambulatory hospital transfers will be provided for any injuries and casualties resulting from security incidents. • Local law enforcement authorities will be notified immediately, upon the occurrence of security incidents, to enable authoritative response, official investigation, apprehension, and prosecution. • An Occupational Health and Safety Plan and Emergency Preparedness and Response Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented, in coordination with relevant LGA departments and the local police force. • **<u>Gender Risk – Gender Based Violence and Harassment</u>** • The workers will be provided with information regarding worker code of conduct in local languages as part of their employment contract which will include provisions for reporting, investigations, termination and disciplinary action against those who perpetrate gender violence and harassment. • The EPC Contractor will implement the Project specific GBVH Policy. This policy will align with ACWA Power's GBVH policy and will list out the unacceptable behaviour among workers, provisions for reporting, sanctions for perpetrators and available resources & support systems for the victims in accordance with lenders and Uzbek requirements including ACWA Power's Environmental & Social Management System Implementation Manual. • The EPC Contractor will conduct mandatory regular training and awareness raising for the workforce about gender-based violence and harassment towards local community members and their colleagues especially women and the availability of a grievance mechanism to report any GBVH/SEA/SH cases.						

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• Training will be provided to GBVH focal point on the risks of GBV/SEA/SH and information provided on how to deal with any GBV/SEA/SH related cases. • The workers will be made aware of the laws and regulations that make sexual harassment and gender-based violence a punishable offence which is prosecuted. • Ensure inclusion of a balanced representation of women on the HSE team who will be easily relatable and approachable to female workers. • Project personnel in charge of receiving GBVH/SEA/SH grievances will be provided with appropriate training on how to handle such complaints. It is recommended that the personnel are trained in coordination with any GBVH organizations working in the Project area where available. • Female workers will be included in the grievance redress committee to help female workers and host community female members raise their grievances. • Regular consultations will be undertaken with women on their concerns about the project • The EPC Contractor will work to identify a suitable labour pool locally in order to minimize the need for bringing large number of workers from other regions or countries. This could also help the EPC Contractor in cutting cost associated with provision of accommodation facilities if the majority of the workers are sourced locally. • Provision of opportunities for the workers to regularly return to their families who may be located far from the Project site. • The EPC Contractor will provide opportunities for workers to have access to entertainment opportunities away from the host communities. • EPC Contractor will allow submission and investigation of anonymous sexual harassment complaints by workers and host community members and protect the confidentiality of the complainants. • The EPC Contractor will work in close coordination with the local authorities in investigating any complaints relating to gender violence and harassment in the host communities where it relates to Project workers. • The EPC Contractor will provide targeted training (including in life skills such as leadership and decision-making) and awareness raising to vulnerable workers such as women. • The EPC Contractor will prepare a Gender Equality and GBVH/SEA/SH Policy in line with Uzbek and lenders requirements. This will include provision of training to workers, subcontractors and suppliers on GBVH associated risks.						

15.4.2 Operations phase

15.4.2.1 Unequal access to employment opportunities and benefits due to discriminatory and/or exploitative recruitment practices

The Project's operations phase is set to employ an estimated total of 700 workers. A large fraction of the O&M workforce will be sourced locally, and foreign recruitment will be limited to specialized labour.

While most of the Project Company's direct workers will be recruited internally, a combination of recruitment channels will be used for the procurement of skilled workers, both with Uzbekistan and abroad. Depending on the accessibility of in-demand O&M specialists, the O&M Contractor will undertake employment for certain labour sections internally and outsource the remainder of labour procurement to recruitment agencies within Uzbekistan and abroad, as appropriate.

Recruitment mechanisms for operations-phase labour may involve discriminatory and/or exploitative practices which may inhibit fair and equitable access to job opportunities and employment terms/ benefits. This risk potentially applies to recruitment agencies with unscrupulous recruitment procedures. Discriminatory recruitment practices may deny suitably qualified job candidates equitable access to employment on the basis of bribery, nepotism, sexual harassment, and/or biased consideration on the basis of personal attributes of no bearing on inherent job requirements (e.g., gender, religion, ethnicity etc.).

Likewise, exploitative recruitment practices may deny job candidates and recruits equitable employment benefits or legal entitlements (e.g., remuneration, overtime compensation, health insurance professional development, leave entitlements, freedom of association etc.). In addition, workers may be recruited without the establishment of transparent, comprehensive, and mutually accessible employment contracts to document mutual obligations (i.e., job requirements, length of employment, related legal entitlements) and ensure satisfactory performance and sound employee-management relationships.

15.4.2.2 Occupational health and safety incidents

O&M workers are subject to a wide range of occupational physical, chemical, and biological hazards which potentiate injury, sickness, and fatalities. Key construction-phase hazards within the project sites and transit corridors include (but are not limited to):

- Work at height (i.e., for sub-station and LILO maintenance)
- Lifting and manual handling of heavy objects
- Moving vehicles

- Fire and explosion
- Electrocution
- Heat stress
- Exposure to hazardous materials (i.e., via inhalation, skin contact)

The lack of H&S risk assessment to eliminate critical hazards, comprehensive H&S training oriented to general and specific areas of work, provision of Personal Protective Equipment (PPE), H&S monitoring for direct and contracted workers, emergency response plans and other crucial safeguards may result in H&S accidents, which may culminate in severe injury, sickness, and fatalities.

15.4.2.3 Forced labour

The use of independent recruitment agencies to facilitate the employment and management of contracted workers (under the O&M Contractor and any sub-contractors) poses the risk of unscrupulous and exploitative recruitment and management practices.

As elaborate in Section 15.4.1.4, the Project's reliance on a Chinese-based solar panel supply chain poses a notable risk of forced labour within its upstream supply chain, for the procurement of spare PV modules for operational maintenance.

15.4.2.4 Child labour

As described in the sub-sections above, the engagement of in-country recruitment agencies for contracted and sub-contracted O&M workers presents the potential of unscrupulous and exploitative recruitment practices, which may involve minors below the age of 18 and unlawful employment arrangements for minor recruits.

At the Project's operational stage, the risk of child labour is largely associated with the Project's foreign supply-chain workforce, particularly the upstream nexus for Tier 4 PV module suppliers. The elevated risk of forced labour in this connection presents a commensurate likelihood for the worst forms of child labour, including debt bondage, slavery, trafficking and other modes of forced labour.

15.4.2.5 Workplace harassment, violence and other security incidents involving project workers

Project workers, particularly contracted workers are subject to a range of human rights violations, in the form of workplace intimidation, harassment and assault. Female workers are further at risk of sexual violence, harassment and exploitation in the workplace. Acts of workplace aggression and other hostile transgressions representing the violation of human rights can be perpetrated by co-workers, particularly those in superior positions. Sexual exploitation and abuse are also typically involve female workers in subservient roles,

particularly migrant workers who have lesser support systems and awareness of in-country legal recourse.

Further, the criminal and abusive acts towards project workers can also be inflicted by third-party perpetrators. Attacks on project workers can occur in the event of theft, robbery and rape crimes. Personal violence and hate crimes involving project workers can also occur in the unlikely event of community protests.

Table 15-5 Overview of potential impacts relating to labour and working conditions during operations

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-management Impact Significance	Residual Impact Significance
Unequal access to employment opportunities and benefits due to discriminatory and/or exploitative recruitment practices	Host communities in Yukorichirchik and Parknt Districts, Tashkent Region, wider Uzbekistan, and foreign labour markets	Moderate	Job candidates	High	**Moderate/ Major**	**Minor**
Occupational health and safety incidents	Project sites and off-site accommodation facilities	Major	Direct and contracted workers	High	**Major**	**Minor/ Moderate**
Forced labour	Uzbekistan and China	Major	Direct and contracted workers	High	**Major**	**Minor/ Moderate**
			Supply chain workers	High	**Major**	**Minor/ Moderate**
Child labour	Uzbekistan and China	Major	Direct and contracted workers	High	**Major**	**Minor/ Moderate**
			Supply chain workers	High	**Major**	**Minor/ Moderate**
Workplace harassment, violence and other security incidents involving project workers	Project sites	Major	Direct and contracted workers	High	**Major**	**Minor/ Moderate**

Impact avoidance, mitigation and offset measures

<u>Unequal access to employment opportunities and benefits due to discriminatory and/or exploitative recruitment practices</u>

- A Human Resources (HR) Policy will be instituted for the project. The policy will highlight a commitment to equal-opportunity recruitment and fair employment terms, in addition to promoting gender equality and local content in this respect.
- The Project's HR Policy will be contractually cascaded from the Project Company down to the O&M Contractor, and any f recruitment agencies,

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
to ensure that the policy provisions are applied to all contracted workers. • Induction trainings for all direct and contracted construction workers will include familiarization with the Project's HR Policy, the workers' legal rights and the Grievance Redress Mechanism (GRM) for project workers. • The recruitment of all project workers will involve equal-opportunity eligibility criteria based around inherent job requirements (e.g., educational attainment, professional experience, fitness for work etc.). The recruitment process will be free of discrimination on the grounds of gender, ethnicity, religion, income status and other attributes of no bearing on inherent job requirements. • Employment for the Project's direct and contracted labour as well as the procurement of services from supply chains will be implemented at the community, district, regional and national levels, in order of decreasing priority. • Employment terms and benefits with all direct and contracted workers will be stipulated in form of bilateral employment contracts, which will be documented in Uzbek, Russian, and English, as appropriate. • Bilateral employment contracts for all direct and contracted workers will expressly state the workers' legal rights and entitlements, which are to include (but not be limited to) the duration of employment, workstation(s), working hours, description of duties or general responsibilities, remuneration and overtime compensation, health insurance, leave and pension entitlements, as well as the notice period for termination of the contract agreement. • Bilateral employment contracts for all direct and contracted workers will not infringe the workers' legal rights to collective bargaining through registered trade unions, and any negotiated agreements with relevant trade unions will be incorporated into the employment contracts of all affected workers. • Remuneration packages for direct and contracted workers will be provided on a fair and equitable basis, taking into account legally established minimum wage, benchmarks for similar jobs within the relevant sector and project location, the cost of living, provisions for health insurance and other fringe benefits, as well as level of experience. • Any changes to employment contract agreements for direct and contracted workers will be discussed and mutually agreed upon, prior to the contract changes being officially documented and effected. • The promulgation of employment opportunities within project-affected communities, districts and the wider region will be undertaken by means of (i) newspaper advertisements, (ii) public announcements by relevant LGAs, (iii) posts at vocational training institutions, (iv) posts at project site entry points, and (v) local community engagements by dedicated CLOs. • Suitably qualified service providers based within the project-affected communities, districts, Tashkent Region and wider national markets (in order of decreasing priority) will be identified, evaluated and listed in an internal procurement database. Procurement of O&M goods and services will provide priority consideration for local service providers. • All project employees and contracted workers will have equitable access to relevant on-the-job trainings, which will enable the dissemination of specialist and transferable skills within the Project's construction phase. • Career development programs such as internships, mentorships and professional development plans will be provided for various tiers and sections						

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of project employees and contracted workers, particularly skilled workers paired with expatriate experts not readily available in Uzbekistan.. • The gender profile of the Project's direct and contracted workforce will be reviewed on a regular basis, with a view to ensuring a sufficient representation of women within construction labour to the extent feasible. • A dedicated Local Content Plan, Retrenchment Plan, and Sub-Contractor and Supplier Management Plan will be developed and implemented. • A worker GRM will be instituted for the Project and disclosed to the Project's direct and contracted workers to enable the collection of workplace grievances on platforms that are accessible to the workers and free of manipulation, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. **<u>Occupational health and safety incidents</u>** • A Health Safety Security and Environmental (HSSE) Policy will be instituted for the project. The policy will highlight a commitment to preventive and protective measures to safeguard the health, safety and security of the Project's O&M workforce. • The Project's HSSE Policy will be contractually cascaded from the Project Company down to the O&M Contractor and any sub-contractors, to ensure that the policy provisions are applied to all contracted workers. • Construction workers will be provided with a safe and healthy work environment, taking into account inherent risks and specific classes of hazards associated with the project. • An operations-phase Occupational Health and Safety (OHS) management system taking into account specific risks associated with the project, legal requirements and duty of care will be developed and implemented. • Safeguard measures to ensure the health and safety of direct and contracted workers will include default efforts to eliminate workplace hazards that pose the risk significant Health and Safety (H&S) incidents (i.e., serious injury, chronic occupational disease and/or fatalities). • Where complete elimination of major workplace hazards is not feasible, subsequent consideration will be given to substituting high-risk facilities with safer technology or modifying the working environment and processes to lessen the hazards. • Provision of ladders, scaffolding, railing, and fall arrest equipment such as full-body harness (where necessary), as well as demarcation, timely covering and backfilling of fall hazard zones, will be implemented to prevent and mitigate against falls from a heights. • Measures for ensuring sufficient ventilation in areas with evaporative, fugitive, aerosol and exhaust emissions will be implemented. • Preventative and mitigating measures for the handling, storage and transportation of hazardous (i.e., toxic, flammable or explosive) materials will be implemented as part of relevant Standard Operating Procedures (SOPs), based on continual hazard assessment. • Material Safety Data Sheets (MSDSs) for any hazardous materials that will be stored, handled and transferred within the project sites will be communicated to relevant workers in a clear and understandable manner, as part of targeted trainings and SOPs. Copies of the MSDSs will also be made readily accessible in any on-site HAZMAT storage facilities, with efforts to ensure that precautionary signage and descriptions are provided in Uzbek, Russian, Chinese and English.						

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• Fire detection and suppression systems as well as the establishment of emergency exits, assembly points and emergency medical response, will be implemented. • Periodic fire emergency response and spill emergency drills will be organized to ensure sufficient preparedness for incidents of fire outbreak and chemical/ waste spills (these will involve Uzsuvtaminot designated staff). • Sufficient and specialized Personal Protection Equipment (PPE) including (but not limited to) safety boots, helmets, ear plugs/ mufflers, eye protection, overalls and gloves will be provided for O&M workers engaged in various risk-presenting activities, in conjunction with regular training on the proper use of the PPE. • Recruitment of project vehicle drivers and industrial/ heavy goods vehicles in particular will involve qualification criteria such as driving license status, adequate experience, familiarity with traffic H&S safety, visual tests and professional references. • All energized facilities and system components will be labelled accordingly to indicate the hazard of electrocution. • High-voltage equipment will be placed on hard-standings above ground level and housed with access controls and clear warning signage. • Routine maintenance checks will be carried out to ensure the integrity and insulation of power system components and electrical equipment. • Electrical systems, equipment and metallic enclosures for heavy electrical machinery will be grounded accordingly. • All workplace H&S incidents (i.e., accidents and near-misses) will be reported and documented for expert investigation and root-cause analysis, and subsequent remedial action to prevent re-occurrence. • Adequate and conveniently located sanitation and welfare facilities, including toilets, ablution, drenching, handwashing, and sanitizing facilities will be provided within the project sites. • An adequate number of waste bins will be placed for the collection of non-hazardous construction waste to minimize littering. • Dedicated bins will be placed around any on-site kitchen and office facilities to enable the collection and temporary storage of putrescible waste. On-site bins and skips dedicated to this waste stream will be covered and regularly emptied/ replaced to prevent the pest infestation. • The O&M Contractor's Health and Safety (H&S) team will include specially trained first aid providers and fire emergency responders. • Regular H&S monitoring will be carried out by relevant H&S staff underneath the Project Company and O&M Contractor. This line of monitoring will include (i) inspections to ensure the implementation of H&S safeguards in work procedures/ activities, and (ii) maintenance inspections and testing to ensure the structural integrity, mechanical integrity and overall operability of construction equipment and engineering controls for prevention of on-site and off-site H&S accidents. • Induction trainings for all direct and contracted O&M workers will include familiarization with a safety-oriented workplace culture, construction workplace H&S hazards and safeguards, essential PPE, hygienic requirements, emergency preparedness and response, H&S incident reporting requirements, as well as various obligations and prohibitions related to the prevention of significant H&S incidents. • Periodic refresher trainings and daily tool-box talks will be provided updated or reiterated information on (i) general workplace H&S hazards and safeguards, and (ii) targeted H&S instruction for specific O&M activities.						

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• Induction trainings for all direct and contracted construction workers will cover hygiene, housekeeping and sanitation, the waste management hierarchy, operational waste streams, relevant categories of hazardous materials and waste, the impacts of hazardous materials and waste on human health and ecosystems, as well as requirements and safeguards for the handling, storage and transposition of various hazardous and non-hazardous construction materials and waste streams. • Operations-phase Occupational Health and Safety Plan and Emergency Preparedness and Response Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented. • A worker GRM will be instituted for the Project and disclosed to the Project's direct and contracted workers to enable the collection of workplace grievances on platforms that are accessible to the workers and free of manipulation, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. **Forced labour** • A Human Resources (HR) Policy and Supplier Code of Conduct will be instituted for the project. The policy will highlight zero tolerance for any forms of forced labour within the Project's direct, contracted and primary supply-chain workforce. • The Project's HR Policy and Supplier Code of Conduct will be contractually cascaded from the Project Company down to the O&M Contractor, sub-contractors, suppliers and any contracted recruitment agencies, to ensure that the policy provisions are applied to the to all workers associated with the Project's core business processes during operations. • The recruitment of all project workers will involve equal-opportunity eligibility criteria based around inherent job requirements (e.g., educational attainment, professional experience, fitness for work etc.), with priority consideration for Uzbekistan nationals. The recruitment process will be free of discrimination on the grounds of gender, ethnicity, religion, income status and other attributes of no bearing on inherent job requirements. • Employment terms and benefits with all direct and contracted workers will be stipulated in form of bilateral employment contracts, which will be documented in Uzbek, Russian, and English, as appropriate. • Bilateral employment contracts for all direct and contracted workers will expressly state the workers' legal rights and entitlements, which are to include (but not be limited to) the duration of employment, workstation(s), working hours, description of duties or general responsibilities, remuneration and overtime compensation, legally mandated health insurance, leave and pension entitlements, as well as the notice period for termination of the contract agreement. • Bilateral employment contracts for all direct and contracted workers will not infringe the workers' legal rights to collective bargaining through registered trade unions, and any negotiated agreements with relevant trade unions will be incorporated into the employment contracts of all affected workers. • Remuneration packages for direct and contracted workers will be provided on a fair and equitable basis, taking into account legally established minimum wage, benchmarks for similar jobs within the relevant sector and project location, the cost of living, provisions for health insurance and other fringe benefits, as well as level of experience.						

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• Any changes to employment contract agreements for direct and contracted workers will be discussed and mutually agreed upon, prior to the contract changes being officially documented and effected. • Induction trainings for all direct and contracted O&M workers will include familiarization with the Project's HR Policy, the workers' legal rights and the Grievance Redress Mechanism (GRM) for project workers. • The procurement process for the Project's O&M Contractor contractual stipulations for initiatory and annual supply chain due diligence for the full term of the EPC contract. Supply chain due diligence efforts will include (i) supply chain mapping and high-level labour risk screening, (ii) Self-Assessment (SA) audits, (iii) traceability audits for sourcing contracts for specific Bills of Materials (BoMs), and ad-hoc on-site audits for high-risk supply chain businesses. • The O&M Contractor will develop and implement a Corrective Action Plan (CAP) for any verified incidents of non-compliance with the Project's policy requirements and standards for forced labour, such that relevant performance gaps are remediated within the remedial timeframe specified in the CAP. • Operations-Phase Sub-Contractor and Supplier Management Plan, Supply Chain Management Plan (or Responsible Sourcing Procedure, as appropriate) including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented. • A worker GRM will be instituted for the Project and disclosed to the Project's direct and contracted workers to enable the collection of workplace grievances on platforms that are accessible to the workers and free of manipulation, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. **Child labour** • A Human Resources (HR) Policy and Supplier Code of Conduct will be instituted for the project. The policy will highlight labour restrictions for workers under the age of 18 and prohibition of labour for workers under the age of 16 within the Project's direct, contracted, and primary supply-chain workforce. • The Project's HR Policy and Supplier Code of Conduct will be contractually cascaded from the Project Company down to the O&M Contractor, sub-contractors, suppliers and any contracted recruitment agencies, to ensure that the policy provisions are applied to the to all workers associated with the Project's core business processes during operations. • The recruitment process for the Project's direct and contracted workers will involve the screening of official personal identification documents (i.e., national ID, passport etc.) for the purposes of age verification. • Induction trainings for all direct and contracted O&M workers will include familiarization with the Project's HR Policy, the workers' legal rights and the Grievance Redress Mechanism (GRM) for project workers. • The procurement process for the Project's O&M Contractor contractual stipulations for initiatory and annual supply chain due diligence for the full term of the EPC contract. Supply chain due diligence efforts will include (i) supply chain mapping and high-level labour risk screening, (ii) Self-						

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Assessment Questionnaire (SAQ) audits, and ad-hoc on-site audits for high-risk supply chain businesses. • The O&M Contractor will develop and implement a Corrective Action Plan (CAP) for any verified incidents of non-compliance with the Project's policy requirements and standards for child labour, such that relevant performance gaps are remediated within the remedial timeframe specified in the CAP. • Operations-phase Sub-Contractor and Supplier Management Plan, Supply Chain Management Plan (or Responsible Sourcing Procedure, as appropriate) including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented. • A worker GRM will be instituted for the Project and disclosed to the Project's direct and contracted workers to enable the collection of workplace grievances on platforms that are accessible to the workers and free of manipulation, intimidation, service charges and restrictions on arbitration, judicial recourse and choice of confidentiality. **<u>Workplace harassment, violence and other security incidents involving project workers</u>** • Public access to the project sites will be restricted using procedural and engineering controls including site fencing, issuance of administrative identification documents to all direct and contracted O&M workers, security checks at entry gates, as well as electronic access control systems and video surveillance for any high-risk and/or high-value facilities within project sites. • Professional security personnel will be hired to undertake on-site security monitoring including CCTV surveillance, site entry checks, and patrols for high-risk and/or high-value facilities within the project sites. • The recruitment of the project's security personnel will involve a vetting or screening procedure to ensure that candidates under consideration have no record of implication in unlawful use of force and other forms of human rights violations (including gender-based violence). • Reasonable efforts will be made to sensitize dedicated site security management teams to the standards set out in the National Guard to the UN Code of Conduct for Law Enforcement Officials and Voluntary Principles on Security and Human Rights (i.e., exceptional conditions for the application of force as a last resort, in a manner that is (i) cautious, (ii) proportionate to the extent of a given threat to project workers and assets and (iii) compliant with national laws on the use of lethal force). • The O&M Contractor's security department will regularly engage with the local police force and relevant Local Government Authority (LGA) units to obtain information on the incidence of crime within local communities based around the project sites and the wider host districts and develop the Project's security arrangements. • Emergency medical response and ambulatory hospital transfers will be provided for any injuries and casualties resulting from security incidents. • Local law enforcement authorities will be notified immediately, upon the occurrence of security incidents, to enable authoritative response, official investigation, apprehension, and prosecution. • Operations-phase Occupational Health and Safety Plan and Emergency Preparedness and Response Plan including (but not limited to) provisions for the avoidance and mitigation measures listed above will be developed and implemented, in coordination with relevant LGA departments						

E&S Impact	Area of Influence	Impact Magnitude	Potential Receptors (direct and indirect receptors)	Receptor Sensitivity	Pre-Management Impact Significance	Residual Impact Significance
and the local police force. **<u>Gender Risk – Gender Based Violence and Harassment</u>** • O&M workers will be provided with information regarding worker code of conduct in local languages as part of their employment contracts which will include provisions for reporting, investigation, disciplinary and legal action against those who perpetrate gender violence and harassment. • The O&M Contractor will implement the Project specific GBVH Policy. This policy will align with the Project Company's GBVH policy and define unacceptable behaviour among workers, provisions for reporting, sanctions for perpetrators and available resources & support systems for the victims in accordance with lenders and Uzbek requirements including the Project Company's Environmental & Social Management System Implementation Manual. • The O&M Contractor will conduct mandatory regular training and awareness raising for the workforce about gender-based violence and harassment towards local community members and their colleagues especially women and the availability of a grievance mechanism to report any GBVH/SEA/SH cases. • The workers will be made aware of the laws and regulations that make sexual harassment and gender-based violence a punishable offence which is prosecuted. • The O&M Contractor will work in close coordination with the local authorities in investigating any complaints relating to gender violence and harassment in the host communities where it relates to Project workers.						

15.4.3 Decommissioning phase

Project decommissioning will entail the deconstruction of project facilities, demobilization of related equipment and materials, as well as potential repurposing and/or rehabilitation works. At this stage, potential impacts relating to labour and working conditions will be similar to the above-described construction-phase impacts. Specifically, this set of impacts potentially includes:

- Unequal access to employment opportunities and benefits due to discriminatory and/or exploitative recruitment practices
- Occupational health and safety incidents
- Forced labour
- Child labour
- Workplace harassment, violence and other security incidents involving project workers

For the avoidance and mitigation of these impacts, relevant impact management measures specified in Section 15.4.1 will be implemented. Accordingly, the same pre-management and residual significance ratings are provisionally assigned to mutually relevant impacts on sensitive receptors.

15.5 Monitoring requirements

Table 15-6 below provides an overview of the key monitoring arrangements for evaluating performance against applicable standards relating to labour and working conditions in the Project's construction and operational phases. A more elaborate and comprehensive coverage of these requirements will be provided in the Construction- and Operations-phase Environmental and Social Management Plans (C-ESMP, O-ESMP) and Environmental and Social Monitoring Plans (ESMoPs).

Table 15-6 Monitoring arrangements for impacts and preventative and mitigation measures relating to labour and working conditions

E&S Impact	Key Performance Indicator/ Parameter	Target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
Construction phase					
Lacking access to employment opportunities and benefits due to discriminatory and repressive recruitment practices	Project-specific Human Resource Policies with equal-opportunity employment commitments and fair working conditions	- Project-specific Human Rights Policies with equal-opportunity employment commitments and fair working conditions are in place for the Project Company, the EPC Contractor and all primary sub-contractors	- Labour audits log	Upon onboarding of construction-related contractors, sub-contractors and suppliers	- Project Company HR Manager - EPC Contractor HR Manager
	Employment contracts	- Employment contracts in place for all direct and contracted workers, in appropriate languages	- Labour audits log	Quarterly	- Project Company HR Manager - EPC Contractor HR Manager
	Recruitment of local workers and retention of local workers	- Women account for at least 5% of the project labour	- Workforce profile	Quarterly	- Project Company HR Manager - EPC Contractor HR Manager
	Recruitment of local workers and retention of women	- Locals account for at least 20% of the project labour	- Workforce profile	Quarterly	- Project Company HR Manager - EPC Contractor HR Manager
Poor working and living conditions	Non-conformances (NCRs) related to inadequate labour accommodation and	- 100% of non-conformances are closed out in the shortest	- Labour audits log	Quarterly	- Project Company HR Manager - EPC Contractor HR

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
	welfare facilities	practicable duration			Officer, H&S Officer
	Grievances concerning poor working and living conditions	- All related grievances are closed out within the shortest practicable duration	- Worker Grievance Log	Ongoing	- EPC Contractor HR Officer
Occupational health and safety incidents	Number of significant H&S accidents involving project workers	- Zero significant H&S accidents involving project workers	- H&S Accidents Log	Ongoing	- EPC Contractor H&S Officer
	Percentage of H&S accidents involving project workers investigated and addressed through remedial and preventative actions within the shortest practicable duration	- 100% of accidents involving project workers have been investigated and addressed through remedial and preventative actions, within the shortest practicable duration	- H&S Accidents Log	Upon occurrence of accidents	- EPC Contractor H&S Officer
Forced labour	Project-specific Human Resource Policy and Human Rights Policy with prohibition of all forms of forced labour	- Project-specific Human Resource Policy and Human Rights Policy with prohibition of all forms of forced labour are in place for the Project Company, the EPC Contractor and all primary sub-contractors	- Labour audit log	- Upon onboarding of construction-related contractors, sub-contractors and suppliers. - Upon change in Sourcing Contract (supply chain).	- Project Company E&S Manager - Project Company HR Manager - Project Company Procurement Manager - EPC Contractor E&S Manager - EPC Contractor HR Manager - EPC Contractor

E&S Impact	Key Performance Indicator/ Parameter	Target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
					Procurement Manager
	Percentage of labour audits completed in line with the schedules specified in the Sub-Contractor and Supplier Management Plan and Supply Chain Management Plan	- 100% of labour audits have been completed in line with the schedules specified in the Sub-Contractor and Supplier Management Plan and Supply Chain Management Plan	- Bill of Materials for solar panels - Traceability Audit Report - Labour Audit Reports	Upon onboarding of construction-related contractors, sub-contractors and suppliers; Annually thereafter	- Project Company E&S Manager - Project Company HR Manager - Project Company Procurement Manager - EPC Contractor E&S Manager - EPC Contractor HR Manager - EPC Contractor Procurement Manager
Child labour	Project-specific Human Resource Policy and Human Rights Policy with prohibition of illicit child labour	- Project-specific Human Resource Policy and Human Rights Policy with prohibition of illicit child labour are in place for the Project Company, the EPC Contractor and all primary sub-contractors	- Labour audit log	Upon onboarding of construction-related contractors, sub-contractors and suppliers	- Project Company E&S Manager - Project Company HR Manager - Project Company Procurement Manager - EPC Contractor E&S Manager - EPC Contractor HR Manager - EPC Contractor Procurement

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
					Manager
	Percentage of labour audits completed in line with the schedules specified in the Sub-Contractor and Supplier Management Plan and Supply Chain Management Plan	- 100% of labour audits have been completed in line with the schedules specified in the Sub-Contractor and Supplier Management Plan and Supply Chain Management Plan	- Traceability Audit Report - Labour Audit Reports	Upon onboarding of construction-related contractors, sub-contractors and suppliers; Annually thereafter	- Project Company HR Manager - Project Company Procurement Manager - EPC Contractor HR Manager - EPC Contractor Procurement Manager
Workplace harassment, violence and other security incidents involving project workers	Project-specific Human Rights Policy with a commitment to the protection of human rights and Code of Conduct	- Project-specific Human Rights Policy with a commitment to the protection of human rights, and a Code of Conduct, are in place for the Project Company, the EPC Contractor and all primary sub-contractors	- Labour audit log	Upon onboarding of construction-related contractors, sub-contractors and suppliers	- Project Company HR Manager - EPC Contractor HR Manager
	Grievances concerning workplace harassment, violence and other security incidents (from contracted workers)	- All related grievances are closed out within the shortest practicable duration	- Worker Grievance Log	Ongoing	- Project Company HR Manager - Manager - EPC Contractor E&S Manager - EPC Contractor HR Manager - EPC Contractor Security Manager/ Chief Security

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
					Officer
Operational phase					
Lacking access to employment opportunities and benefits due to discriminatory and repressive recruitment practices	Employment contracts	- Employment contracts in place for all direct and contracted workers, in appropriate languages	- Labour audits	- Annually	- Project Company HR Manager - Project Company Procurement Manager - O&M Contractor HR Manager - O&M Contractor Procurement Manager
Occupational health and safety incidents	Percentage of O&M workers who have received induction trainings in construction-related hazards, related safeguards, emergency response procedures, and reporting of health and safety incidents	- 100% of O&M workers have received induction trainings in construction-related hazards, related safeguards, emergency response procedures, and reporting of health and safety incidents	- HSSE Training Report	- Weekly	- O&M Contractor HSSE Trainer
Forced labour	Project-specific Human Resources Policy and Human Rights Policy with prohibition of all forms of forced labour	- Project-specific Human Resources Policy and Human Rights Policy with prohibition of all forms of forced labour are in place for the Project Company, the O&M Contractor and all primary sub-contractors,	- Labour Audit - O&M Contractor/Supplier Sourcing Contract	- Upon onboarding of O&M Contractor, sub-contractors and suppliers	- Project Company E&S Manager - Project Company HR Manager - Project Company Procurement Manager

E&S Impact	Key Performance Indicator/ Parameter	target	Monitoring Location / Means of Verification	Monitoring Frequency	Responsible Entity
		alongside the Project's Code of Conduct			- O&M Contractor E&S Manager - O&M Contractor HR Manager - O&M Contractor Procurement Manager

16 CLIMATE CHANGE RISK ASSESSMENT

16.1 Legal Requirements and Standards

16.1.1 National laws and regulations

The ratification of the Paris Climate Agreement committed Uzbekistan to transitioning to a green economy, and adoption of the following normative documents:

- Decree of the President of the Republic of Uzbekistan. № PD-4477, dated October 4, 2019 "On approval of the Strategy on transition of the Republic of Uzbekistan to the "green" economy for the period 2019-2030".,
- Decree of the President of the Republic of Uzbekistan, № PD-5863, dated October 30, 2019, "On approval of the Concept of environmental protection of the Republic of Uzbekistan until 2030".

Priority areas of "The Strategy on transition of the Republic of Uzbekistan to the "green" economy for the period 2019-2030" regarding to the electricity producing industry are:

- Reconstruction and modernization of generating capacities of existing power plants with implementation of highly efficient technologies based on combined cycle gas and gas turbine units.
- Improvement of configurations and modernization of main power networks to increase the stability of the power system.
- Implementation of organizational and technical measures, including optimization of modes.
- Increasing the level of automatization of technological processes; and
- Full equipment of power consumption systems with automatic control and metering devices.

16.1.2 Lender requirements

16.1.2.1 EBRD

The EBRD PR1 requires the E&S appraisal of Projects to consider potential transboundary and global issues, such as impacts from effluents and emissions, increased use or contamination of international waterways, greenhouse gas emissions, climate change mitigation and adaptation issues, and impacts on endangered species and habitats. With regard to 'Greenhouse Gases', the standards require consideration of alternatives and for Project's to implement, 'technically and financially feasible and cost-effective options to reduce project-related GHG emissions during the design and operation of the project.'

16.1.2.2 EPFIs

The Equator Principles (EPIV) require ESIA studies for Category A projects to include a Climate Change Impact Assessment (CCIA), which includes an assessment of Scope 1, 2 and 3 emissions as well as physical and transition climate risks as appropriate.

16.2 Historical climate trends and climate-related natural disasters

16.2.1 Temperature and precipitation

The climate of Uzbekistan is widely described as arid and continental, with large variations in temperature within days and between seasons. Most of the country (79% by area) features flat topography in the form of semi-desert steppes and desert zones, including desert areas in the far west that have formed due to the shrinking of the Aral Sea. The country's south-eastern reaches harbour the high mountains forming part of the Tien-Shan and Gissar-Alai Ranges and exhibit a continental climate. Uzbekistan experiences long, hot and dry summers with an average temperature of 26.1°C, along with cold winters with lowest temperatures averaging 0.91°C. Recent climatology indicates that overall temperature is highest in the country's south and lowest in the west. The spatial variation in annual precipitation levels varies considerably, with western parts of the country receiving less than 100 mm of yearly precipitation, and eastern reaches receiving 800–900 mm. The figures below illustrate the spatial variation in Uzbekistan's mean annual temperature and precipitation levels.

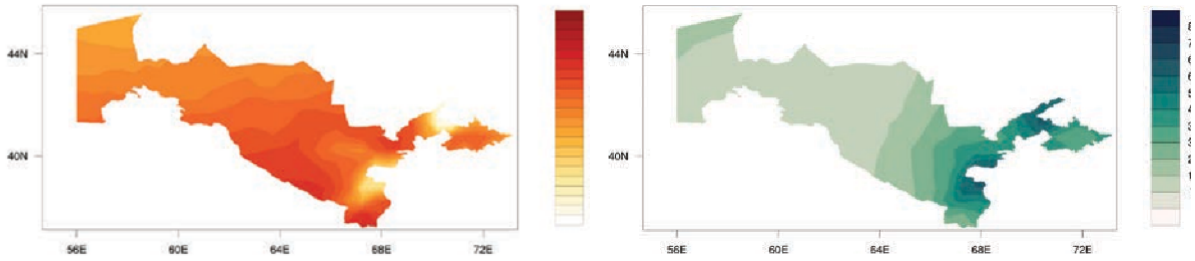


Figure 16-1 Visual representation of spatial variation in mean temperature and

Meteorological analyses have demonstrated a link between changes in the global climate system and the increased frequency and severity of climate-related disasters, such as droughts, floods, tropical storms and wild fires. These disasters have had a particularly severe impact on countries with both climatic and socioeconomic vulnerability. According to a risk index analysis published by INFORM for 2022, Uzbekistan currently holds a low risk score, and its humanitarian risk trend for the past three years has remained stable. The risk index report also indicates that drought and floods represent the country's main humanitarian risks.

Mean annual air temperatures have risen steadily and significantly in Uzbekistan over the past few decades, with varying rates of increase. Between 1990 and 2020, the country's mean annual temperature grew at a rate of 0.03°C per decade. Warming rates also differ geographically, with sharpest increases concentrated in the north and less warming in the southern highlands. Recent studies suggest that the changes in Uzbekistan's temperature are partly attributable to the drought of the Aral Sea (Asian Development Bank, 2021).

The most recent climatological analyses indicate that long-term changes in Uzbekistan's precipitation levels have not been statistically significant. The period 1990 to 2020, has seen an overall reduction in precipitation at a rate of 1.22 mm per decade. This general trend is nonetheless insignificant, with the greatest increases in precipitation recorded for the months of February, March and April, and sharpest declines recorded for the months of December, January and March. Climatological research focused on Uzbekistan and the wider central Europe asserts that the El Niño Southern Oscillation (ENSO) has exerted a substantial influence over multi-year dry and wet climate variability in the region.

16.2.2 Heat Waves

A heat wave event can be defined as three or more days where the daily temperature exceeds the long-term 95th percentile of daily mean temperature. The frequency and severity of heat waves in Uzbekistan has increased in recent years, with the largest temperature rise observed in the north-western areas surrounding the Aral Sea and the lower Amu Darya. According to temperature records provided in the hydrometeorological report by Juru Energy, the average annual air temperature in Uzbekistan in the period 1991 to 2021 is 15.8°C, where are the absolute maximum temperature recorded in the same period is 44.6°C. At the time of the assessment, official information on the frequency of heat waves in Uzbekistan was not publicly available at the time of. This assessment.

16.2.3 Drought

The climate of Uzbekistan is increasingly characterized by arid climate and regular high temperatures that cyclically culminate in droughts with return periods of three to five years. Droughts in the country are classified as:

- Hydrological drought (water shortages from January to March due to low precipitation in the upper watershed of key rivers);
- Meteorological drought (usually associated with a precipitation deficit, and typically occurring in spring or summer), and;
- Agricultural drought (a lack of moisture in the soil that inhibits crop growth).

Over the past two decades, hydrological droughts have dominated the western reaches of Uzbekistan, whereas meteorological droughts have been most frequent in the country's central and southern provinces. A review of recent literature and information gathered from local communities during ESIA-oriented consultations and socioeconomic surveys indicates that there have not been any major dry spells or extended periods of drought in Yukorichirchik and Parkent districts. High-level statistics from the World Bank Climate Change Knowledge Portal[19] nonetheless indicates that for the period 1980-2020, drought accounted for 10% of the average annual natural hazard occurrence in Uzbekistan.

16.2.4 Floods

Certain areas within Uzbekistan remain vulnerable to river flooding and flash flooding. Flash flooding and mudflows are most prevalent in the southern and eastern parts of the country, with 3,300 incidents recorded between 1900 and 2013. Such floods typically follow heavy precipitation and melting snow between the months of March and July. The most severe inundation events reported over the past three decades include the floods of Aksu and Shahimardan Rivers, Syrdarya River, which took place in 1998 and 2020. In April of 2022, extreme rainfall events led to destructive flash floods in Samarkand and Jizzakh regions, and in the provinces of Mangystau, West Kazakhstan, Aktobe, Akmola, Karaganda and Pavlodar. Altogether, the floods have caused the displacement of thousands of people, destroyed housing, farms and transport infrastructure, and led to landslides, the worst of which hit residential areas of the city of Tekeli. Uzbekistan's Ministry of Emergency Situations described the floods as being the most intense of those witnessed over the last 80 years.

Publicly available information reviewed at the time of the assessment does not provide the frequency of flooding in Tashkent Region. The review generally indicates the occurrence of flash floods and mudflows is particularly frequent in the nearby Jizzakh Region. According to an official news outlet in Kyrgystan[20], a major flash flood event took place in Tashkent City on 2 April 2023. The flood inundated parts of the city and overwhelmed resident sewerage networks. About 500 first respondents from the Ministry of Emergency and Tashkent Regional Department for Public Utility Systems were mobilized for emergency flood control and search and rescue operations, in connection with this flood.

[19] World Bank Climate Change Knowledge Portal for Development Practitioners and Policy Makers. Risk/ Historical Hazards, Uzbekistan, Viewed on 15 September at https://climateknowledgeportal.worldbank.org/country/uzbekistan/vulnerability

[20] Kabar: Kyrgyz National News Agency. 2023. Two hours rain causes massive flooding of streets in Tashkent. Viewed on 15 September at http://en.kabar.kg/news/two-hours-rain-causes-massive-flooding-of-streets-in-tashkent/

16.3 Projection of temperature and precipitation trends

To understand possible temperature and precipitation extremes within the Project's operational phase, in the high-emissions scenario, climatological projections were performed for the period 2040-2059. Up-to-date Global Climate Models (GCM) for an integrated projection analysis were be sourced from the Coupled Model Inter-Comparison Project Phase 6 (CIMP6) Multi-Model Ensemble (MME). The analysis was be premised on the Shared Socioeconomic Pathway (SSP) 5 (Fossil Fuel Development), paired with the Representative Concentration Pathway (RCP) 8.5. This assumption is opted on account of the following:

- The high-emissions scenario is applied in keeping with the precautionary principle, to enable provisions for a plausible worst-case outcome.
- Greenhouse gas concentrations in the high-emissions scenario are the most consistent with the total cumulative GHG emissions between 2005 and 2020, and the SSP 5-8.5 is therefore regarded as particularly useful for near-term planning (up to 2050s).

Projections for Tashkent Region were made for a select two parameters of concern, namely:

- Average Maximum Surface Air Temperature
- Largest 1-day cumulative precipitation

The period 2040-2059 was used for the purposes of climate projection, considering the Project's operational timeframe, and the temporal progression of adverse climatic changes.

16.3.1 Temperature Mean Projections

Temperature projections for gauging the significance of related climatic impacts were performed using the MME available on the World Bank Climate Change Knowledge Portal. The model output for average maximum surface air temperature is presented in the chart below.

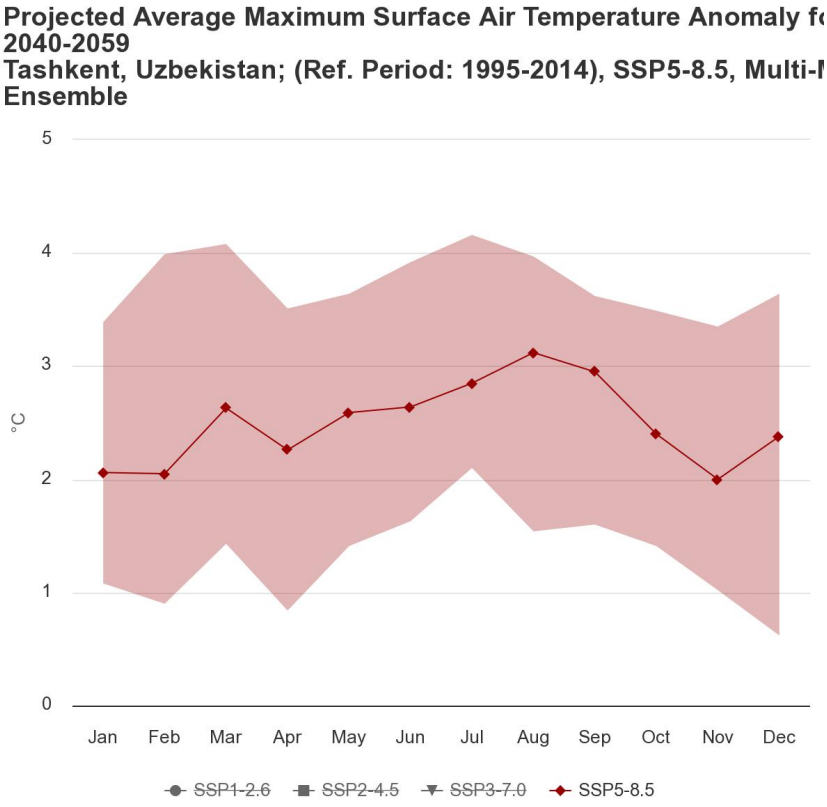


Figure 16-2 Range of projected anomalies for average maximum surface air temperature in Tashkent, for the period 2040-2059

As shown in Figure 16-2, the projected rise in average maximum temperature appears to culminate in the months of March and July, at which time maximum temperatures are likely to increase by up to 4°C, on average. This magnitude of increase would elevate average maximum temperature in the region to 32.6 °C.

16.3.2 Precipitation Mean Projections

Precipitation projections for gauging the significance of related climatic impacts were performed using the MME available on the World Bank Climate Change Knowledge Portal. The model output for average largest 5-day cumulative precipitation is presented in the chart below.

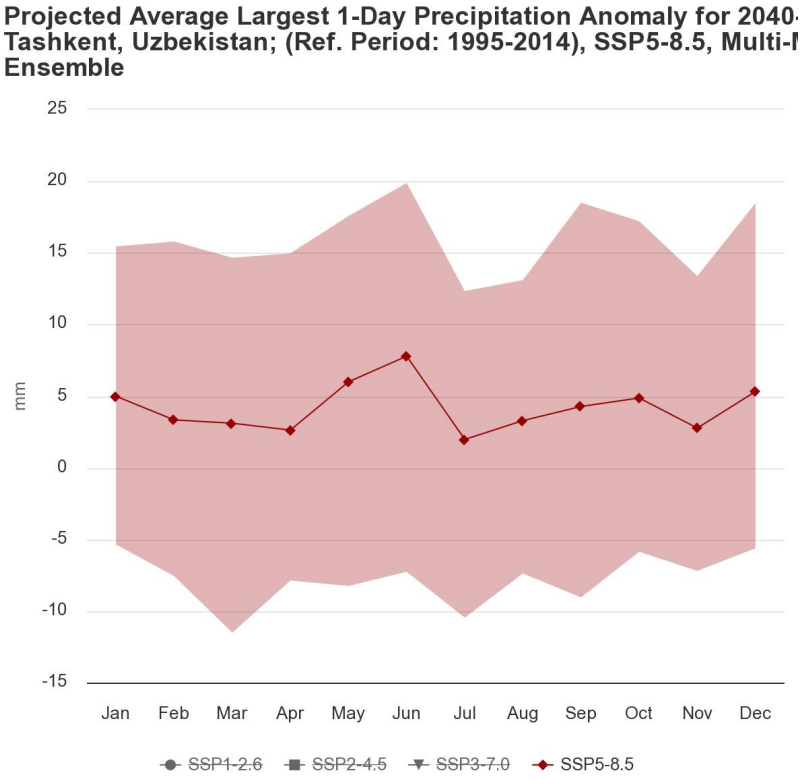


Figure 16-3 Range of projected anomalies for average largest 1-day precipitation in Tashkent, for the period 2040-2059

As shown in Figure 16-3, the projected rise in average largest 1-day precipitation appears to culminate in May/June, at which time largest 5-day precipitation levels are likely to increase by up to 20 mm, on average. This magnitude of increase would elevate average maximum precipitation in the region to 45 mm.

16.3.3 Climate Change Vulnerabilities

Following table shows key E&S receptors with vulnerability to climate change related impacts, in the context of the project.

Table 16-1 Climate Change Vulnerability

CLIMATE VULNERABILITY RECEPTORS	RELATION TO THE PROJECT
O&M Company	The Project Company is charged with the operation and maintenance of the PV plant and BESS facilities. It is potentially responsible for ensuring the full-time operation of the power generation and storage systems, and addressing any climate-induced asset damages, service interruptions and environmental releases.
Workers employed in	O&M workers within the PV plant and BESS sites are vulnerable to

Climate vulnerability Receptors	Relation to the Project
operational labour	heat stress from prolonged exposure to elevated ambient air temperatures in the event of extreme heat (i.e., heatwaves etc.). Heat stress can cause heat stroke, heat exhaustion, heat cramps, or heat rashes. Heat can also heighten the risk of injuries for workers as it may result in sweaty palms, fogged-up safety glasses, and dizziness. Accidental burns are also potentiated by accidental contact with hot surfaces or steam. In addition, potential electrical and structural failures posed by foreseeable weather extremes heightens occupational safety risk to the personnel employed within the O&M of these facilities.
Nearby/ downstream communities	Communities/ households resident nearby the PV plant and BESS are potentially vulnerable to H&S incidents that may ensure from fire outbreak resulting from extreme temperature. The broader communities served by the grid are also considered potentially sensitive to any events of power interruptions from downtime associated with damaging/ disastrous impacts on the PV plant and BESS infrastructure.

16.4 Climatic Risks

In the context of the climate change risk assessment, the Project is subject to several physical climatic risks. Due to the Project's renewable status, and little to no GHG emissions over the Project's implementational period, transitional climate risks are scoped out of this assessment.

16.4.1 Reduction in solar module efficiency and yield under high temperatures

High temperature levels have a retarding effect on PV power production, as the efficiency of solar panels generally decreases by 0.5%, with every degree of temperature increase beyond 35°C. High temperatures in the event of heatwaves can reduce the output efficiency of solar panels by as much as 25%[21]. Temperature projections analysed in Section 16.3.1 above indicate that maximum temperatures will continue to rise in Tashkent region, to an average level of about 32°C. Protracted heatwaves will undermine the PV module efficiency on panels within the solar arrays and thereby impinge on the yield of the PV plant.

[21] World Economic Forum. 2022. Why don't solar panels work as well in heatwaves? Accessed on 16 September, on https://www.weforum.org/agenda/2022/08/heatwaves-can-hamper-solar-panels/

In the absence of mitigation, the impact significance is potentially moderate, given that baseline temperature levels do not exceed the PV efficiency threshold of 35°C. Nevertheless, yield constraints pose the cumulative risk of grid congestion and economic losses associated with inefficient power generation.

16.4.2 Thermal runaway and associated fire hazards due to failure of BESS cooling systems under high temperatures

Batteries and other sensitive electronic components constituting the BESS are required to operate at relative low temperatures. This requirement is particularly strict for the battery storage containers, as high ambient temperatures within the containers can cause battery overheating, thermal runaway and potentially major fire hazards. Projected increases in ambient temperature, coupled with other factors for thermal runaway, can result in overheating and/or fire and extensive property damage (and occupational H&S incidents). On this account, a thermal management system will be installed for the BESS, in line with manufacturer-prescribed requirements for battery operating conditions.

In the absence of mitigation, the impact significance is potentially minor, as an adequate HVAC system, and other features are built into the thermal management system dedicated to the BESS facilities.

16.4.3 Damage to PV plant and BESS infrastructure due to flooding from high-precipitation events and associated dam failure

As indicated in Section 16.3.2, the flash floods are likely to intensify within the next 30 years, based on relevant projections. Increased frequency and magnitude of high-precipitation events may interact with other factors, to cumulatively undermine the structural integrity of the Kavardam dam. Based on the flood-risk assessment conducted for the PV plant and BESS locations, the PV plant infrastructure will be largely inundated in the event of catastrophic dam failure. Dam break flooding will damage the power plant infrastructure and necessitate extensive maintenance, which would result in significant downtime and operational losses.

In the absence of mitigation, the impact significance is potentially moderate, considering the scale of on-site floods, associated O&M costs, and economic losses from service interruptions/ closure, as well as the probability of dam break events.

16.4.4 Power shortages and socioeconomic losses due to climate-related plant downtime (forced outage)

Projected uptrends in the frequency and intensity of extreme weather events and associated disasters (e.g., floods, mudflows and extreme heat) pose the risk of infrastructural damage and power generation inefficiencies, which will result in decreased yield and a resultant diminution of the grid power. Damage to relevant utility assets and associated service interruptions will lead to economic losses, both for the owners and operators of the utility assets, and power consumers within service areas.

In the absence of mitigation, the impact significance is potentially major, considering the existing power shortages in Tashkent Region, and the typically high demand for power during periods of extreme climate events.

16.4.5 H&S incidents resulting from climatic extremes and disasters

The Project's physical climate risks further include health and safety incidents amongst operational plant workers during periods of extreme heat. Climate modelling for the Project's operational period indicates that the annual ambient air temperatures are likely to increase. The incidence of inordinately high temperatures is likely to impact on the wellbeing of workers, particularly those who will operate outdoors. Prolonged exposure to extreme heat presents the risk of dehydration, heat stress, heat stroke, heat exhaustion, heat cramps, heat rashes and burns from contact with overheated surfaces.

The following mitigation measures can be implemented to mitigate against natural heat hazards:

- Workers assigned to operations in the exterior of the Plant's buildings and shaded areas will be provided with appropriate PPE (e.g., sun hats and cooling vests).
- Shaded resting areas and adequate access to potable water will be provided for workers stationed outside of the Plant's buildings (e.g., guard houses).
- Work locations (and duration, to the extent possible) will be restricted during periods of extreme heat to lessen the risk of heat-related health effects. Maintenance work within high-temperature units will be avoided during days with inordinately high temperatures.
- Staff rooms on the plant's premises will be equipped with HVAC or fans to enable operations at workstations during periods of extreme heat.
- Induction and refresher health and safety (H&S) trainings will include trainings on prevention of and first response to extreme heat exposure. The trainings will cover risk factors, mitigating PPE, first aid measures and nearest health centre for treatment of hyperthermia.

16.5 Greenhouse Gas (GHG) Emissions

The EP(IV) CCRA guidelines categorize the greenhouse gas emissions of various IFI investment projects as follows:

- Scope 1 emissions – Direct GHG emissions from owned or controlled sources, i.e. fuel combustion and fugitive emissions.
- Scope 2 emissions – Indirect GHG emissions from the use of purchased electricity, heat or steam.
- Scope 3 emissions – Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities not covered in Scope 2, outsourced activities, waste disposal, etc.

The guidelines prescribe different CCRA requirements and protocols for projects based on their general E&S risk categorization (i.e., Category A and Category B).

For Category A projects with projected Scope 1 and Scope 2 GHG footprints exceeding 100 kilotons of CO_2 equivalent annually, the guidelines require (i) a GHG emissions assessment, (ii) physical CCRA, (iii) transition CCRA, and (iv) GHG alternatives analysis. For Category A projects with a lower annual GHG footprint, the guidelines mandate (i) a GHG emissions assessment, and (ii) physical CCRA, exclusively.

The project's operational facilities are not expected to generate greenhouse gas (GHG) emissions in excess of 100,000 tonnes per year. As such the Project is not required to monitor and publicly report on its annual GHG emissions inventory (from auxiliary O&M operations).

For the purposes of this assessment, GHG emission calculation tools designed by the Greenhouse Gas Protocol were used to estimate the carbon footprint of the Project's construction phase. The analysis is based on the best available estimates of fuel demand for various combustion sources to be employed during construction.

16.5.1 Construction-phase GHG footprint

The assessment of GHG emissions at the Project's construction stage includes both Scope 1 and Scope 2 emissions. Scope 1 emissions refer to direct greenhouse (GHG) emissions that occur from sources under the ownership of the Project organization (i.e., Project Company as well as EPC and O&M contractors). Scope 2 and Scope 3 emissions are defined as indirect GHG emissions associated with the production of procured electricity and construction materials respectively.

16.5.1.1 Scope 1 emissions

The sole foreseeable source of Scope 1 emissions in the Project's construction phase is combustion from fuel-powered construction machinery, which includes vehicles and equipment for construction work (e.g., excavators, rollers, cranes etc.). For the purposes of this assessment, the Scope 1 emissions were quantified using the GHG Calculation Tool developed by the Greenhouse Gas Protocol (i.e., Mobile Combustion GHG Emissions Calculation Tool Version 2.6[22]), which offers specialized calculations for GHG emissions from mobile combustion sources. Emissions were computed as a product of estimated fuel quantities, and empirical factors accounting for mobile machinery types and corresponding fuel requirements.

The total estimated quantity of Scope 1 emissions during the Project's construction phase is presented in Table 16-2 below.

Table 16-2 Estimates for scope 1 GHG emission during construction

YEAR	ACTIVITY TYPE	FUEL SOURCE	VEHICLE TYPE	AMOUNT OF FUEL (L)	GHG EMISSION (TONNES CO2EQ)
2023 – 2025	Fuel use	Diesel	Diesel medium- and heavy-duty vehicles	22,500	1,458

16.5.1.2 Scope 2 emissions

Potential scope 2 emissions at the Project's construction stage derive from the procurement of (i) electricity from the local grid to power electrical construction equipment, and (ii) construction materials. Electricity-based scope 2 emissions were quantified using the GHG Calculation Tool developed by the Greenhouse Gas Protocol (i.e., Simplified GHG Emissions Calculator[23]), which offers specialized calculations for GHG emissions from purchased power. Emissions were computed as a product of estimated power demand, and empirical emission factors for thermal electricity generation.

Total estimated quantities of electricity-based and manufacturing-based GHG emissions across the Project's construction phase are presented in Table 16-3 below.

[22] https://ghgprotocol.org/calculation-tools-and-guidance

[23] https://ghgprotocol.org/calculation-tools-and-guidance

Table 16-3 Estimates for scope 2 GHG emissions pertaining to procurement of electricity[24] during construction

Total estimated demand for purchased electricity (MWh)	Scope 2 emissions				
	CO_2 (tonnes)	CH_4 (tonnes)	N_2O (tonnes)	CO_2E (tonnes)	EF ($kgCO_2E/kWh$)
1,650,000	778	0.06	0.008	782	0.47

16.5.1.3 Scope 3 emissions

Construction of the Plant will entail the use of materials, production of which will inevitably result in carbon emissions. Crude estimates of 'embodied carbon' associated with the production stage of primary construction materials (i.e., concrete and steel) are shown in following table[25]. Calculation for carbon emissions is based on initial estimate of construction materials and their 'Product Stage (PAS Modules A1-A3)[26]' emissions only. PAS (Publicly Available Specification) are specifications for the assessment of the life cycle GHG emissions of goods and services, developed by the British Standards Institution (BSI). Module [A1] to [A3] which includes raw material extraction and supply, transport to manufacturing plant, and manufacturing and fabrication.

Table 16-4 Estimate of ghg emissions from embodied carbon (primary materials)

Material	Estimated Quantity (tonnes) [1]	Emission Factor ($kg\ CO_2E/kg$ of material) [1]	GHG Emissions (CO_2E), Tonnes
Concrete	21,000	0.19	3,990
Steel	2,250	2.46	5,535
Total			**9,525**

Notes
[1] Emission factors and densities are taken from the Inventory of carbon and Energy (ICE) database v3, 2019.
Weight of concrete is calculated using estimated volume of 120,000 m^3 of concrete and concrete density of 2,300 kg/m^3.

[24] Estimate of power demand during construction was provided by the Project developer.

[25] Estimates of concrete and steel supplies for the Project's construction phase were provided by the project developer.

[26] PAS (Publicly Available Specification) are specifications for the assessment of the life cycle GHG emissions of goods and services, developed by the British Standards Institution (BSI). Module [A1] to [A3] which includes raw material extraction and supply, transport to manufacturing plant, and manufacturing and fabrication.

16.5.1.4

The following measures can be implemented in subsequent stages of project planning and implementation to minimize GHG emissions over the course of the Project's operational lifetime:

- The Project Company and contractors will implement comprehensive resource efficiency measures to reduce scope 1 and scope 2 GHG emissions during the Project's construction and operational phases. These measures generally include, but are not limited to the following:

- The procurement of equipment for the Project's construction and operational phases should give priority consideration to power efficiency and water conservation (based on operating technology and disrepair).
- During construction and operation, energy conservation measures for electricity-powered equipment should be promoted (in the Project's E&S policy and HSES trainings) and power consumption should be monitored on a monthly basis. Economical use of fuel-powered equipment should be encouraged and monitored on the same basis.
- During construction, resource efficiency in relation to construction materials should be promoted and monitored in the same manner.
- During construction, use of electrically powered equipment, where possible.
- Use of high-performance monitoring and process control techniques, good design and maintenance of the PV plant and BESS systems so that the operational performance targets can prevail under projected climate trends.

16.6 Environmental additionality and creation of carbon credits

With regard to binding climate change conventions, including the Kyoto Protocol, the Clean Development Mechanism (CDM) is amongst the key avenues devised to achieve the GHG emission cutback targets. The mechanism provides a low-cost means for European Union (EU) economies to offset their emission target exceedances, through the acquisition of carbon credits based on the development of decarbonization projects in Early Transition Countries (ETCs). This trade is accredited by the carbon accounting unit of the UNFCCC on condition that the projects have a demonstrable environmental additionality (effective GHG reduction) and that the project delivers on broader sustainable development requirements in host countries.

To facilitate carbon trading based on CDM within the ETC region, EBRD has established a dedicated project facility with a mandate to ease the financial hurdles associated with the development of CDM projects by sponsors within ETC economies. As such, the Project is potentially accounted a CDM investment, with a prospective contribution to global GHG reductions and a carbon-market based economic incentive for the Project Developer.

In this connection, the CCRA further serves to quantify the Project's potential environmental additionality, to provide an indication of how this decarbonization scenario can further enhance the project's economic viability.

The calculation of carbon credits of potential relevance to the Project will be completed in the subsequent version of this Report, subject to the availability of outstanding O&M information.

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