Initial Environmental Examination

Project Number: TA-9708

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UZB: Digitize to Decarbonize - Power Transmission Grid Enhancement Project

Prepared by National Energy Grids of Uzbekistan (NEGU) and the Asian Development Bank.

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Acronyms and Abbreviations

ADB	-	Asian Development Bank
AH	_	Affected Household
BOD	_	Biochemical oxygen demand
CIS	_	Commonwealth of Independent States
COD	_	Chemical oxygen demand
dB	_	Decibel
	_	Draft Statement of Environmental Impacts
FA	_	Executing Agency
	_	Environmental Health and Safety
	-	Environmental Impact Association
	-	
	_	Environmental Manager
EMP	-	Environmental Management Plan
EMS	-	Environmental Management System
EN	-	Endangered
ESO	-	Environmental and Social Officer
EPC	-	Engineering, Procurement and Construction
ERP	-	Emergency Response Plan
FGD	_	Focused Group Discussion
GDP	_	Gross Domestic Product
GHG	_	Greenhouse Gases
GoU	_	Government of Uzbekistan
GRC	_	Grievance Redressal Committee
GRM	_	Grievance redress mechanism
	_	
	-	Household
	_	Health and safety officer
IES	-	International Environmental Specialist
IFC	-	International Finance Corporation
IFI	-	International Financial Institutions
IUCN	-	International Union for Conservation of Nature
JSC	-	Joint-stock company
KBA	-	Key Biodiversity Area
kV	-	Kilovolt
LARP	_	Land Acquisition and Resettlement Plan
LC	_	Least concern
Masl	_	Meters above sea level
MAC	_	Maximum Admissible Concentrations
MOE	_	Ministry of Energy
MOH	_	Ministry of Health
MPC	_	Maximum Permissible Concentration
MPD	-	Maximum Permissible Discharge
MDE	-	Maximum permissible omissions
	-	Madurday Sconbayer Karrily
MOK	-	Medvedev-Sponneuer-Karnik
MW	-	Megawatt
NDA	-	None degraded Airshed
NES	-	National Environmental Specialist
NGO	_	Non-governmental Organization
NO2	_	Nitrogen Dioxide
NT	_	Near Threatened
O&M	_	Operation and Maintenance
PCR	_	Physical Cultural Resources
PGA	_	Poak ground acceleration
	_	Project Implementation Consultant
DM	-	Particulato Mattor
DMLL	-	
	-	Project Management Unit
rzvus	-	Draft of Concept Statement on Environmental Impact
SanPiN	-	Sanitary Regulations and Standards

SCADA	_	Supervisory Control and Data Acquisition
SCNP	-	State Committee of the Nature Protection
SEE	-	State Environmental Expertise
SEI	-	Statement of the Environmental Impact
SEMPs	-	Specific Environmental Management Plans
SES	-	Sanitary and epidemiological service
SniP	-	Construction Standards
SO ₂	-	Sulphur Dioxide
SPS	-	Safeguard Policy Statement
SPZ	-	Sanitary Protection Zones
SZ	-	Safety Zone
UNEP	-	United Nations Environment Program
UZS	-	Uzbekistani soʻm
VOC	-	volatile organic compounds
VU	-	Vulnerable
WHO	-	World Health Organization
ZEP	-	Statement on Environmental Consequences
ZVOS	-	Concept Statement on Environmental Impact (Uzbekistan EIA)

Units of Measurement

HP	Horse Power
HZ	Hertz
in/sec	Inch per second (25.4mm/sec)
km	Kilometer
km/h	Kilometers per Hour
Km ²	Square kilometer
L _{eaq}	Equivalent Continuous Level
mg/l	Milligram per liter
mg/m³	Milligram per cubic meter
mg/kg	Milligram per kilogram
m³/s	Cubic meters per second
m³/h	Cubic meters per hour
m³/d	Cubic meter per day
m	Meter
m ²	Square meter
m³	Cubic Meter
m³/s	Cubic meter per second
MtCO ₂ e	Million tons of CO ₂ equivalent
PPM	Parts per million
°C	Degrees Celsius
μg/m ³	Micrograms per cubic meter

Exchange Rates

Currency Exchange Rates as of 1st January 2023 I US\$ = I1,301 (UZBEK SOM) (\$ refers in this report to US-Dollars

Executive Summary

Introduction

1. This Initial Environmental Examination (IEE) is part of the process of compliance with the ADB guidelines in relation to the UZB: Digitize to Decarbonize - Power Transmission Grid Enhancement Project - Initial Environmental Examination, or the "Project".

2. The IEE provides a road map to the environmental measures needed to prevent and/or mitigate negative environmental effects associated with the project. More specifically, the IEE:

- Describes the existing socio-environmental conditions within the Project area;
- Describes the project design, construction activities and operational parameters;
- Describes the extent, duration and severity of potential impacts;
- Analyzes all significant impacts; and
- Formulates the mitigation actions and presents it all in the form of an Environmental Management Plan (EMP).

3. Based on the existing ADB Environmental Safeguards Policy (2009), this Project falls under ADB's project Category B as the proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects.

Description of the Project

- 4. The Project involves:
- Rehabilitation of twelve high voltage transmission lines (110kV 220kV) including the replacement of towers and conductors.
- Upgrading of four existing substations (replacement of switchgear, transformers, control rooms, etc).

#	Line	Region	Voltage	Length (km)
I	L-19-23	Tashkent	110 kV	14.53
2	L-F-Ch	Tashkent	110 kV	8.00
3	L-19-D	Tashkent	110 kV	11.36
4	L-22-23	Tashkent	110 kV	23.90
5	L-7-F-1,2	Ferghana	110 kV	6.56
6	L-Ks-A	Tashkent	220 kV	15.40
7	L-K-K	Kashkadarya	220 kV	37.50
8	L-32-K	Kashkadarya	220 kV	27.70
9	L-32-M	Kashkadarya	220 kV	5.00
10	L-Hamza-I	Bukhara	220 kV	36.10
11	L-D-Sh	Surkhandarya	220 kV	77.20
12	L-H-K	Samarkand / Navoi	220 kV	81.50
Total				344.75

Table I: Project Transmission Lines

#	Region	Name	Voltage			
I	Tashkent	Zafar	220 kV			
2	Navoi	Zarafshon	220 kV			
3	Namangan	Obi Khaet	220 kV			
4	Tashkent	Fayziobod	220 kV			

Table 2: Project Substations

5. No new lines or substations are to be constructed under the Project. The lines and substations are located across Uzbekistan in multiple regions including Tashkent, Bukhara, Samarkand, Navoi, Surkhandarya, Namangan, Ferghana and Kashkadarya.

6. The Executing agency is the JSC National Electric Grids of Uzbekistan (NEGU).

Environmental and Social Audit Findings

7. An environmental and social audit of the four existing substations has been completed. The audit identified several corrective actions that should be completed by NEGU to ensure the Project is in line with good international industry practice (GIIP). The key corrective actions relate to:

- Waste Management developing inventories of waste, labelling waste containers and development of waste recycling program.
- Hazardous Materials Management preparation of procedures to manage spills and filling, installation of spill kits, procurement of PPE for all types of hazardous activities.
- Site Safety prepare ERPs and install fire detectors and alarms at all sites.
- Occupational Health and Safety complete a detailed OHS audit of each substation by an international specialist.
- Biodiversity remove bird nests at sites.
- Site Management ensure that each substation always has a person responsible on site for environmental and first aid management.
- Grievance Management prepare a formal grievance redress mechanism for workers and the local community.
- 8. All these issues have been organized into a time bound corrective action plan with costs.

Summary of Key Impacts

9. The following section summarizes the key impacts identified in the assessment phase of the Project.

Air Quality

10. During construction air quality may be degraded by construction works, mainly by dust – however most portions of the alignments are in rural locations meaning that there are fewer sensitive human receptors. Sulpher Hexaflouride (SF_6) is generally well managed at substations. Some additional recommendations are made to ensure that best practice is followed.

<u>Soils</u>

11. It is possible that historical leaks and spills of oil and fuel have occurred, especially beneath transformers in substations. Generally, any leaks from transformers should be contained within bunds beneath the transformers and trapped within the underground oil capture tanks. However, other equipment, such as circuit breakers that are not located within bunds, may have leaked and polluted soils (and groundwater). Site visits to the substations did not identify any highly significant areas of pollution (some small patches for oil and staining could be observed) at the sites but given the limited nature of the inspections it is necessary to take a precautionary approach to this issue and assume that soils could be contaminated to some degree.

12. Portions of L-K-S traverse slag heaps, or access roads for slag heaps connected to the AGMK. The composition of the spoil material disposed of at these slag heaps is unknow, but it is likely that they comprise some hazardous elements. Excavation works in these areas could result in health impacts to workers if they are handling toxic soils without adequate PPE or inhaling toxic dust.

13. NEGU indicated, during site visits, the L-Hamza in Bukhara region, is affected by saline soils which are corroding the concrete poles on this alignment.

14. A range of other minor construction related impacts to soils could occur, but they are generally of low significance.

<u>Hydrology</u>

15. Impacts to hydrology are like soils. i.e., via spills and leaks of hazardous liquids. Extreme flood events associated with climate change could impact upon the tower foundations and stability of one tower located in the Halkajur river (L-D-Sh). It is also possible the other towers will be constructed in floodplains that could potentially be impacted significantly by extreme flood events in the future.

<u>Geohazards</u>

16. According to NEGU, some towers in Bukhara region have collapsed, apparently due to high winds (although their age and impacts from animal burrows may have also affected the towers stability). As with seismic events damaged infrastructure could lead to secondary impacts such as power outages and accidents involving people living close to damaged lines.

17. Two of the proposed alignments are in areas identified as being in landslide/mudflow risk areas. Mudflows and landslides could damage and even destroy towers and lines.

Biodiversity

18. The key impacts of the Project to consider during the operational phase relate to the potential for bird electrocutions and bird collisions with towers and lines. The alignments selected during the screening process has sought to eliminate all alignments that have potential to have highly significant biodiversity impacts, including their locations close to Important Bird Areas and any other nationally and internationally designated sites. Therefore, impacts associated with the selected alignments in this IEE are likely to be of lower significance in terms of bird electrocutions and collisions. Turkestan White Stork (LC) were identified nesting on several towers and in one substation.

19. None of the alignments are located within critical habitat according to UNEP mapping and no lines are in, or immediately adjacent to nationally or internationally designated sites. However, a portion of L-Hamza passes through a modified desert environment. Site surveys of this area identified several terrestrial species that could be affected by construction activities including:

- Central Asian tortoise (VU): Assumed to be present in very low numbers.
- Dressing (VU:D): Traces were found on one of the survey points.
- Grey monitor lizard (VU:D): Traces of a monitor lizard were noted at the southeastern tip of the power line.
- Sand boa constrictor (NT): Traces of the boa constrictor were found at least 3 places in the eastern end of the power line, passing through areas of open sand.

Hazardous Materials and Waste

20. Disposal of waste materials, both hazardous and non-hazardous, from transmission line worksites can be difficult to manage due to the de-centralized nature of the works along the alignments. Without suitable waste containers and without adequate training, workers could dump waste materials haphazardly around the work sites which could create pollution events. Waste management is easier to control at the substations.

21. A more significant waste management issue is the large volume of large waste materials which will be generated from removal of the old towers and conductors as well as old equipment from

substations. This waste will include large volumes of scrap metal, reinforced concrete poles, concrete foundations (these may be left in-situ at many tower sites) and conductor wires.

22. Asbestos containing materials are present in substations (mainly in the form of asbestos cement roofing). Rehabilitation of control rooms and other buildings may require demolition of existing structures which may contain asbestos. Demolition works may result in asbestos containing materials being broken or crushed and producing airborne asbestos fibers. Inhaling asbestos fibers increases the risk of cancer.

23. Polychlorinated Biphenyl's (PCBs) tests were completed on the transformers to be removed from substations. The results of the rapid tests did not indicate the presence of PCBs above 50ppm.

Community Health and Safety

24. Work zones in residential areas pose a risk to human health. However, these issues can be adequately managed with sound management plans and oversight. EMF, at voltages between 110kV and 220kV do not represent significant health risks to humans, especially given that any residential properties within a 12 m buffer of all alignments will be removed as part of the Project.

<u>Noise</u>

25. Most of the construction activities are likely to result in some intermittent elevated noise levels for short periods of time (approximately 3 weeks in the location of each tower and approximately 6 months at substations). Literature studies undertaken by EirGrid indicates that "Corona Noise" only becomes a significant issue from 350-500 kilovolts (kV) and above. This would suggest that significant "Corona Noise" impacts may not be likely for 110 kV and 220 kV transmission lines.

Physical Cultural Resources

26. During line stringing impacts are anticipated to be of low significance as lines can be strung without having to impact directly on any graveyards beneath the conductors. However, for safety reasons there will be periods during the stringing when access to these areas is not permitted. Less than five towers are located within graveyards themselves. Construction activities in the graveyards could impact upon graves.

27. Establishment of construction camps and access roads will not have direct impacts on known PCR, but it is possible that any earth moving activities in these areas could impact upon unidentified archeological objects and sites. Likewise, excavation works for towers could result in chance finds, although in general new towers will be in the locations of old towers.

Proposed Key Mitigation Measures

Air Quality

28. During construction phase generic good international industry practice (GIIP) measures will be applied to ensure that dust and combustion emissions impacts are not significant at any worksite. Alarms to monitor for SF_6 leaks are also required at substations.

<u>Soils</u>

29. Substation designs shall be applied based on the Institute of Electrical and Electronics Engineers Standards Association (IEEE) Power and Energy Guide for Containment and Control of Oil Spills in Substations (2013).

30. PCBs will not be used in any transformers and any other Project facilities or equipment at substations. The substations will be surveyed during the design phase to assess the potential for contaminated land to be present in the area of the proposed installation and upgrading works. If signs of potentially significant contamination are present in this area, e.g., oil storage tanks, old leaking transformers, oil staining, etc. soil sampling and testing shall be undertaken in the work area to determine the level of soil contamination. A Contaminated Land Management Plan will be completed including specific procedures for intrusive investigation and mitigation measures. Any soils within work

sites that are identified as contaminated shall be removed and disposed of as hazardous materials per any contaminated land management plan.

31. Designs shall ensure that transmission towers (specifically their foundations) located within saline soil area (mainly along the route of L-Hamza) are constructed from materials resistant to corrosion.

32. For all works within 50m of the AGMK EPC Contractors staff will be provided with PPE, including disposable face masks, eye protection and disposable gloves. Staff will be provided with toolbox training every day before the start of works in these areas warning staff of the hazards of working in these areas and the need for constant application of PPE. Watering of excavated areas shall be performed daily during works to limit exposure to wind-blown dust

<u>Hydrology</u>

33. Designs shall avoid placing a tower in the riverbed of the Halkajur river. If this is not possible designs shall ensure that the tower is constructed so that foundations cannot be significantly affected by high water levels. The EPC Contractor should ensure that the findings of the Project CRVA form part of the design of this tower. Such design considerations shall also apply to any other tower constructed within river floodplains.

34. During construction phase generic good international industry practice (GIIP) measures will be applied to ensure that impacts to water quality and water users are not significant.

<u>Geohazards</u>

35. Designing towers using landslide / mudflow prevention design standards and considering earthquake loading as well as locating the facilities in stable areas, as far as possible would avoid landslides and impacts from seismic events. Specific attention shall be applied in the design phase to towers on the L-Hamza alignment to ensure that they are not impacted negatively by high winds during the operational phase

Biodiversity

36. Electrocutions from transmission lines are rare and according to recent technical papers electrocution mitigation can be far more controlled than collision mitigation since the problem is a physical one, whereby a bird bridges certain clearances on a pole structure, the solution is relatively straightforward, and involves ensuring that a bird cannot touch the relevant components.¹ However, some studies have identified Turkestan White Stork as being at specific risk of electrocution from power lines (although the reports do not differentiate between voltages, e.g. transmission or distribution). The WBG EHS Guidelines for Electric Power Transmission and Distribution provide the following mitigation to reduce the risk of bird electrocution, and this will be applied to the Project; Maintaining 1.5 meter (60-inch) spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware. This IEE also includes some specific mitigation measures for the Turkestan White Stork based on international best practice, including the requirements for nest platforms on some lines.

37. During construction phase generic good international industry practice (GIIP) measures will be applied to ensure that impacts to other aspects of biodiversity are not significant, including measures to complete pre-work surveys of alignments prior to the commencement of works and restoration of work sites.

¹ Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the African-Eurasian Region. AEWA Conservation Guidelines No. 14. 2012

38. The following measures have been recommended during the operational phase to reduce the potential for bird collisions:

- Provision of bird's reflector on top of every tower.
- Provision of line marking devices on all lines to avoid birds' collision with transmission lines. The spacing and location of the marking devices on the lines will be based on the recommendations of a national ornithologist (engaged by the Project Implementation Consultant (PIC)) who will complete bird surveys (over one season) of all lines prior to the start of construction and prepare Bird Marker Survey Reports for each line.

Hazardous Materials and Waste

39. Old towers and conductors shall be removed from site for recycling or landfilling immediately following the removal of the tower. They shall not be left on private property or in any way that could be deemed a hazard to local people. Equipment from substations shall be removed from the substation prior to the competition of works and sent to an appropriately licensed waste management facility. Old equipment shall not be left at the substation after works are completed.

40. Works on areas of existing substations which require demolition of existing structures will require a competent surveyor to complete an asbestos survey. If asbestos is present to develop an Asbestos Management Plan in line with GIIP (specifically ADB guidelines ²). Removal and disposal of asbestos will be in accordance with the management plan. Site will need to be confirmed "clean" before any works on the actual substation will be started.

Physical Cultural Resources

41. Where towers are in graveyards the EPC Contractor should relocate the towers outside of these areas primarily to respect the alignment SPZ. In the event of any chance finds during the construction works procedures shall apply that are governed by GoU legislation and guidelines. A chance finds procedure shall also be developed by the EPC Contractor.

Consultations and Disclosure

42. Stakeholder engagement has been undertaken throughout the development of the Project, with the view to determining and responding to the views of interested and parties potentially affected by the Project throughout the life of the Project, and ensure open and transparent, two-way communication between NEGU and stakeholders.

43. To date more than 8 formal stakeholder consultation sessions (all documented in this IEE) have been undertaken to discuss the IEE and LARP. All the findings and comments from the consultation events, both positive and negative, have been recorded in this IEE and where relevant, mitigation measures have been prepared to manage the issues identified.

Residual Impacts

44. This IEE has established that, except for the residual impacts mentioned below, there are no significant environmental issues that cannot be either totally prevented or adequately mitigated to levels acceptable to the national and international standards for Project activities.

45. The key identified residual impacts are as follows:

² Good Practice Guidance for the Management and Control of Asbestos: Protecting Workplaces and Communities from Asbestos Exposure Risks. ADB. 2022

- Construction Phase Management of Asbestos: Until the asbestos survey and method statements are completed, there remains the possibility of impacts to workers. Residual impacts are of medium significance
- Construction Phase General construction noise Some short-term elevated noise impacts may occur in residential areas during the daytime. The use of temporary mobile noise barriers should reduce the noise levels to acceptable levels during the working day. Residual impacts will be of low significance.
- Operational Phase Bird Electrocution: The proposed mitigation measures should help reduce the potential for bird electrocutions but may not eliminate this issue. Residual impacts will be of low significance.
- Operational Phase Bird Collisions: Like electrocutions, the proposed solutions to limit bird collisions may not entirely eliminate this issue. Residual impacts will be of low significance.
- Operational Phase Accidents involving workers: Mitigation measures proposed should help
 reduce the potential for accidents to occur. However, based on the experience of the Consultants
 preparing this Project IEE, accidents cannot be completely ruled out during the lifecycle of the
 Project. A training program will help NEGU in the longer term. Residual impacts will be of low
 significance.

Implementation Arrangements

46. The EMP, its mitigation and monitoring programs, contained herewith will be included within the Bidding documents for project works for all Project components. The Bid documents state that the EPC Contractor will be responsible for the implementation of the requirements of the EMP (including specific design phase actions) through his own SEMP which will adopt all of the conditions of the EMP and add site specific elements that are not currently known, such as the EPC Contractors camp locations. This ensures that all potential bidders are aware of the environmental requirements of the Project and its associated environmental costs.

47. The EMP and all its requirements will then be added to the EPC Contractors Contract, thereby making implementation of the EMP a legal requirement according to the Contract. He will then prepare his detailed designs and SEMP which will be approved and monitored by the PIC. Should the PIC note any non-conformance with the SEMP (and the EMP) the EPC Contractor can be held liable for breach of the contractual obligations of the EMP. To ensure compliance with the SEMP the EPC Contractor should employ an Environmental and Social Officer and a team of experts, including a Health and Safety Specialist to monitor and report Project activities throughout the Project Construction phase.

48. NEGU are also responsible for completing the required activities outlined in the CAP for the four substations. A timetable for completion of these activities is included in the CAP.

Introduction

I.I. Energy Sector Background

49. Uzbekistan's aging and dilapidated infrastructure in the whole energy supply chain increasingly results in system inefficiencies, unreliable gas and electricity supply that dampens the economic development and business confidence, and uneven access to energy across provinces contributing towards widening regional income disparities. The obsolete energy transmission and distribution system has developed serious problems overtime, such as increasingly frequent electricity blackouts and insufficient gas especially during peak demand times in the winter, putting social service systems, such as education and health care, at risk.

50. The energy supply is increasingly becoming unreliable because of degraded infrastructure along the electricity supply chain and insufficient investments for rehabilitation. Compounded by the regional disparities in indigenous energy resources such as natural gas, hydropower and electricity demand centers, the poor conditions of transmission network result in higher risks of system outages, poor services and transmission losses estimated at 20% of net power generation. Investment in transmission networks is required to reduce overloading, improve supply reliability and significantly reduce electricity losses.

51. With poor electricity transmission infrastructure, Uzbekistan is unable to capitalize its export and transit potential. The power grid of Uzbekistan is a major component of the Central Asian power transmission network, and the Coordinating Dispatch Center in Tashkent manages network operation and planning. As increased interconnection and power trades are expected between Uzbekistan and neighboring countries, the supervisory monitoring and control of energy flows among countries and enhanced transmission network will be prerequisite to increased regional energy trade. At present, Uzbekistan is the only country in the Central Asian power system that does not have supervisory control and data acquisition in the national dispatch center. This results in the inefficient operation of energy assets and constrains Uzbekistan's capacity for regional power trade.

I.2. Project Overview and Objectives

I.2.1. Project Overview

52. The Project involves the rehabilitation of twelve high voltage transmission lines (110kV - 220kV) and the upgrading of four existing substations. No new lines or substations are to be constructed under the Project.

53. The lines and substations are located across Uzbekistan. The figures below (Figure I) illustrate the locations of the transmission lines. More detailed maps of the substations and alignments are provided later in the report.

I.2.2. Implementation

54. The Executing agency is the JSC National Electric Grids of Uzbekistan (NEGU).

I.2.3. Objectives

- 55. The objectives of the Project are:
- a) Improve energy security through versatility and expansion of electricity transmission lines;
- b) Improve reliability of electricity supply in the country and region;
- c) Reduce transmission losses; and
- d) Improve operational efficiency of the energy sector.

56. The project also follows the ADB strategy for Uzbekistan, which includes a focus on energy efficiency and reliable electricity supply.



Figure I: Project Activity Locations (transmission lines)

Source: ADB

57. This Initial Environmental Examination (IEE) is part of the process of compliance with the Asian Development Bank (ADB) guidelines in relation to the Preparing Sustainable Energy Investment Project, or the "Project".

I.3. Purpose of the IEE Report

58. The IEE provides a road map to the environmental measures needed to prevent and/or mitigate negative environmental effects associated with the project. More specifically, the IEE:

- Describes the existing socio-environmental conditions within the Project area;
- Describes the project design, construction activities and operational parameters;
- Describes the extent, duration and severity of potential impacts;
- Analyzes all significant impacts; and
- Formulates the mitigation actions and presents it all in the form of an Environmental Management Plan (EMP).

I.4. Category of the Project

59. Based on the existing ADB Environmental Safeguards Policy (2009), this Project falls under ADB's project Category B as the proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. The Project screening category has been confirmed during the preparation of Rapid Environmental Assessment (REA) of the Project.

I.5. Report Structure

60. <u>Section 1: Introduction</u> – The section in hand provides the introductory information.

61. <u>Section 2: Legal, Policy and Administrative Framework</u> – This section presents an overview of the policy/legislative framework as well as the environmental assessment guidelines of Uzbekistan that apply to the proposed project.

62. <u>Section 3: Description of the Project</u> – Section 3 describes the Project need and its environmental setting. A scope of works is also provided indicating the type of construction works required.

63. <u>Section 4: Assessment of Alternatives</u> – This section presents a summary analysis of the 'no project' alternative as well as any alternative alignment and technical design options.

64. <u>Section 5: IEE Approach</u> – Section 5 outlines the methodology used to complete the assessment.

65. <u>Section 6: Description of the Environment</u> – This section of the report discusses the local environmental baseline conditions. This section is divided into subsections relating to:

(i) Physical: geology and soils; topography; climate and air quality; hydrology and geohazards.

- (ii) Biological: flora and fauna (including Red List species) and nationally and internationally designated sites.
- (iii) Social: population; communities; demographics; employment and socioeconomics; land use; infrastructure (including local access roads); public health and safety; physical cultural heritage; waste management and noise.

66. Surveys have been conducted to address important gaps in the existing data and to collect upto-date information on topics and areas where potentially significant negative impacts may occur, specifically biodiversity and cultural heritage.

67. <u>Section 7: Substation Audits</u> – Provides the findings of the environmental audit of four substations and corrective actions required.

68. <u>Section 8: Environmental Impacts and Mitigation Measures</u> – Outlines the potential environmental impacts and proposes mitigation measures to manage the impacts. The residual impacts of the Project are also presented.

69. <u>Section 9: Public Consultation, Information Disclosure</u> – Section 8 provides a summary of all of the stakeholder consultation activities undertaken and includes the Projects grievance mechanism.

70. <u>Section 10: Environmental Management Plan</u> – This section of the IEE comprises an Environmental Mitigation Plan and an Environmental Monitoring Plan.

71. The Environmental Mitigation Plan:

- (i) Clearly identifies what specific potential impacts various types of works may have on the sensitive receptors;
- (ii) Provides concrete actions prescribed for managing these impacts, including location and timing of these actions;
- Provides cost estimates for the main discrete mitigation measures (those that are unlikely to be part of a construction company' corporate policy and will not necessarily be included into general pricing of the contract); and
- (iv) Specifies responsibility for the implementation of each mitigation activity.
- 72. The Environmental Monitoring Plan:
- (i) Lists all prescribed mitigation measures by types of construction activities;
- (ii) Provides selected criteria of monitoring implementation of mitigation measures;
- (iii) Specifies methods for measuring outcomes of applied mitigation measures (visual, instrumental, survey, etc.);
- (iv) Identifies location and timing/frequency of monitoring mitigation measures by the prescribed criteria;
- (v) Gives cost estimates of monitoring mitigation measures by the prescribed criteria; and
- (vi) Specifies responsibility for tracking each monitoring criterion.

73. <u>Section 11: Conclusions and Recommendations</u> – The final section of the IEE provides the report conclusions and recommendations, including a summary of residual impacts

2. Policy, Legal and Administrative Framework

2.1. National Environmental Legislation

74. Uzbekistan has created a legal framework in the field of environmental protection and environmental management, which is designed to ensure the rights and obligations of citizens enshrined in Articles 50 and 55 of the Constitution of Uzbekistan. These are more than 100 laws, about 50 Decrees of the President and Decrees of the Cabinet of Ministers of the Republic of Uzbekistan and other by-laws and regulatory documents. A list of Uzbekistan's environmental legislation as it pertains to the proposed project is given in Table 3.

Year	Law / Regulation	Last revision
08.12.1992	Constitution of Uzbekistan	09.02.2021
09.12.1992	Law "On nature protection"	12.10.2021
06.05.1993	Law "On water and water use"	01.12.2021
25.05.2000	Law "On State Environmental Expertise"	29.05.2021
03.12.2004	Law "On Protected Natural Areas"	30.06.2022
26.12.1997	Law "On protection and use of flora"	21.09.2016
26.12.1997	Law "On protection and use of fauna"	19.09.2016
27.12.1996	Law "On ambient air protection"	28.09.2020
05.04.2002	Law "On wastes"	15.11.2019

 Table 3: List of environmental laws relevant to the project

75. Brief summaries of the listed documents are given below:

76. **Constitution of Uzbekistan.** In accordance with the Constitution of the Republic of Uzbekistan, land, subsoil, water, flora and fauna and other natural resources are national wealth, subject to rational use and protected by the state.

77. **Law on State Environmental Expertise.** Environmental Impact Assessment in Uzbekistan is called State Environmental Expertise (SEE). SEE is regulated by the Law "On State Environmental Expertise" (SEE) and the Regulation "On further improvement of the environmental impact assessment mechanism", approved by the Resolution of the Cabinet of Ministers No. 541 (2020).

78. Law on Nature Protection regulates the legal relationship between the bodies of the state authority and the physical persons or legal entities (without distinction-legal form) in the field of environmental protection and in the use of nature on all Uzbekistan's territory including its territorial waters, airspace, continental shelf and special economic zone. The law defines the principles and norms of legal relations, rights and obligations and responsibilities, awareness raising, education and scientific research in the field of environment, key players and principles of environmental management; describes economical mechanisms and levers; ecological insurance; basics of environmental audit; environmental requirements during privatization; justifies needs of environmental standards and limits (air, water, soil, noise, vibration, fields, radiation) and ecological requirements for production, transportation and storage of goods and food products; ecological requirements applicable to waste; states necessity of environmental impact assessment and related issues (strategic environmental protection and transboundary environment assessment) referring to Environmental Assessment Code; defines general principles of environmental protection; considers different aspects on protection of ecosystems, protected areas, issues of global and regional management, protection of ozone layer, biodiversity and international cooperation aspects. As stated in the law, in order to protect the climate against the global changes, the subject of the business activity is obliged to observe the limits to green-house gas emissions as well as to take measures for mitigating this emission.

79. Law on Water and Water Use regulates water use, defines rights and obligations of water users, sets out the types of licenses for the use of water, the rules and conditions of their issuance,

considers conditions of suspension, withdrawal and deprivation of license, regulates water flows. The law states liability of all natural and legal persons to prevent pollution of catchment basins, water reservoirs, snow and ice covers, glaciers, permanent snow cover with industrial, household and other wastes and emissions which may cause deterioration of the underground water quality; prohibits piling of industrial and household wastes near the public water headwork's and in their sanitation protection zones, bans construction of facilities and implementation of any other activity which may cause water pollution; sets requirements for forest use within water protection zones. The state management of water protection and use is exercised through accounting, monitoring, licensing, control and supervision.

80. Law on Ambient Air Protection. The law regulates protection of atmospheric air from man-caused impact. Pollution of atmospheric air is emission of hazardous substances originating from activities which can have negative impact on human health and environment. Maximum permitted limits for concentration of hazardous substances into the atmospheric air are defined for each contaminant and represent maximum concentration of hazardous pollutants, in averaged time span, recurring action of which has not have negative impact on human health and environment.

81. Law on Sanitary and Epidemiological Welfare of the Population- $N^{0.657-XII}$ of 07/03/1992 (as amended on 27.04.2021). It regulates social relations in the field of sanitary-epidemiological well-being and radiation safety, the right of people to a healthy environment and other related rights, guarantees and guarantees for their realization.

82. Law on Waste provides the legal conditions for implementation of measures aiming at prevention of generation of waste and increased re-use, environmentally sound treatment of waste (including recycling and extraction of secondary raw materials, as well as safe disposal). It states that citizens have the right to a safe and healthy environment, to participate in the discussion of projects, and compensation for damage to their life, health or property.

83. Law on Protected Natural Areas. The purpose of this Law is to regulate relations in the field of organization, protection and use of protected natural areas. The main objectives of this Law are the preservation of typical, unique, valuable natural objects and complexes, the genetic fund of plants and animals, the prevention of the negative impact of human activities on nature, the study of natural processes, the monitoring of the natural environment, the improvement of environmental education and upbringing.

84. Law on Protection and Use of Flora regulates protection and usage of flora growing in natural condition, as well as in cultivation and its reproduction and conservation of gene pool of wild plants. The Cabinet of Ministries, local government bodies and special authorized agencies implement the law. State Committee of Ecology and Environmental Protection (SCEEP) and Head Department of Forestry under the Ministry of Agriculture are the special authorized agencies in flora protection and its usage. The Cabinet of Ministries, SCEEP, local government bodies and Head Department of Forestry are responsible for implementing on the national level the administration of the law.

85. Law on Protection and Use of Fauna. This Law regulates relations in the field of protection and use of wild animals living in a state of natural freedom on land, water, atmosphere and soil, constantly or temporarily inhabiting the territory of the Republic of Uzbekistan, as well as contained in semi-free conditions or artificially created habitat for scientific or nature protection goals.

86. **Law on the Protection and Use of Cultural Heritage Objects** sets out procedures for protection of cultural heritage and permitting arrangements for archaeological investigations. the purpose of this law is to regulate relations in the field of protection and use of cultural heritage objects, which are the national property of the people of Uzbekistan.

87. A list of Uzbekistan's social legislation as it pertains to the proposed project is given in Table4.

Table 4: I	List of social	and land ow	nership re	lated laws r	elevant to	the pro	oject

Year	Law / Regulation	Last revision
29.08.1996	Civil code of Uzbekistan	18.04.2018

21 12 1995	Labor codo	14 10 2019
21.12.1775		10.10.2010
30.04.1998	Land Code	24.07.2018
13.01.1992	Law on employment	03.01.2018
30.08.2001	Law on cultural heritage	18.04.2018
29.08.1996	Law on Public Health	13.06.2017
01.08.2018	Decree of the President of the Republic of Uzbekistan Nº5495 on	01.08.2018
	measures on cardinal improvement of investment climate in the republic	
	of Uzbekistan.	
29.05.2006	Resolution of Cabinet of Ministers Nº 97 on compensation for losses to	29.05.2006
	individuals and legal entities due to seizure of land plots for state and	
	public needs	
25.05.2011	Resolution of Cabinet of Ministers Nº 146 on improve the procedure of	25.05.2011
	granting land plots, protect the rights of legal entities and individuals on	
	land and improve the architecture of settlements and the efficient use of	
	their settlements land for construction.	
16.06.2018	Resolution of Cabinet Ministers Nº3857 on measures to improve the	16.06.2018
	effectiveness of training and realizing projects with participation of	
	international financial institutions and foreign government financial	
	organizations.	

88. Brief summaries of the listed documents are given below.

89. **Civil Code** defines the legal status of participants of civil relations, the grounds and procedure of implementation of property rights and other proprietary rights, rights on intellectual property, regulates the contractual and other obligations, as well as other property and related personal non-property relations. The Civil Code defines general rules of property seizure, determination of property cost and rights for compensation, terms of rights termination.

90. **Labor code and Law on employment.** These two documents are main legislations regulating labor relations of individuals employed with labor contract by enterprises, institutions, organizations of all type ownership forms, including contracted by individuals. These legislations are considering interests of employees and employers provide efficient function of labor market, just and secure labor conditions, protection of labor rights and employees health, promote to growth of labor productivity, increase of work quality, raising on this matter welfare and social livelihood level of the population.

91. Land Code. The Land Code is the main regulatory framework for land related matters in Uzbekistan. The land code regulates allocation, transfer and sale of land plots, defines ownership and rights on land. It describes responsibilities of different state authorities (Cabinet of Ministers, region, district and city hokimiyats) in land management; rights and obligations of land possessor, user, tenant and owner; land category types, land acquisition and compensation issues, resolution of land disputes and land protection. The land code also defines the terms of rights termination on land plot, seizure and land acquisition of land plot for state and public needs, and terms of seizure of land plot in violation of land legislation.

92. **Law on Public Health.** The main objectives of legislation on the protection of public health are: guaranteeing the rights of citizens to health care from the state; the formation of a healthy lifestyle of citizens; legal regulation of the activities of state bodies, enterprises, institutions, organizations, public associations in the field of public health.

93. **Resolution of Cabinet of Ministers** \mathbb{N}° 97. This resolution regulates compensation for losses to individuals and legal entities due to seizure of land plots for state and public needs. This regulation is mainly dealing with land plots, houses, building and structures of individuals and legal entities. The resolution determines the procedure for seizure of land or part thereof, as well as the procedure for calculating the amount of compensation to individuals and legal entities for the demolished residential, industrial and other buildings, structures and plantings in due to seizure of land for state and public needs.

94. **Resolution of Cabinet of Ministers № 146.** This Resolution is aimed to improve the procedure of granting land plots, protect the rights of legal entities and individuals on land and improve the architecture of settlements and the efficient use of their (settlements) land for construction in accordance with the Land Code and the Town Planning Code. This resolution has approved two Regulations: (i) Regulation on the procedure for granting land for urban development and other non-agricultural purposes, (ii) Regulation on the procedure of compensation for land possessors, users, tenants and owners, as well as losses of agriculture and forestry.

95. **Resolution of Cabinet Ministers № 3857.** The resolution "On measures to improve the effectiveness of training and realizing projects with participation of international financial institutions and foreign government financial organizations" partly provides that payment of compensation for the land acquisition, demolition of houses, other structures, plantings within the framework of projects with the participation of International Financial Institutions (IFIs), if it is agreed and stated in agreements, then will be carried out by authorized bodies in accordance with the requirements of IFIs or Foreign Governmental Finance Organizations.

96. Decree of the President of the Republic of Uzbekistan N° 5495. Decree "On measures on cardinal improvement of investment climate in the republic of Uzbekistan" partly provides that the adoption of decisions on the seizure of land for state and public needs is allowed only after an open discussion with interested parties whose land plots are planned to be seized, as well as assessing the benefits and costs; demolition of residential, industrial premises, other structures and structures belonging to individuals and legal entities, with the withdrawal of land plots is allowed after the full compensation of the market value of immovable property and losses caused to owners in connection with such withdrawal.

2.2. Administrative Framework

97. The State Committee on Ecology and Environmental Protection (SCEEP): SCEEP is responsible for environmental protection. The main tasks of the SCEEP are ensuring the implementation of a unified state policy in the field of environmental safety, environmental protection, use and reproduction of natural resources; the implementation of state control over the observance by ministries, state committees, departments, enterprises, institutions and organizations, as well as individuals, in the area of the use and protection of land, mineral resources, water, forests, flora and fauna, atmospheric air; interdisciplinary integrated environmental management; and organization and coordination of work to ensure a favorable state of the environment and improve the environmental situation.

98. **Center for State Ecological Expertise:** The activities of the Center for State Ecological Expertise are directly related to the consideration of materials for EIA and the issuance document on determination of compliance of the planned or carried out business and other activities with environmental requirements and determination of the admissibility of the implementation of the object of environmental expertise.

2.2.1. Monitoring Responsibilities

- 99. Various agencies are responsible for environmental monitoring as follows:
- **SCEEP:** Responsible for monitoring sources of pollution (emissions) to air, surface waters and soils as well as monitoring flora and fauna in protected areas.
- **Uzhydromet:** Responsible for monitoring air pollution, pollution of surface waters, soils and background (ambient) monitoring.
- Ministry of Water Resources: Responsible for monitoring composition of drainage and discharge water.
- State Committee for Geology: Responsible for monitoring groundwater quality.
- **Goskomles** (State Committee for Forestry): responsible for monitoring lands in the state forest fund.

2.3. National Environmental Impact Assessment (EIA) Legislation

100. The national environmental assessment procedure is regulated by the Law "On State Environmental Expertise" (SEE) and the Regulation "On further improvement of the environmental impact assessment mechanism", approved by the Resolution of the Cabinet of Ministers No. 541 (2020). The Resolution specifies the legal requirements for EIA in Uzbekistan. According to the Resolution, SEE is a type of environmental examination carried out by specialized expert divisions to set up the compliance of the planned activities with the environmental requirements and determination of the permissibility of the environmental examination object implementation.

101. The special authorized state body in the field of SEE is the SCEEP. SEE is carried out by the three specialized expert divisions of the SCEEP:

- The state unitary enterprise "The Center of the State Environmental Examination" of the SCEEP, hereinafter referred to as "The Center of the State Environmental Examination SUE" carries out the state environmental examination of EIA of the objects of economic activity classified as the I and II categories of environmental impact (high and medium risk);
- The state unitary enterprise "The Center of the State Environmental Examination" of the Republic of Karakalpakstan carry out environmental examination of EIA of the objects of economic activity classified as the III and IV categories of environmental impact (low risk and local impact);
- The state unitary enterprises "The Center of the State Environmental Examination" of regions and Tashkent city carry out environmental examination of EIA of the objects of economic activity classified as the III and IV categories of environmental impact (low risk and local impact).

102. The three stages of the EIA and their required results are summarized as follows:

103. **Stage I:** "A Draft Statement of the Environmental Impact ("DSEI") shall be carried out at the planning stage of the proposed project prior to the allocation of funds for development. The DSEI is prepared at the planning stage of the Project. A DSEI shall include:

- The state of the environment prior to the implementation of the planned activities, the population of the territory, land development, analysis of environmental features;
- Situational plan with an indication of the geographical coordinates of the object in question, available recreational areas, settlements, irrigation, land-improvement facilities, farmland, power lines, transport, water, gas pipelines and other information about the area;
- The envisaged (planned) main and auxiliary objects, used equipment, technologies, natural resources, materials, raw materials, fuel, analysis of their impact on the environment;
- Expected emissions, discharges, wastes, their negative impact on the environment and ways to minimize them;
- Storage, storage and disposal of waste;
- Analysis of alternatives to the planned or ongoing activities and technological solutions from the standpoint of nature conservation, taking into account the achievements of science, technology and best practices;
- Organizational, technical, technological solutions and measures that exclude negative environmental consequences and reduce the impact of the object of examination on the environment;
- Analysis of emergency situations (with an assessment of the likelihood and scenario of preventing their negative consequences);
- Forecast of environmental changes and environmental consequences because of the implementation of the object of examination.



Figure 2: State Environmental Expertise Procedure

104. The DSEI shall be reviewed and approved at the national level (for projects relating to category I and II) or at the regional level (for projects relating to category III and IV) under the SCEEP. The SEE confirms the category of the project and identifies the main issues that the project beneficiary shall focus on in the next stages of the environmental assessment process and during the project implementation (construction or rehabilitation works).

105. **Stage II:** "A Statement of the Environmental Impact" ("SEI") shall be prepared based on the conclusions of the SEE on the DSEI. The SEI shall include:

- assessment of environmental problems of the selected site based on the results of engineering and geological surveys, model and other necessary studies;
- environmental analysis of technology in relation to identified problems of the site;
- results of public hearings; and
- reasoned studies of environmental measures to prevent the negative effects of the implementation of the object of examination.

106. **Stage III:** "State Environmental Consequences" ("ZEP") is the final stage of the SEE process and shall be carried out prior to the start of the project. The report describes in detail the changes in the project made as a result of the analysis of the SEE during the first two stages of the EIA process, the comments received during public consultations, the environmental standards applicable to the project, and the environmental monitoring requirements related to the project, as well as the main conclusions.

107. The Conclusion of SEE shall be valid for three years from the date of its issuance. If the object is not implemented within three years from the date of issue of the Conclusion of the SEE needs to be revised and re-submitted to the SCEEP for revision and approval.

108. The Conclusion of the SEE shall be sent to the relevant regional (city) control inspections in the field of ecology and environmental protection for control. Such inspections under the SCEEP supervise the compliance with the requirements and conditions specified in the Conclusion of the SEE.

109. SEE is currently being prepared for the Project by NEGU.

2.4. Environmental Regulations and Standards

110. Uzbekistan has a large set of specific standards that refer to emissions, effluent discharge, and noise standards, as well as standard to handle and dispose specific wastes ranging from sewage to hazardous wastes. The following summarizes these laws and standards along with other international best practice standards.

2.4.1. Air Quality and Emissions

111. <u>National Standards</u> – Air quality in Uzbekistan in measured against Maximum Permissible Concentrations (MPC) and Maximum Permissible Emissions (MPE).

112. Ambient Air Quality Standards, or MPCs, are established by SanPiN 0293-11 (May 16, 2011). According to the United Nations Environment Program (UNEP), Uzbek national ambient air quality standards meet World Health Organization (WHO) standards.³ The MPCs relevant to the Project are show in Table 5.

Parameter	Uzbekistan MPC (mg/m³)			
	30 min	24 Hour	Monthly	Annually
Nitrogen Dioxide (NO2)	0.085	0.06	0.05	0.05
Nitrogen Oxide (NO)	0.6	0.25	0.12	0.06
Sulphur Dioxide (SO ₂)	0.5	0.2	0.1	0.05
Dust	0.15	0.1	0.08	0.05
Carbon Monoxide (CO)	5.0	4.0	3.5	3.0

Table 5: National Air Quality MPCs

113. Emission standards are stipulated by The Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 14 of January 21, 2014 "On Approval of the Regulation on the Procedure for Developing and Coordinating Environmental Draft Projects". It states that the main criterion for establishing MPE are quotas for pollutants.

Project Air Quality Standards

114. Any air quality monitoring during the construction phase will be undertaken against national standards as they meet WHO standards.

2.4.2. Water quality standards

115. <u>National Standards</u> - Ambient river water quality standard is given as Maximum permissible concentration (MPCs) established by "SanPiN Nº0318-15 Hygienic and anti-epidemic requirements for the protection of water reservoirs on the territory of the Republic of Uzbekistan. MPC has two categories. First category is for centralized or non-centralized drinking water supply. The second category is for cultural and everyday purposes of the population, recreation, and sports.

 $^{^{3}\} https://wedocs.unep.org/bitstream/handle/20.500.11822/17141/Uzbekistan.pdf?sequence=1&isAllowed=yallowe$

116. In addition to the above, the WBG provides guidelines values for treated sanitary sewage discharges. The following table provides these values with which the Project shall also comply, for example relating to any wastewater discharge from construction camps.

Pollutant	Unit	Guideline Value
рН	pН	6-9
Biological Oxygen Demand (BOD)	Mg/I	30
Chemical Oxygen Demand (COD)	Mg/I	125
Total Nitrogen	Mg/I	10
Total Phosphorus	Mg/I	2
Oil and Grease	Mg/I	10
Total Suspended Solids	Mg/I	50
Total Coliform Bacteria	MPN ^A / 100 ml	400

Table 6: WBG Indicative	Values for	Treated Sanitary	Sewage Discharges
	values ioi	ricacca eanicar	och age Bischai ges

Water Quality Project Standards

117. Baseline water quality monitoring will be assessed against national MPCs.

Water Discharge Project Standards

118. Wastewater discharge from construction sites and camps shall be assessed against WBG values (for any treated sanitary sewage discharge) and against national MPDs which will be set by SCEEP.

2.4.3. Noise

119. <u>National Standards</u> - Nº 0331-16 Admissible noise level into the living area, both inside and outside the buildings is used to ensure the rules of acceptable noise levels for residential areas in Uzbekistan. These rules and regulations establish permissible noise parameters in residential, public buildings and residential buildings of populated areas created by external and internal sources, as well as general requirements for measurements, measurement methods and hygienic noise assessment at research sites. Evaluation of the sound level at the calculation point is performed for the day and night period of the day (from 7 to 23 hours and from 23 to 7 hours) and takes into account the maximum intensity of the sound source level during the half-hour period. Table 7 presents the permissible noise levels in the territories that are most significant for the project. The levels are almost identical to IFC standards shown below, with the exception of the periods where IFC are slightly more stringent. As such IFC guideline limits will be used for the Project.

Table 7: Noise limits from SanPiN No. 0331-16

Purpose of premises or territories	Time	SanPiN No. 0267-09
Territories adjacent to homes, clinics,	From 7 am to 11 pm	55 dB(D)
dispensaries, rest homes, boarding houses,	From II pm to 7 am	45 dB(A)
nursing homes, child care facilities, schools		
and other educational institutions, libraries.		

120. <u>WBG Standards</u> – To meet WBG guideline requirements noise impacts should not exceed the levels presented in Table 8 or result in a maximum increase in background levels of 3 dB at the nearest receptor location off site.

Receptor	One-hour Laeq (dBA)	
	Daytime	Night-time
	07.00-22.00	22.00 - 07.00
Residential; institutional;	55	45
educational		
Industrial; commercial	70	70

Table 8: WBG Noise Level Guidelines

121. <u>Workplace Noise</u> - In order to protect the health of staff in the workplace Uzbekistan, utilizes the law (SanPiN) No. 0325-16. Sanitary Standards for Permissible Noise Levels at the Workplace -. This document provides acceptable noise levels for various types of work, the most significant of which are listed below in Table 9. In addition, the IFC provides noise limits for various working environments, which are also illustrated in Table 9.

Type of work, workplace	SanPiN No. 0325-16	General EHS Guidelines of IFC		
Performance of all types of work at permanent workplaces in industrial premises and at enterprises operated since March 12, 1985	80 dB (A)			
Heavy industry		85 Equivalent Level Laeq, 8h		
Light industry		50-65 Equivalent Level Laeq, 8h		

Table 9: Working environment Noise Limits

* Laeq- equivalent average sound pressure level

Project Noise Standards

122. For construction phase monitoring, WBG guideline limits will be followed as the nighttime period is slightly longer than Uzbek standards. For workplace noise, national guidelines shall be followed.

2.4.4. Vibration

123. <u>International Standards</u> – The German Standard DIN 4150-3 – Vibration in Buildings – Part 3: Effects on structures provides short term and long-term limits ⁴ for vibration at the foundation for various structures. This standard is considered international best practice and will be followed as part of the Project.

Table 10: Guideline Values for Vibration Velocity to be Used When Evaluating theEffects of Short-term and Long-term Vibration on Structures

Group	Type of structure	Guideline Values for Velocity (mm/s)				
		Short-term				Long-term
		At foundation			Uppermost	Uppermost
					Floor	Floor
		Less than 10 Hz	10 Hz to 50 Hz	50 to 100 Hz	All frequencies	All frequencies
I	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40	10
2	Residential dwellings and buildings of similar design and/or use	5 (105 dB)	5 to 15	15 to 20	15	5 (105 dB)
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines I or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3 (100.5 dB)	2 to 8	8 to 10	8	2.5 (99.0 dB)

Source: DIN 4150-3, Structural Vibration, Part 3: Effect of vibration on structures

124. DIN 4150-3 notes that "experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur. If damage nevertheless occurs, it is to be assumed that other causes are responsible. Exceeding the value in the table does not necessarily lead to damage".

⁴ short-term vibrations are defined as those that do not occur often enough to cause structural fatigue and do not produce resonance in the structure being evaluated and long-term vibrations are all the other types of vibration.

Project Vibration Standards

125. German Standard DIN 4150-3 will be followed during the construction phase.

2.4.5. Waste Management Standards

126. <u>National Standards</u> - The Law on Waste No.362-II of April 5, 2002 (modified 11 October 2018) regulates solid waste treatment procedures and defines the authority of various institutions involved in solid waste management. The law also provides rules for the transport of solid waste. Hazardous wastes that are transported must undergo environmental certification and be transported by special vehicles.

2.4.6. Hazardous material

127. <u>National Standards</u> - The order to place hazardous chemicals and hazardous materials in special landfills, their protection and disposal, approved by the State Committee for Nature Protection, the Ministry of Emergency Situations, the Ministry of Finance, the Ministry of Health No. 2438 of March 20, 2013. The provision identifies hazardous chemicals, toxic materials, special landfills and special vehicles. The state organization "Kishlokkime" (Agricultural Chemicals) is responsible for the transportation and disposal of hazardous materials.

128. Transportation of such materials should be carried out in accordance with the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 35 dated February 16, 2011 "On rules of transportation of hazardous materials in the territory of Uzbekistan". The Ministry of Health and the State Committee for Nature Protection approve proper performance of work.

2.5. Sanitary Protection Zones and Electro Magnetic Field

2.5.1. Sanitary Protection Zone

129. According to sanitary and epidemiological rules and regulations (SanPiN 2.2.1 / 2.1.1.984-00), in order to protect the population from the effects of the electric field created by overhead high voltage power lines, sanitary protection zones (SPZ) are established. The SPZ of the overhead line is the territory along the high-voltage line, in which the electric field exceeds 1 kV / m.

130. In accordance with the RCM N^{\circ} 93 of 17.05.2010 for newly designed overhead lines and in accordance with paragraph 14 (a) of Annex I to the CM Resolution N^{\circ} 1050 "On Approval of Rules for the Protection of Electric Grid Facilities" from 26.12.2018, as well as buildings and structures are allowed to take the boundaries of sanitary protection zones along the overhead line with a horizontal arrangement of wires and without means of reducing the electric field strength on both sides of it at the following distances from the projection onto the ground of the outer phase wires in a direction perpendicular to the overhead line:

- 20 meters for overhead lines with a voltage of 110 kV.
- 25 meters for overhead lines with a voltage of 220 kV.
- 30 meters for overhead lines with a voltage of 500 kV.

2.5.2. International Electromagnetic Field (EMF) Standards

131. WBG EHS guidelines for Electric Power Transmission and Distribution refer to International Commission on Non-Ionizing Radiation Protection (ICNIRP), which establish reference levels for general public exposure to electric field as 5 kV/m and for magnetic fields 200 μ T. In the UK, the exposure limit is 360 μ T ⁵ (reference level 100 μ T). ⁶ The typical level of magnetic field and electric fields under a power line are shown in the tables and figure below. Typical ground level field levels from overhead power lines in the UK (based on 275-400kV) are illustrated in the table below and

⁵ Only where the time of exposure is significant

 $^{^{6}\} https://www.energynetworks.org/assets/files/electricity/she/emfs/ENA\%20 training\%20 distribution\%20 EMFs\%20 v5.pdf$

show that at a distance of 25 meters EMF levels are well below ICNIRP reference levels for both magnetic and electric fields. Further, typical field under the lines does not exceed ICNIRP limits.

Table 11: Typical Ground-level Electric Field Levels from Overhead Power Lines (275-400kV)

Location	Magnetic Field (microteslas)	Electric Field (kV/m)				
Maximum Field (under line)	100					
Typical Field (under line)	5-10	3-5				
Typical Field (25 meters to side)	1-2	0.2 – 0.5				
Typical Field (100 meters to side)	0.05 – 0.1	0.01 – 0.04				

Source: National Grid, 2012 (https://www.nationalgrid.com/sites/default/files/documents/13791-Electric%20and%20Magnetic%20Fields%20-%20The%20facts.pdf)

132. Further, data provided by National Grid for 132kV transmission lines shows that maximum field under lines is 40 μ T and 4 kV/m which is below ICNIRP reference levels.⁷

133. Corresponding ICNIRP limits for general occupational exposure to electric and magnetic fields are significantly higher at 10 kV/m and 1,000 μ T, respectively. In the UK, the occupational exposure limits (high action level) are 6000 μ T and 20 kV/m and 1000 μ T and 10 kV/m (low action level).

134. The EU have also provided guidance via a Directive on occupational exposure to EMF (2013/35/EU) on EMF exposure which is closely based in ICNIRP guidelines. The Directive requires different actions at successive action levels and exposure limit values. They are summarised as follows:

- You have to do an exposure assessment as soon as you exceed the public exposure limits.
- You can exceed the action levels provided you have put in place various provisions.
- You can exceed the sensory exposure limit values provided you control any sensory effects that might arise.
- You cannot exceed the health exposure limit value.
- 2.6. Permit and Licenses
- 135. Required permits and licenses are listed in Table 12.

Permit Required Activity	Permit Title	Issuing Authority	Implementing Law	Responsible Party for Obtaining License
Pre-construction				
Construction activities	Construction Permit	Hokimiyats of each Project component region	 Resolution of the Oliy Majlis of the Republic of Uzbekistan "On the list of activities for which a license is required" No. 222-II of 12.05.2001. Resolution of the Cabinet of the Republic of Uzbekistan No. 54 of 02/25/2013. Appendix I "Regulations on the procedure for granting land plots in populated areas for the implementation of 	NEGU

Table 12: Required permits and licenses

⁷ https://www.nationalgrid.com/sites/default/files/documents/13791-Electric%20and%20Magnetic%20Fields%20-%20The%20facts.pdf)

Permit Required Activity	Permit Title	Issuing Authority	Implementing Law	Responsible Party for Obtaining License
			urban planning activities of design and registration of construction objects, as well as the acceptance into operation of objects"	
Construction activities	Environment Decision	Goskomekologiya	- Law «On Nature Protection» (1992) - PKM RUz No. 491 of December 31, 2001. "On Approval of the Regulation on State Ecological Expertise"	NEGU
Construction activities	Cultural Heritage Clearance	Ministry of Culture of Uzbekistan	 Law on the Protection and Use of Cultural Heritage Objects (2001) The Law "On Specially Protected Territories" with amendments and additions (08/30/93) 	NEGU
Construction activities	Visual geological- engineering conclusion	O'zGASHKLITI	 PCM Ruz No. 222 "On Improving the System of Permitting Procedures and State Supervision in the Sphere of Urban Planning" Urban Development Code of the Republic of Uzbekistan 	NEGU
Waste discharge	Waste passport		Oz RH 84.3.18: 2005. Regulation Document on Production and consumption waste.	NEGU
Hazardous materials transport and storage	Hazardous materials permission	"Kishlokkime" (Agricultural Chemicals)	The Order No. 2438 of March 20, 2013	NEGU
Construction activities	SPZ permits	Relevant Regional Hokimiyats, and relevant Regional Department of Ecology and Environmental Protection		NEGU
Construction Pha	se			
Underground water abstraction	Mineral extraction license	State Committee on Geology and Mineral Resources	PKM number 443 of 12.06.2018. Regulations on the procedure for issuing licenses for the right to use subsoil areas containing non-metallic minerals	Contractor
Construction or upgrade of access roads	Approval of construction or upgrade activities	State Inspectorate for quality control of roads and construction works under the Cabinet of Ministers of the	Law of the Republic of Uzbekistan "On Automobile Roads"	Contractor

Permit Required Activity	Permit Title	Issuing Authority	Implementing Law	Responsible Party for Obtaining License
		Republic of		
		Uzbekistan		
Transportation	Transportation	State Committee of	PKM RUz No 11 of January	Contractor
of oversized and	permit	the Republic of	11, 1995 On the procedure	
overweight		Uzbekistan on	for the entry, stay, transit	
cargo		highways	and departure of foreign	
			road carriers from the	
			territory of Uzbekistan "	
Spoil disposal	Spoil disposal	Goskomekologiya	Law "On Subsoil", dated	Contractor
	approval	Waste department	May 8, 2012	

2.7. International Agreements and Conventions

136. The global agreements in which Uzbekistan is a Party are as follows:

- UN Framework Convention on Climate Change (06/20/1993).
- Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (05/26/1993).
- Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (12/22/1995).
- Paris Convention on Protection of the World Cultural and Natural Heritage (12.22.1995).
- UN (Rio) Convention on Biological Diversity (05.05.1995).
- United Nations Convention to Combat Desertification (08/31/1995).
- Convention on International Trade of Endangered Species of Wild Flora and Fauna (07/01/1997).
- Bonn Convention on the Conservation of Migratory Species of Wild Animals (05/01/1998);
- Ramsar Convention on Wetlands of International Importance Especially as Wildlife Habitat (30.08.2001), etc.
- UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) (9.08.2007).
- Convention on the Law of the Non-Navigational Uses of International Watercourses (August 9, 2007).

137. As a member of the CIS countries, Uzbekistan is a member of the Interstate Environmental Council on the harmonization of environmental legislation, the development of the EA and the development of economic instruments for environmental protection, as well as a member of the Interstate Environmental Fund for financing environmental protection in interstate and regional programs.

2.8. Asian Development Bank Safeguard Policies 2009

138. The ADB has three safeguard policies that seek to avoid, minimize or mitigate adverse environmental impacts and social costs to third parties, or vulnerable groups as a result of development projects. The Project requires the application of both environmental safeguard and social safeguard.

Safeguard Requirements I: Environment

139. The objectives are to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process. Environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts. Eleven 'Policy Principles' have been adopted as part of the ADBs Safeguard Policy Statement (SPS 2009), including:

140. Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks. The Project was screened by the ADB and classified as a Category B project – see REA, Appendix Q.

141. Conduct an environmental assessment for the proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential transboundary and global impacts, including climate change. Use strategic environmental assessment where appropriate. The IEE herewith provides the environmental assessment for the Project. A separate Climate Risk Vulnerability Assessment (CRVA) has been prepared for the Project. All of the proposed works are located within Uzbekistan and will not have transboundary impacts. One line passes through Kazakhstan, but no rehabilitation works are proposed in this location.

142. Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative. Alternatives have been considered, including the 'no project' alternative in Section 4.

143. Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an environmental management plan (EMP) that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle. An EMP has been prepared for the Project and is outlined in detail in Section 10.

144. Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a grievance redress mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance. Consultations were held to discuss environmental issues, the findings of the consultations (and a description of the Project grievance redress mechanism) are presented in Section 9.4.

145. Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders. This IEE and its EMP will be disclosed on the ADB and NEGU web-site (in local language for NEGU).

146. Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports. The IEE and its EMP outline a plan to monitor the implementation of the EMP and the institutional responsibilities for monitoring and reporting throughout the Project lifecycle: Section 10.

147. Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area

of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources. **Critical habitats have not been identified that maybe significantly impacted by the Project**.

148. Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phase-outs. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides. **The IEE outline the mitigation plan of the EMP: Section 10.**

149. Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities. The IEE and its EMP outline the requirement for specific community health and safety plans: Section 10.

150. Conserve physical cultural resources and avoid destroying or damaging them by using fieldbased surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation. (**A sample chance find procedure is provided in this IEE – see Appendix P**).

Safeguard Requirements 2: Involuntary Resettlement.

151. The objectives are to avoid involuntary resettlement wherever possible; to minimize involuntary resettlement by exploring project and design alternatives; to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-project levels; and to improve the standards of living of the displaced poor and other vulnerable groups. The safeguard requirements underscore the requirements for undertaking the social impact assessment and resettlement planning process, preparing social impact assessment reports and resettlement planning documents, exploring negotiated land acquisition, disclosing information and engaging in consultations, establishing a grievance mechanism, and resettlement monitoring and reporting.

152. The involuntary resettlement requirements apply to full or partial, permanent or temporary physical displacement (relocation, loss of residential land, or loss of shelter) and economic displacement (loss of land, assets, access to assets, income sources, or means of livelihoods) resulting from (i) involuntary acquisition of land, or (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas. Resettlement is considered involuntary when displaced individuals or communities do not have the right to refuse land acquisition that results in displacement. A Draft Land Acquisition and Resettlement Plan (LARP) has been prepared for the Project according to the requirements of ADB and is summarized in this IEE.

Safeguard Requirements 3: Indigenous Peoples.

153. The objective is to design and implement projects in a way that fosters full respect for Indigenous Peoples' identity, dignity, human rights, livelihood systems, and cultural uniqueness as defined by the Indigenous Peoples themselves so that they (i) receive culturally appropriate social and economic benefits, (ii) do not suffer adverse impacts as a result of projects, and (iii) can participate actively in projects that affect them. According to the Draft LARP The Project does not involve impacts to Indigenous Peoples and therefore no further actions relating to this safeguard are required.

2.9. Gap analysis

154. The environmental assessment of the Project will need to satisfy both, the national requirements of Uzbekistan and ADB. A harmonized safeguard framework is developed for conducting the IEE. The framework is given below.

Aspect	ADB	Uzbekistan	Harmonized
Environmental Policy and Regulations	ADB's SPS (2009) sets out the policy objectives, scope and triggers, and principles for three key safeguard areas: -Environmental safeguards, -Involuntary resettlement safeguards, and -Indigenous peoples safeguards	EIA is called State Environmental Expertise (SEE) in Uzbekistan. SEE is stipulated in the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On the further improvement of the environmental impact assessment mechanism" No. 541 (2020).	The Project follows both ADB's SPS (2009) and Resolution No.541, (2020).
Screening	ADB carries out project screening and categorization at the earliest stage of project preparation when sufficient information is available for this purpose using rapid environmental assessment (REA) checklist. Categories A, B, C, FI	A project category is classified in accordance with Appendix I to RCM No. 541.	All the requirement of ADB will cover the requirement of Uzbekistan requirement. Then the project will follow the Category B of ADB and Category II (national legislation)
Alternatives	Examination of financially and technically feasible alternatives to the project location, design, technology and components, their potential environmental and social impacts.	Alternative assessments are to be carried as per request of the Center for State Ecological Expertise.	Assessment of alternatives will be included.
Reporting	Guidelines and Table of Contents are provided for IEE report in SPS (2009). EMP will include proposed mitigation measures, monitoring and reporting requirements, institutional arrangements, schedules and cost estimates. The report should be in English.	Draft of Concept Statement on Environmental Impact (national acronym PZVOS) requires, Baseline, analysis of alternatives, Pollution prevention plan, Waste storage, and other mitigation. The report should be in Russian.	The Project prepared IEE report in English following the form of ADB. After that IEE report is translated in Russian or Uzbek and change the format in Uzbekistan style. The contents of two reports are same but layout and language is different.
Public Consultations	"Meaningful" consultation with affected people are required for the project.	Public meetings are mandatory for all projects.	A wide range of public consultations have been undertaken to ensure they are 'meaningful'.
Public Disclosure	Draft IEE will be published in ADB website before Project approval by the Board.	If the report has secrets of official or private organization, it should not be disclosed.	Draft IEE report (English and Russian or Uzbek) will be published in ADB Website. The copies of the Russian version of Draft of Concept Statement on

Table 13: Comparison of ADB and Uzbekistan Legislation Requirements

UZB: Digitize to Decarbonize - Power Transmission Grid Enhancement Project - Initial Environmental Examination

Aspect	ADB	Uzbekistan	Harmonized
			Framework
			Environmental Impact will
			be made available at the
			affected villages.

3. Description of the Project

3.1. Introduction

155. This section of the report presents the Project description for all Project components, including the design, construction and operation and maintenance aspects of the Project.

3.2. Project Overview and Location

156. The overarching goals of the Project are:

- Increase energy security through versatility and expansion of power lines;
- Improve reliability of power supply in the country and the region;
- Reduce transmission losses; and
- Improve operational efficiency of the power sector.

157. Initially NEGU selected 24 potential sub-projects (all transmission lines) for inclusion in the Project. Screening of these 24 sites (including site visits) was undertaken in March 2022 to assess which of these sub-project's sites should be 'screened-out' of the Project due to their potentially high risk environmental and social impacts, e.g., being located within a protected area, or having significant resettlement requirements.

158. Subsequently 14 sub-projects were selected from the original list, all deemed to have limited environmental and social impacts based on the screening exercise. The table below lists the selected sites.

#	Line	Region	Voltage	Lengths (km)
I	L-19-23	Tashkent	110 kV	14.53
2	L-F-Ch	Tashkent	110 kV	8.00
3	L-19-D	Tashkent	110 kV	11.36
4	L-22-23	Tashkent	110 kV	23.90
5	L-7-F-1,2	Ferghana	110 kV	6.56
6	L-Ks-A	Tashkent	220 kV	15.40
7	L-K-K	Kashkadarya	220 kV	37.50
8	L-32-K	Kashkadarya	220 kV	27.70
9	L-32-M	Kashkadarya	220 kV	5.00
10	L-Hamza-I	Bukhara	220 kV	36.10
11	L-D-Sh	Surkhandarya	220 kV	77.20
12	L-H-K	Samarkand / Navoi	220 kV	81.50

Table 14: Project Transmission Lines

159. In addition to the transmission lines rehabilitation of four substations is planned, including:

Table 15: Project Substations

#	Region	Name	Voltage
Ι	Tashkent	Zafar	220 kV
2	Navoi	Zarafshon	220 kV
3	Namangan	Obi Khaet	220 kV
4	Tashkent	Fayziobod	220 kV

160. Geographically, the project will be implemented in several regions across Uzbekistan. The following figures illustrates the site locations.


Figure 3: Location of the Substations within Uzbekistan

Figure 4: Location of the Transmission Lines in Samarkand, Bukhara, Kashkadarya and Surkhandarya





Figure 5: Location of the Transmission Lines within Tashkent Region

Figure 6: Location of the Transmission Lines within Ferghana Valley



161. Section 6 provides site specific routes and locations for all twelve lines and Section 7 provides location maps of the four substations

UZB: Digitize to Decarbonize - Power Transmission Grid Enhancement Project - Initial Environmental Examination

162. The total investment cost of the project is estimated at **US\$ 110 million**, including physical and non-physical components. The Project is anticipated to be completed within 30 months from bidding.

3.3. Project Footprint

Transmission Lines

163. The "Project footprint' - is the total estimated physical area of land required by the Project. According to the Draft Land acquisition and resettlement plan (LARP), the area of the temporarily affected land on which the power transmission tower wires will be erected and installed will be 352.3 hectares.

164. This temporary footprint represents the work area that needs to be free of people and livestock during the construction phase for safety reasons. It does not represent the whole area which will necessarily be impacted by construction activities.

165. The area between the towers, between 150 and 225m, will not be impacted significantly by Project works. The areas between the towers will only be affected by the following activities:

- Laying out of the wires between the towers prior to the stringing.
- Pulling/tensioning sites.
- Staging areas.

166. Regarding permanent land use, the preliminary area of the land plot for placing the towers will be 35.65 hectares. No additional land is required for substations as all work will be completed within the boundary of the existing substation sites.

167. Existing tracks are present to all of the existing lines and substations and there will be limited requirements for construction of new access roads. Some access roads may be required where existing agricultural tracks, which generally are numerous along the entire alignment, cannot be found. Some of the existing tracks may require limited upgrading to allow vehicle access.

Substations

168. All substation works will be undertaken within the boundary of existing substations. No additional permanent or temporary land requirements are necessary.

3.4. Incorporated Mitigation Measures

3.4.1. Embedded Design Measures

169. Aspects of the Project that have been developed specifically to mitigate potential environmental or social impacts associated with this Project are termed embedded design measures (EDM) and are identified in this chapter by a reference number in parentheses following the EDM. The reference number is prefixed by the letter EDM. This is followed by is environmental characteristic, e.g. AQ for air quality, CHS for community health and safety, etc, and then by a list number, e.g. 01, 02, 03, etc. An example is given in the box below, where EDM-CHS-01 is the reference number. All the EDMs have been referenced in the Project EMP (Section 10).

Box I: Examples of Incorporated Design Measures

Example EDM - The overhead lines will be constructed with a 25m sanitary protection zone (EDM-CHS-01).

3.5. Transmission Line Design

3.5.1. Design Standards

170. The technical design of power transmission lines in Uzbekistan is regulated by the State Technical Design Standard (GOST) and the Electrical Installation Code (EIC) Rules, which are mandatory in all projects of power transmission facilities. The characteristics of supports, foundations of supports, wires, cables, earthing, insulators and even connection fittings are standardized by GOST. These

standards have been inherited from the Soviet times and have remained practically unchanged since then. All power transmission facilities existing in Uzbekistan have been designed and constructed in accordance with these technical standards.

171. These standards are not the same as those used in Europe. In most cases, they provide greater reliability and durability. For example, according to GOST in metal designs of supports it is used on 25-30 % more steel, than for similar designs in Europe. For precast concrete foundations manufactured in accordance with GOST, 40-50% more concrete is used than in Europe. From an economic point of view, the use of the European Technical Design Standards would probably achieve considerable savings, but they cannot be considered in Uzbekistan.

3.5.2. Length of Line, Number and Height of Towers and Tower Dimensions

172. The total length of the proposed transmission lines is approximately 445 km. The following table provides and overview of each line.

Line	Region	Voltage	from Substation	to Substation	Circuits	Conductor	Lengths (km)	Approximate Number of Towers
L-19-23	Tashkent	110 kV	GES-23	GES-19	single	ACSR 240/32	14.53	70
L-F-Ch	Tashkent	110 kV	Feruz	Chinaz	single	ACSR-150/24	8.00	40
L-19-D	Tashkent	110 kV	GES-19	Dalaguzar	single	ACSR-185/24	11.36	55
L-22-23	Tashkent	110 kV	GES-22	GES-23	single	ACSR-150/24	23.90	120
L-7-F-1,2	Ferghana	110 kV	GES-7A	Fergana	single	ACSR-120	6.56	30
L-Ks-A	Tashkent	220 kV	Korakiyasay	Adolat	single	ACSR-400/51	15.40	75
L-K-K	Kashkadarya	220 kV	Koson	Karshi	single	ACSR-500/64	37.50	185
L-32-K	Kashkadarya	220 kV	GES-32	Koson	double	ACSR-400/51	27.70	135
L-32-M	Kashkadarya	220 kV	GES-32	Mubarak	single	ACSR-400/51	5.00	25
L-Hamza- I	Bukhara	220 kV	Karakul	Hamza-2	single	ACSR-300	36.10	180
L-D-Sh	Surkhandarya	220 kV	Denau	Sherabad	single	ACSR-500/64	77.20	385
L-H-K	Samarkand	220 kV	Kattakurgan	Khimiya	single	ACSR-500/64	81.50	405

Table 16: Transmission Line Details

173. This IEE recommends that steel poles be used as the preferred option for the project (except where angle towers are required) for several reasons including reduced footprint (see section on Alternatives below for more details). The distance between any two towers depends on the type of terrain and support tower but will generally vary from 200 to 250 meters (or more depending on river and valley crossings).

174. The height of the towers will be between 32 and 46m depending upon the site layout.

175. The approximate dimensions for concrete pole towers will be approximately 5 m2. The approximate dimensions of the tower base for steel framed towers will be between 25m2 and 50m2.

3.5.3. Construction Materials

176. Prefabricated reinforced concrete and metal are used as the basic material of supports in the project. Intermediate supports on HV lines are metal and reinforced concrete. Anchor-corner supports are made of metal. The following types of concrete and metal will be used for structures:

- Type of concrete for structures made of vibrated reinforced concrete: frost resistance F100, waterproof W4. Structures of vibrated reinforced concrete are supposed to be made of concrete on the sulfate-resistant Portland cement.
- Type of concrete centrifuged stands of reinforced concrete supports: frost resistance F150, waterproof W6. The concrete of the reinforced concrete centrifuged supports is supposed to be produced on the sulfate-resistant Portland cement.

 Metal structures of steel supports will be manufactured: welded - from B steel. ST.3. PS 5, bolted from B grade steel according to GOST 380-88.

3.5.4. Other Design Characteristics

Bird Protection

177. To protect the birds from electric shock, to prevent contamination and insulation overlapping, a bird guard will be installed on the ends of the crossheads of intermediate supports, as well as on the crossheads of anchor-angle supports, where the stub is to be looped by means of a suspension string, above each suspension set (EDM-BIO-1).

<u>Theft</u>

178. To prevent theft of bolt support elements, anti-theft bolts will be provided.

Earthing

179. The towers will be equipped with an earthing device.

Insulation

180. Glass insulators are used as insulation. The actual safety margin coefficients of insulators and linear fittings correspond to the coefficients regulated by Electrical Installation Code (EIC). To protect wires and cables from vibration, vibration dampers are provided in all spans, one for each wire (rope) on both sides of the span.

Foundations

181. Prefabricated reinforced concrete foundations F5-2, F5-AM and crossbar P1-A and AR-5 of 1977 unification are provided for metal supports, in some cases with PC1-A ballast slabs, the use of which makes it possible not to install paired foundations. In especially severe cases, a special L-shaped foundation F5-USU250 will be used to ensure the load-bearing capacity of foundations with breaking out force, which makes it possible to install connecting foundations without metal beams. Reinforced concrete supports will be fixed in the ground using standard reinforced concrete crossbars AR6. In-situ foundations are also acceptable.

Corrosion

182. According to the requirements of KMK 2.01-11.96 "Corrosion Protection of Building Structures", the foundations of the supports will be protected with bituminous waterproofing in two layers on the primer. Waterproofing of the underground part of reinforced concrete struts (up to 3.5 m from the bottom log), foundations, slabs and crossbars will be performed by two-layer reinforcement with a cloth of severe ART-4744 on oil bitumen of type II. Nefras C4-130/210 has been adopted as a solvent.

183. This design has been proposed by the Consultant on the basis of information available at the time of preparation of the report. The precise determination of the type of supports, the location, the line elements used, and the line route will be carried out during the detailed design phase by the EPC Contractor who will be responsible for ensuring all recommendations of this IEE are followed.

3.6. Transmission Line Construction Activities

184. The following is a sequential description of the potential activities associated with the construction of the Project.

3.6.1. Land Acquisition

185. A Draft Land Acquisition and Resettlement Plan (LARP) has been prepared according to Uzbek Laws, the ADB SPS (2009). JSC NEN will be responsible for the timely implementation of the LARP prior to the start of construction.

3.6.2. Surveying the Transmission Centreline, Other Project Features and Work Areas

186. Ground survey and staking will be performed to locate tower centers, right-of-way boundaries, new access roads, spur roads to tower sites, overland access and temporary work areas. Flagging will be maintained until final cleanup and/or reclamation is completed, after which they will be removed.

187. The right of way of the alignment and any additional temporary workspaces will be surveyed and set out (i.e. marked out and, where necessary, fenced off). (EDM-BIO-02).

188. Sensitive receptors that need to be avoided during construction will be marked (EDM-BIO-03).

189. A record will be made of the condition of access roads, construction camps, laydown areas and rail offloading areas and any special features in the Project alignment before construction to inform the reinstatement works (EDM-IU-01).

3.6.3. Upgrading or Construction of Temporary and Permanent Access Roads

190. Existing paved and unpaved roads will be used for the initial transportation of materials and equipment from the staging and storage areas to locations where they will be needed along the transmission line right-of-way (EDM-IU-02).

191. If any new access roads are required the EPC Contractor shall do what is necessary to make the access suitable for his use and shall take all reasonable precautions to avoid damage, including, if required the erection of temporary fences or gates where permanent fences, hedges or gates have been removed (EDM-IU-03).

192. Access roads shall not be cut into a hillside immediately below a tower (EDM-SG-01). Plans for access roads in steep terrain will be submitted to the PMU and PIC for approval (EDM-SG-02). Stability of slopes over 30% shall be checked and approved by the PMU/PIC prior to selection of foundation to be used (EDM-SG-03). Access roads will be graded and sloped to prevent unnecessary flow of water across the tower sites and to minimize soil erosion (EDM-SG-04).

193. New earth access tracks shall be suitably compacted (EDM-SO-05). The final surface level shall be at least 0.5 m above the existing ground level and shall be constructed in such a way as to be adequately drained to prevent washouts and flooding impacts to adjacent properties (EDM-HY-01). Junctions between new tracks and existing roads shall not impede or damage the latter nor any associated drainage channels, irrigation infrastructure, etc. (EDM-HY-02).

194. During construction, dust control measures will be implemented on all roads within 250m of residential / sensitive receptors (EDM-AQ-01).

3.6.4. Clearing and Grading Activities for the Right-of-Way, Tower Sites and Camps

195. Clearing of vegetation may be required for construction purposes. Vegetation will be selectively removed under or near the towers to provide adequate electrical clearance as required by National Standards (EDM-BIO-04). Camp sites shall be selected to avoid the cutting of mature vegetation (EDM-BIO-05). There is restriction for agriculture activities near the towers, trees and other types of plants can be planted, the maximum height of which should not exceed 4 meters in a radius of 1.5 meters around the towers.

3.6.5. Excavating and Installing Foundations

196. Tower sites will be sloped as necessary to prevent erosion (EDM-SG-06). Natural flows will be diverted around the site and the site protected by grading, placing rip-rap, or other erosion control measures (EDM-SG-07).

197. Vertical excavations for foundations will be made with power drilling equipment. Where soils permit, a vehicle-mounted power auger or backhoe will be used. In rocky areas, the foundation holes will be excavated by drilling or installing special rock anchors. Pre-cast footings will be installed.

3.6.6. Assembling and Erecting Towers with Temporary and Permanent Pad Sites

198. Bundles of steel members and associated hardware (and often times insulators, hardware and stringing sheaves) will be transported to each tower site by truck. Wood blocking is hauled to each location and laid out, then the tower steel bundles are opened and laid out for assembly by sections and assembled into subsections of convenient size and weight. Steel poles will arrive preassembled at site.

199. Typically, the leg extensions for the structures are assembled and erected by separate crews with smaller cranes to make ready for setting of the main structure assembly. The assembled subsections are then hoisted into place by means of a large crane and fastened together to form a complete tower. A follow-up crew then tightens all the bolts in the required joints.



Figure 7: Foundation Installation, Tower Assembly, and Tower Erection

Figure 8: Typical Construction Zone for Installation of New Towers Adjacent to Existing (to be replaced) Towers



Source: Consultants own photo. Stockholm, March 2020.

200. A range of towers are proposed for the Project, final selection to be made by the EPC Contractor during design.



Figure 9: Types of Tower Proposed for the Project

Source: Consultants own photos, 2022

3.6.7. String Conductors, Ground Wires, and Fiber Optic Cable

201. Insulators, hardware, and stringing sheaves will be delivered to each tower site. The towers will be rigged with insulator strings and stringing sheaves at each ground wire and conductor position. For protection of the public during wire installation, guard structures will be erected over highways, railroads, power lines, structures, and other barriers (EDM-CHS-01).

202. Guard structures will consist of H-frame wood poles placed on either side of the barriers or by using boom trucks raising a guard cross beam. These structures will prevent ground wires, conductors, or equipment from falling across obstacles. Equipment for erecting guard structures will include augers, backhoes, line trucks, boom trucks, pole trailers, and cranes. Guard structures may not be required for small roads. In such cases other safety measures such as barriers, flagmen, or other traffic control will be used (EDM-CHS-02).

203. Following stringing and tensioning of all conductors, the guard structures will be removed, and the area restored (EDM-BIO-06).

204. Pilot lines will be pulled (strung) from tower to tower by land operated equipment and threaded through the stringing sheaves at each tower. Following pilot lines, a stronger, larger diameter line will be attached to conductors to pull them onto towers. This process will be repeated until the ground wire or conductor is pulled through all sheaves.



Figure 10: Wire Hanging

205. Ground wires, fiber optic cable and conductors will be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end of a conductor segment.

206. Sites for tensioning equipment and pulling equipment will be approximately two to three kilometers apart as determined by the EPC Contractor. Tensioners, pullers, line trucks, wire trailers, dozers, pickups and tractors needed for stringing and anchoring the ground wire or conductor will be located at these sites. The tensioner, in concert with the puller, will maintain tension on the ground wire or conductor while they are fastened to the towers. Tension will be maintained on all insulator assemblies to assure positive contact between insulators, thereby avoiding sparking. Caution also will be exercised during construction to avoid scratching or nicking the conductor surface, which may provide points for corona to occur.

3.6.8. Installing Counterpoise (Tower Grounds) Where Needed

207. Part of standard construction practices prior to conductor installation will involve measuring the resistance of the ground to electrical current near the tower structures. If the measurements indicate a high resistance, counterpoise will be installed, which will consist of trenching in- ground wire to a depth of 12 inches in non-cultivated land and 18 inches in cultivated land, with a ground rod driven at the end. The counterpoise will be contained within the limits of the rights- of-way and may be altered or doubled back-and-forth to meet the requirements of the projects. Typical equipment used for installing ground rods includes line trucks, backhoes and trenchers, etc.

3.6.9. Clean-up and Reclamation of Affected Areas

208. Construction sites, material storage yards, and access roads will be kept in an orderly condition throughout the construction period (EDM-WM-01). Refuse and trash will be removed from the sites and disposed of in an approved manner (e.g., in an approved landfill) (EDM-WM-02). In remote areas, trash and refuse could be removed to a construction staging area and contained temporarily until such time as it could be hauled to an approved site (EDM-WM-03). No open burning of construction trash will be permitted (EDM-WM-04). Contaminants such as oils, hydraulic fluids, antifreeze and fuels will not be dumped on the ground, and all spills will be cleaned up (EDM-WM-05).

3.7. Design Characteristics of Substations

209. Three of the four substations will be completely rehabilitated, they include:

- <u>Faysiobod SS</u> Replacement of the two power transformers, 4x 220 kV circuit-breakers, 11x 110 kV circuit-breakers and associated equipment, new 10 kV switchgear, new cabling, new protection, control and measuring equipment. New control building which shall house the 10 kV switchgear too.
- <u>Zarafshon SS</u> The existing 220 kV bays with oil tank circuit-breakers and associated equipment shall be replaced i.e., 7 bays, new cabling, new protection (electro-mechanical relays from 1970s), control and measuring equipment. Complete replacement of 35 kV switchgear with indoor switchgear to be housed in the new control building. According to NEGU the transformer capacity shall be increased by 170 MVA. It is recommended to replace the existing power transformers with new ones e.g., 2x 125 MVA to reduce the energy losses.
- <u>Zafar SS</u> The two power transformers shall be replaced with 2x 200 MVA transformers. The entire 110 kV switchgear must be replaced, two 220 kV incoming bays must be constructed, the power transformers must be replaced, new cabling, new protection, control and measuring equipment. New control building which shall house the 10 kV switchgear for the station supply (10/0.4 kV).

210. Obi Khaet SS will be partially rehabilitated. The existing pneumatic driven high-voltage circuitbreakers and associated equipment shall be replaced i.e., 9 bays 110 kV and 5 bays 220 kV, new cabling, new protection (electro-mechanical relays from 1970s), control and measuring equipment.

3.8. Construction of Substations

211. Construction at each substation will take place simultaneously with each substation site employing around 20-30 (5-10 skilled and remaining unskilled) workers; it will take approximately 9 months for each new substation to be completed.

212. When the design of the substations is finalized and approved, the construction activities commence with the clearing of obstructions, existing equipment and vegetation. The boundary wall of the substation property is fenced to avoid unauthorized entry into the site. Post award the EPC contractor shall set up temporary construction facilities including material storage areas and camps for workers.

213. Some substations may require cutting and backfilling to create a level construction platform or elevate the site; soil is graded and compacted.⁸ The foundation for the substation structures, transformer pads, cable trenches, rails, and other equipment will be constructed in accordance with the approved detailed design (EDM-SG-08). Oil pit will be provided (impermeable bunded area of 110% capacity) in the transformer pad area to ensure collection of any potential oil leak or spill to the ground (recommended specifications are provided in Section 8) (EDM-SO-09). Once all civil works are completed, the installation, erection, testing and commissioning of equipment follows in accordance with the prescribed specifications.

3.9. Construction Camps and Laydown Areas

214. Construction camps will be established for the Project transmission lines. The location of the camps will be determined by the EPC Contractor and no specific location for any camp site has been provided to date by NEGU. Siting of the camp will consider the sensitive site restrictions provided in this IEE, e.g., not locating within 200m of a water course or within 500m of residential areas (EDM-CHS-01). The camp will be approximately 2 hectares in size. Workers at substations will be accommodated in residential areas.

3.10. Equipment Refuelling

215. The EPC Contractor will implement standard refueling procedures for heavy equipment that is left on the rights-of-way for long periods of time, such as cranes, blades, dozers, drill rigs, etc. This equipment will be refueled in place.

⁸ EPC contractor shall determine the requirement based on detailed design for each substation site.

3.11. Manpower and Equipment

216. Construction and installation works will be undertaken by dedicated teams consisting of specialized units recommended by the technological cards/scheme operating in power engineering. Several crews of up to approximately 10 workers each will be required at each construction area, each crew responsible for a specific construction assignment including laying the foundations for the towers, assembling the towers on the ground, raising the towers, installing the wires, etc. These crews will be engaged sequentially at each construction area as the construction of each length of transmission line proceeds. The following tables provide the estimate manpower and equipment requirements for the various stages of the Project.

#	Activity	Εqι	uipment	Manpower	Timescale
I	Surveying the transmission centerline	•	2 Pick-up trucks	4 people	4 weeks
2	Upgrading or development of temporary	•	Grader	4-8 people	2 days per
	and permanent access roads	•	Bulldozer (20t)		tower
		•	Pick-up truck		
3	Clearing and grading activities	•	Grader	4-8 people	2 days per
		•	Bulldozer (20t)		tower
		•	Pick-up truck		
4	Transporting materials to the tower site	•	2 Pick-up truck	8-10 people	2 days
		•	4 Lorry (4 axle)		
5	Excavating and installing foundations	•	Excavator (22t)	6-8 people	4 day per
		•	Bulldozer (20t)		tower
		•	2 Backhoe (8t)		
		•	2 pick-up trucks		
		•	2 lorries (4 axle)		
		•	Pneumatic Tools		
6	Assembling tower	•	2 pick -up trucks	10 people	10 days per
		•	I mobile crane		tower
		•	2 lorries (4 axle)		
7	Erecting Tower by crane	•	l crane	6-9 people	2 days per
		•	2 pick -up trucks		tower
		•	2 lorries (4 axle)		
8	Stringing conductors (including layout of	•	l crane	10 people	2 to 3 days per
	equipment, unfolding of wires and raising	•	2 pick -up trucks		tower
	and stringing)	•	2 lorries (4 axle)		
		•	Mobile Bull wheel		
			tensioners		
		•	Mobile Winch		
9	Earthing Tower	•	l pick -up trucks	4 people	2 days per
		•	I Backhoe (8t)		tower
		•	Auger drill		
10	Cleanup and reclamation of affected areas	•	Bulldozer (20t)	6 people	2 days per
		•	Backhoe (8t)		tower

Table 17. Estimated Manbower and Equibinent – Transmission Line

Table 18: Estimated Manpower and Equipment – Substations

#	Activity	Equipment		Manpower	Timescale
1	Surveying the site	•	2 Pick-up trucks	4 people	2 week
2	Clearing and grading activities	•	Grader	4-8 people	2 weeks
		•	Bulldozer (20t)		
		•	Pick-up truck		
3	Transporting materials to the site	•	2 Pick-up truck	8-10 people	4 weeks
		•	2 Lorry (4 axle)		
4	Construction of substation buildings	•	2 pick-up trucks	10-15 people	3 months
		•	2 lorries (4 axle)		
		•	I mobile crane		
		•	Pneumatic Tools		
5	Installation of electrical equipment	•	2 pick -up trucks	10 people	3 months

#	Activity	Equipment	Manpower	Timescale
		I mobile crane		
		• 2 lorries (4 axle)		
6	Cleanup and reclamation of affected areas	Bulldozer (20t)	6 people	I month
		Backhoe (8t)		

3.12. Associated Facilities

217. According to ADB SPS (2009) associated facilities are "Facilities that are not funded as part of the Project but whose viability and existence depend exclusively on the project, or whose goods or services are essential for successful operation of the Project." The proposed transmission lines for rehabilitation will connect to existing transmission lines which form part of the grids of Uzbekistan. These existing lines are operational and are not dependent on the Project and are therefore not considered to be associated facilities.

4. Analysis of Alternatives

4.1. General

218. One of the objectives of an IEE is to investigate alternatives to the Project. In relation to a proposed activity "alternative" mean different ways of meeting the general purposes and requirements of the proposed activity.

219. In general, it is noted that the Project intends to reconstruct the old transmission line that has fallen into disrepair, as such there are few realistic alternatives. Accordingly, the following section provides an assessment of:

- 'no action' alternative
- Alternative sub-projects
- Alternative locations
- Alternative tower designs and conductor arrangements
- Short summary of alternative camps sites, etc.

4.2. 'No Project' Alternative

220. The "No Action" Alternative in this instance is defined as a decision not to undertake the proposed construction of the Project. The electricity demand in Uzbekistan has been increasing for the past several years, and the government estimates its power demand will be doubled by 2030. The key factors fueling the increasing power demand include increasing population, rapid urbanization, industrialization, improvement in per capita income and village electrification programs of Uzbekistan's central and provincial governments. To match the increasing trend in the power demand, regular investments in various segments of the power network – generation, transmission, and distribution are vitally important. Otherwise, the gap between the supply and demand will keep on increasing.

221. In case the proposed project is not undertaken, Uzbekistan, will not be able to cope with the increasing demand and the existing system will remain over-loaded, line losses will also remain high, and the system reliability will progressively decrease, with increasing pressure on the system. The utility will also forego the opportunity of increasing its consumers' base as well as revenue associated with the system expansion. In view of the above, the 'no project' option is not a preferred alternative.

4.3. Choice of Sub-projects

222. An environmental, social and technical screening exercise has been undertaken as part of this project to determine which transmission lines, out of a possible 27 initially proposed by NEGU should be selected for funding. The screening activity focused on the potential aspects of the individual sub-projects which could result in the Project being classified as a high risk category A project. The screening focused on:

- Biodiversity aspects, in particular the sub-project's location in relation to designated sites.
- Community safety, relating to sub-projects location in relation to residential areas
- Land acquisition and resettlement, including the number of potential affected persons (PAP) and affected households (AH).
- Technical issues.

223. 13 of the proposed sub-projects were screened out, nine since they did not constitute full line rehabilitation (only partial sections) meaning that from a technical point of view the rehabilitation works did not add full value. Four lines were excluded due to their sensitive location adjacent to or within designated sites and their potentially high resettlement impacts.

224. The result of the screening exercise is the selection of the 12 transmission lines considered to represent the lowest environmental, social and technical risk. Appendix A provides a presentation made to NEGU by ADB showing the screening results.

4.4. Alternative Location

Transmission Lines

225. The project involves upgrading of existing lines within existing corridors. No alternative locations have been proposed or will be proposed as part of the Project. Some minor changes of alignment, micro-alignment changes may be required to avoid certain sensitive features located within RoWs. Any known micro-alignment changes at this stage of the Project are identified within this IEE, otherwise they will become apparent at the detailed design stage of the Project.

Substations

226. All substation works will be undertaken within the boundaries of existing substations, no alternative locations need to be considered.

4.5. Alternative Tower Designs and Conductor Arrangements

Tower Designs

227. As part of this IEE, discussions were held with NEGU and ADBs technical consultants regarding alternative tower designs and conductor arrangements. It has been proposed that the towers used for this project are steel pole types.

Conductor Arrangements

228. According to the German Society for Nature Protection, ⁹ the highest risks posed by HV lines are where the conductor cables are arranged at different heights (multi-level arrangements) and with neutral cables high above the conductor cables. On the other hand, less dangerous constructions are in use, which have the conductor cables arranged at one height (single-level arrangement) and with the neutral cable only slightly higher.

229. Nearly all of the towers proposed by NEGU will be single circuit towers. According to documentation provided by NEGU, the single circuit towers will have three horizontal cross arms (including the earth wire). Discussion with the Technical team members of the Project has indicated that arrangement of the conductors in a horizontal arrangement is not practical and therefore conductors will continue to be arranged per the exiting tower designs.

4.6. Alternative choice of insulators for 220 kV HV lines

230. An alternative option of insulation during the construction of the projected line of 220 kV line is the use of polymer insulators. Polymer insulators have been used in post-Soviet countries for over 30 years on 110-220-500 kV HV lines. However, recently, during the construction of 500 kV HV line there have been repeated failures of polymer insulators. In this regard, glass insulators were preferred for this facility. They are also more convenient to use, as it is easy to identify and replace a damaged insulator on the track during an inspection. No significant environmental issues are associated with these alternatives.

4.7. Alternative Construction Camps.

231. The locations of construction camps are not currently known. The EPC Contractor will choose the sites which will need to follow the guidelines for siting and permitting as outlined in this IEE, including consultations with residents. Employment of local labor force will reduce the need for a large construction camp size.

⁹ http://birdsandpowerlines.org/cm/media/Protecting_birds_on_powerlines.pdf

5. IEE Approach

5.1. Assessment Boundaries

232. The boundaries of the assessment have been divided depending upon the specific environmental and social characteristic to be affected and the type of activity. For example, the potential area of impact for operational phase noise around a high voltage substation will be different to the potential area of impact upon soils which will be confined to the areas within the substation boundary. These specific boundaries are defined individually in Section 7 below.

5.2. IEE Methodology

233. The methodology used to prepare this IEE is based on the requirements of the ADB Safeguard Policy Statement (2009) and the joint experience of the consultants involved in the IEE. Specifically, the methodology for this assessment is based on other recent disclosed Category B projects funded by ADB.

5.2.1. Desk-top Data

234. Background data and information collected by the team was obtained from published and unpublished sources, e.g., on climate, topography, geology and soils, natural resources, flora and fauna, agriculture, and socio-economic data. References to all sources used is made throughout the report.

5.2.2. Site Surveys and Audits

235. Several site inspections of the Project area were conducted during March, June, July and August 2022. The potential areas of impact have been inspected by the Consultant and areas of potential environmental significance assessed carefully. Information relating to the site surveys is provided in Section 6.

236. Baseline surveys and instrumental monitoring has also been undertaken at two sites. Socioeconomic surveys have been completed for the entire Project area.

Торіс	Survey			
Biodiversity	Ecological Survey			
Social	Socio-economic Survey and Census			

Table 19: Site Surveys Undertaken

237. The scope of work for the biodiversity survey is provided in Appendix B.

238. Audits of the four substations have also been completed. The audits were completed by the Consultant during visits to the substations with the Technical team. The Consultant interviewed substation management and staff using the questionnaire provided in Appendix C and inspected the site to observe site conditions and practices. Any 'non-compliances' with national regulations and best practice were recorded and have been added to this IEE as part of a corrective action plan (CAP)

5.2.3. Impact Assessment Methodology

239. This IEE follows a set format during the impact assessment process. As shown in the following flow chart and described further below.



Project Aspects

240. Firstly, the main environmental aspects of the Project are noted. An environmental aspect is any activity of the Project that interacts with the environment. E.g., an aspect of the Project that may impact upon air quality will be the movement of vehicles on unpaved roads through rural settlements. The area of assessment is also included in this phase, i.e., determining the areas in which the environmental aspect may have an impact. This area of assessment varies for the different aspects and is based on GIIP or the consultants experience of similar projects.

Identification of Sensitive Receptors

241. Once the main aspects of the Project have been identified any sensitive receptors within the Project area of influence are noted. Examples of sensitive receptors include residents, rivers, groundwater, birds, etc. Identification of receptors is a key part of the impact assessment process as without a receptor there will be no impact. For example, if a road generates significant noise but there are no sensitive receptors who can hear the noise, then there will be no noise impact.

Identification of Significant Environmental Aspects

242. Thirdly, the potential impacts of the identified aspects are outlined and how they could impact upon the identified receptors, in the case above, this could be the movement of a construction vehicle creating dust on an unpaved road which impacts upon local villagers.

243. The significance of an impact is determined based on the product of the consequence of the impact and the probability of its occurrence. The consequence of an impact, in turn, is a function primarily of three impact characteristics:

- magnitude
- spatial scale
- timeframe

244. Magnitude is determined from quantitative or qualitative evaluation of several criteria including:

- (i) Sensitivity of existing or reasonably foreseeable future receptors.
- (ii) Importance value of existing or reasonably foreseeable future receptors, described using the following:
 - (a) inclusion in government policy.
 - (b) level of public concern.
 - (c) number of receptors affected.

- (d) intrinsic or perceived value placed on the receiving environment by stakeholders.
- (e) economic value to stakeholders.
- (iii) Severity or degree of change to the receptor due to impact, measured qualitatively or quantitatively, and through comparison with relevant thresholds:
 - (a) legal thresholds—established by law or regulation
 - (b) functional thresholds if exceeded, the impacts will disrupt the functioning of an ecosystem sufficiently to destroy resources important to the nation or biosphere irreversibly and/or irretrievably
 - (c) normative thresholds established by social norms, usually at the local or regional level and often tied to social or economic concerns
 - (d) preference thresholds—preferences for individuals, groups or organizations only, as distinct from society at large
 - (e) reputational thresholds—the level of risk a company is willing to take when approaching or exceeding the above thresholds

245. Spatial scale is another impact characteristic affecting impact consequence. The spatial scale of impacts can range from localized (confined to the proposed Project Site) to extensive (national or international extent). They also may vary depending on the component being considered.

246. The impact timeframe is the third principal impact characteristic defining impact consequence and relates to either its duration or its frequency (when the impact is intermittent). Impact duration can range from relatively short (less than four years) to long (beyond the life of the Project). Frequency ranges from high (more than 10 times a year) to low (less than once a year). These timeframes will need to be established for each Project based on its specific characteristics and those of the surrounding environment.

247. Once the impact consequence is described based on the above impact characteristics, the probability of impact occurrence is factored in to derive the overall impact significance. The probability relates to the likelihood of the impact occurring, not the probability that the source of the impact occurs. For example, a continuous Project activity may have an unlikely probability of impact if there are no receptors within the area influenced by that activity. The characteristics are outlined in the table below.

Characteristic	Sub-components	Terms Used to Describe the Impact
Туре		Positive (a benefit), negative (a cost) or neutral
Nature		Biophysical, social, cultural, health or economic
		Direct, indirect or cumulative or induced
Phase of the Project		Construction and operation.
Magnitude	Sensitivity of Receptor	High, medium or low capacity to accommodate change
		High, medium or low conservation importance
		Vulnerable or threatened Rare, common, unique, endemic
	Importance or value of receptor	High, medium or low concern to some or all stakeholders
		High, medium or low value to some or all stakeholders (for example, for

Characteristic	Sub-components	Terms Used to Describe the Impact
		cultural beliefs)
		Locally, nationally or internationally important
		Protected by legislation or policy
	Severity or degree of change to the receptor	Gravity or seriousness of the change to the environment
		Intensity, influence, power or strength of the change
		Never, occasionally or always exceeds relevant thresholds
Spatial Scale	Area affected by impact – boundaries at local and regional extents will be different for biophysical and social impacts	Area or Volume covered Distribution Local, regional, transboundary or global
Timeframe	Length of time over which an environmental impact occurs or frequency of impact when intermittent	Short term or long term Intermittent (what frequency) or continuous Temporary or permanent
		Immediate effect (impact experienced immediately after causative project aspect) or delayed effect (effect of the impact is delayed for a period following the causative project aspect)
Probability – likelihood or chance	an impact will occur	Definite (impact will occur with high likelihood of probability)
		Possible (impact may occur but could be influenced by either natural or project related factors)
		Unlikely (impact unlikely unless specific natural or Project related circumstances occur)

Impact Significance Rating

248. The impact significance rating process serves two purposes: firstly, it helps to highlight the critical impacts requiring consideration in the approval process; secondly, it serves to show the primary impact characteristics, as defined above, used to evaluate impact significance. The impact significance rating system is presented in Table 22 and described as follows:

- (i) **Part A**: Define impact consequence using the three primary impact characteristics of magnitude, spatial scale and duration.
- (ii) **Part B**: Use the matrix to determine a rating for impact consequence based on the definitions identified in Part A; and
- (iii) **Part C**: Use the matrix to determine the impact significance rating, which is a function of the impact consequence rating (from Part B) and the probability of occurrence.
- 249. Using the matrix, the significance of each described impact is rated.

PART A: DEFINING C	ONSEQUENCE IN TERM	IS OF MAGNITUDE, DURATION AND SPATIAL	SCALE			
Definition		Criteria				
MAGNITUDE		Negative	Positive			
	Major	 Large number of receptors affected Receptors highly sensitive and/or are of conservation importance Substantial deterioration, nuisance or harm to receptors expected Relevant thresholds often exceeded Significant public concern expressed during stakeholder consultation Receiving environment has an inherent value to stakeholders 	 Large number of receptors affected Receptors highly amenable to positive change Receptors likely to experience a big improvement in their situation Relevant positive thresholds often exceeded 			
	Moderate	 Some receptors affected Receptors slightly sensitive and/or of moderate conservation importance Measurable deterioration, nuisance or harm to receptors Relevant thresholds occasionally exceeded Limited public concern expressed during stakeholder consultation Limited value attached to the environment 	 Some receptors affected Receptors likely to experience som improvement in their situation Relevant positive thresholds occasionall exceeded 			
TIMEFRAME	Minor	 No or limited receptors within the zone of impact Receptors not sensitive to change Minor deterioration, nuisance or harm to receptors Change not measurable or relevant thresholds never exceeded Stakeholders have not expressed concerns regarding the receiving environment Duration of Continuous Aspects 	 No or limited receptors affected Receptors not sensitive to change Minor or no improvement in current situation Change not measurable Relevant positive thresholds never exceeded No stakeholder comment expected 			
	Short term / low frequency	• Less than 4 years from onset of impact	Occurs less than once a year			

Table 22: Method for Rating Significance

	Medium term / medium frequency	• More than 4 years from onset of impact up to end of life of project (approximately 30 years)		• Occurs less than 10 times a year but more than once a year		
	Long term / high frequency	• Impact is experien of the project (greater the pr	ced during and beyond the life ater than 30 years)	Occurs more than 10	• Occurs more than 10 times a year	
SPATIAL SCALE		Biophysical		Socio-economic		
	Small	Within the defined	'Project area'	• Within the defined 'P	roject area	
	Intermediate	• Within the distric located	t in which is the facilities are	Within the municipality in which the activity occurs		
	Extensive	• Beyond the district in which the facilities are located		• Beyond the municipality in which the activity occurs		
PART B: DETERMININ	G CONSEQUENCE RAT	ING		·		
MAGNITUDE	TIMEFRAME		SPATIAL SCALE	AL SCALE		
			Small	Intermediate	Extensive	
Minor	Short term / low frequency		Low	Low	Medium	
	Medium term / medium frequency		Low	Low	Medium	
	Long term / high frequency		Medium	Medium	Medium	
Moderate	Short term / low frequency		Low	Medium	Medium	
	Medium term / medium frequency		Medium	Medium	High	
	Long term / high frequency		Medium	High	High	
	<u></u>					
Major	Short term / low frequency		Medium	Medium	High	
	Medium term / medium frequency		Medium	Medium	High	
	Long term / high frequency		High	High	High	
PART C: DETERMINING	G SIGNIFICANCE RATI					
		Nagligible	Low	Madium	Lliah	
	Definite	Net Significant	Low	Medium		
OT (OT	Possible	Not Significant		Modium	High	
exposure to impacts)		Not Significant	Low		Modium	
	Nogligible	Not Significant	Not Significant	Not Significant	Not Significant	
	INERINGIDIE	Not Significant	Not Significant	NUL SIGNILLANL	Not Significant	

Mitigation, Management and Good Practice Measures

250. Wherever the Project is likely to result in unacceptable impact on the environment, mitigation measures are proposed (over and above the inherent design measures included in the Project description). In addition, good practice measures may be proposed however these are unlikely to change the impact significance. In the case of positive impacts, management measures are suggested to optimize the benefits to be gained.

251. The following mitigation hierarchy will be utilized in selecting practical mitigation measures for unacceptable impacts as follows (in order of preference):

- Avoid the impact wherever possible by removing the cause(s).
- Reduce the impact as far as possible by limiting the cause(s).
- Ameliorate the impact by protecting the receptor from the cause(s) of the impact.
- Providing compensatory measures to offset the impact, particularly where an impact is of high significance and none of the above are appropriate, e.g., for impacts to critical habitat.

Residual Impacts

252. Once mitigation measures are declared and committed to, the next step in the impact assessment process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation measures.

5.2.4. Stakeholder Consultations

253. According to the ADB Safeguard Policy Statement (2009):

"The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. Meaningful consultation is a process that:

- (i) Begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle;
- (ii) Provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people;
- (iii) Is undertaken in an atmosphere free of intimidation or coercion;
- (iv) Is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and
- (v) Enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results are to be documented and reflected in the environmental assessment report."

254. Stakeholder engagement has been undertaken by NEGU and the findings presented in this IEE.

6. Description of the Environment

6.1. Introduction

255. This section presents a description of the environmental baseline conditions in the Project area and covers the following topics and indicates where primary and secondary data were used:

		Primary Data	Secondary Data
Phy	sical Environment		
Ι	Topography & Soils	No	Yes
2	Geohazards	No	Yes
3	Hydrology	No	Yes
4	Climate	No	Yes
5	Air Quality	No	Yes
Bio	logical Environment		
I	Designated Sites	No	Yes
2	Notable Habitat	Yes	Yes
3	Notable Species	Yes	Yes
Soc	io-Economic Environment		
I	Administration and Demographics	No	Yes
2	Local Economy	Yes	Yes
3	Land Use & Landscape	Yes	Yes
4	Infrastructure	Yes	Yes
5	Noise	Yes	No
6	Physical Cultural Resources	Yes	Yes

Tał	ble	23:	Data	Types

256. References for all secondary data are provided throughout the report and methodologies for collection on primary data are included in the relevant sections of the report, or in Appendices.

6.2. Section Layout

257. Due to the large geographical coverage of the Project, this section of the report is divided by sub-project. The sub-project descriptions are supplemented by a range of country data and maps included as Appendices. These appendices include:

- Appendix D Topographical Data
- Appendix E Geological and Soils Data
- Appendix F Geohazard Data

- Appendix G Hydrological Data
- Appendix H Climate Data (including climate Change)
- Appendix I Nationally Protected Areas
- Appendix J Important Bird Areas / Key Biodiversity Areas
- Appendix K Critical Habitat
- Appendix L Socio-economic mapping
- 6.3. Sub-project Conditions

258. The following section describes the sub-project conditions for each of the proposed transmission lines. The section includes a map of the Project alignment, photos taken from site visits and data tables for each of the sub-projects.

6.3.1. L-19-23

Figure 11: L-19-23 Location Map





Concrete poles are used along various portions of the alignment. They occupy a much smaller footprint in the agricultural land which is farmed almost up to the base of the pole.

Figure 12: L-19-23 Site Photos



The agricultural setting of the alignment is clearly illustrated in this figure.

Figure 13: L-19-23 Baseline Conditions				
Physical Environment	Biological Environment			
Topography and Soils – The alignment is flat, ranging from 330 masl to 340 masl. Most of the alignment traverses' fertile hydromorphic soils (see Appendix E-I) irrigated by a series of rivers and canals in the region.	Designated Sites – There are no nationally protected areas within 50 km of the site. The closest internationally designated site is located at more than 20 km (see Appendix J-4).			
${\it Geohazards}$ – No specific geohazards have been identified in the Project area (see Appendix F). The alignment is in a moderate to high earthquake zone (see Appendix G-1).	Notable Habitat – The alignment is located within a heavily modified agricultural landscape. No notable habitat has been identified and no critical habitat within, or close to the Protected area (see Appendix K-3).			
Hydrology – The Project area is in the Syrdarya basin (see Appendix G-2). The alignment crosses the Bozsuv canal, shown in the figure below. Towers will not be located close to the river itself (more than 110m away). None of the project area has been identified as prone to flooding.	Notable Species – Given the location in a predominantly agricultural setting it is considered unlikely that notable species would be present in large number in the Project area. Cranes were observed nesting on some lines in the Project area, possibly on L-19-23, although this was not confirmed during site visits.			
	Socio-Economic Environment			
$\label{eq:limit} \begin{aligned} & \mbox{Climate} - \mbox{Tashkent region is defined with an extreme continental climate with long hot summers (with temperature up to +35°C) and short winters with little snow (minimum temperature -2°C). The average annual air temperature is equal to 15°C, the average temperature of the hottest month of July is + 27°C, and the average temperature in January, the coldest month, is - 2°C. Precipitation is highest between February and April followed by dry summers and lighter precipitation in the autumn and winter (see Appendix I-2). Wind speeds in this region are generally lower than the rest of the country (see Appendix H-3). \\ & \mbox{Air Quality} - The rural setting of the Project area indicates that air quality is the set of the set of the set of the average temperature is a set of the set of the country (see Appendix H-3). \\ & \mbox{Air Quality} - The rural set of the Project area indicates that air quality is the set of the set o$	 Administration and Demographics – The alignment is located in Tashkent Region in Yangiyol district. The population of Yangiyol is 61,700 (https://toshvilstat.uz/uz/) Local Economy – The economy of this area of Tashkent region is dominated by agriculture. No large industrial areas are present close to the Project area. Land Use and Landscape – The landscape along the alignment is generally flat and is not considered to be of touristic or cultural importance. Primary land use along the alignment is agricultural land divided by small villages. Infrastructure – The alignment crosses numerous local roads and electricity distribution lines. Access to the alignment is via these access roads. The line connects to a small hydropower plant on the Bozsuv canal. Noise – No significant point sources of noise are in the Project area. Nearby roads represent the highest producers of noise. Physical Cultural Resources – The line crosses one graveyard. No other PCR is known to be present. 			
Air Quality – The rural setting of the Project area indicates that air quality is good. Further no point sources of significant emissions are present in the Project area.				

6.3.2. L-F-CH

Figure 14: L-F-CH Location Map





This short section of line is defined by its crossing of the Syrdarya river, shown in the photo above. The line is located just a relatively close to the Balykchi fish farm IBA, but there are numerous other high voltage transmission lines between L-F-CH and the IBA.

Figure 15: L-F-CH Photos





Source: http://datazone.birdlife.org/species/factsheet/white-stork-ciconia-ciconia

Turkestan White Storks (*Ciconia Ciconia asiatica*) were observed nesting on many of the towers. The storks are listed on the Uzbek Red book as 'near threatened' ¹ and as 'Least Concern' by the IUCN.

According to Birdlife International it is threatened by a shortage of nesting sites in some areas as, for example, the roofs of new rural buildings do not support nests and nest structures on pylons are frequently destroyed during maintenance work.

Some, although not all, of the towers have bird nesting prevention devices. As noted in the photo opposite, this does not necessarily prevent birds nesting on the towers and some NEGU staff indicates that the spikes helped hold nests in place.

1: Turkestan white stork Ciconia ciconia asiatica (Aves: Ciconiiformes) in Uzbekistan: current size and condition of population. International Journal of Zoology Studies. Volume 2; Issue 1; January 2017; Page No. 96-101

Figure 16: L-F-CH Baseline Conditions				
Physical Environment	Biological Environment			
Topography & Soils – This flat, short section of line is situated at an elevation of approximately 250 masl. Apart from the areas located in Yangi-chonoz, most of the alignment traverses' fertile hydromorphic soils (see Appendix E-1). The soils in this region are slightly more saline than in other parts of Tashkent. Geohazards - No specific geohazards have been identified in the Project area (see Appendix F) apart from the potential flood risks associated with climate change and the proximity of the line to the Syrdarya river. The alignment is in a low / moderate earthquake zone (see Appendix F-1).	Designated Sites – There are no nationally protected areas within 50 km of the site. The Balykchi fish farm IBA is located approximately 1.2km southeast of the southern portion of the line (see Appendix J-4). This man-made reservoir hosts several species (passage and resident) all of which are classified as 'least concern' by IUCN red list except for the Ferruginous Duck (<i>Aythya nyroca</i>) which is classified as 'Near Threatened'. Notable Habitat – The alignment is located within a heavily modified agricultural landscape. The Balykchi fish farm IBA is however, classified as potential critical habitat by the UNEP (see appendix K-3).			
Hydrology - The Project TL is crossed Syrdarya river in one location shown below. River width at this location is approximately 250m.	Notable Species – Given the location in a predominantly agricultural setting it is considered unlikely that notable species would be present in large number in the Project area. Cranes were observed nesting on the line.			
	Socio-Economic Environment			
	Administration and Demographics - The alignment is located in Tashkent Region in Chinoz district. The capital lies at the city Chinoz. It has an area of 340 km ² and it had 136,100 inhabitants in 2021.			
	Local Economy – The economy of this area of Tashkent region is dominated by agriculture. No large industrial areas are present close to the Project area.			
Climate - Tashkent region is defined with an extreme continental climate with	Land Use and Landscape - The landscape along the alignment is generally flat and is not considered to be of touristic or cultural importance. Primary land use along the alignment is agricultural land divided by small villages.			
long hot summers (with temperature up to $+35^{\circ}$ C) and short winters with little snow (minimum temperature -2° C). The average annual air temperature is equal to 15°C, the average temperature of the hottest month of July is $+27^{\circ}$ C, and the	Infrastructure – The alignment runs parallel and passes over the M-39 road, a major connecting road between Tashkent and Samarkand.			
average temperature in January, the coldest month, is - 2°C. The climate is rather wet, with 300-700 mm of atmospheric precipitation a year. Wind speeds in this region are generally lower than the rest of the country (see Appendix H-3).	Noise - No significant point sources of noise are in the Project area. Nearby roads represent the highest producers of noise.			
Air Quality – The mainly agricultural setting of the alignment indicates that air quality in the area is good. No major point sources of emissions are present.	Physical Cultural Resources – No important PCR has been identified to date close to the alignment.			

6.3.3. L-Ks-A

Figure 17: L-KS-A Location Map





Figure 19: L-KS-A Baseline Conditions				
Physical Environment	Biological Environment			
Topography & Soils – The alignment is generally flat, but with a slight elevation	Designated Sites - IBA protected area named as "Tuyabuguz water reservoir" is			
rise from north to south from 460 masi to 530 masi. The alignment traverses	located at the distance 15 km from the project line. There are no nationally protected			
fertile hydromorphic soils (see Appendix E-1). Some portions of the line are	areas within 20km of the alignment.			
contaminated to some degree.	 Notable Habitat – The alignment is located in a heavily modified and degraded environment. No notable habitat can be found within the Project area. Notable Species – Consultations with NEGU staff revealed that white storks were nesting on poles in this area. Specifically, they noted that birds were present around the sewage treatment plant. NEGU staff also commented that during days with heavy fog 			
	the Turkestan white storks collided with the transmission line around the plant.			
	Socio-Economic Environment			
	Administration and Demographics – Located in Piskent district of Tashkent region. Piskent has an area of 790 km ² (310 sq mi) and it had 102,000 inhabitants in 2021.			
Geohazards - The alignment is in a moderate earthquake zone (see Appendix F- I). No other geohazards have been identified that may affect this line.	<i>Local Economy</i> – The local economy is dominated by heavy industry, including the AGMK.			
Hydrology - The closest water object to the Project TL is Akhangaran river (4.67 km)	<i>Land Use and Landscape</i> – The landscape is dominated by the AGMK and its slag heaps. The alignment mainly passes through agricultural land.			
Climate - The average annual air temperature is equal to 15°C, the average	Infrastructure – The alignment crosses several roads and a water treatment plant			
temperature of the hottest month of July is + 27° C, and the average temperature in January, the coldest month, is - 2° C. Precipitation is highest between February and April followed by dry summers and lighter precipitation in the autumn and winter (see Appendix H-2). Wind speeds in this region are generally lower than the rest of the country (see Appendix H-3)	Noise – Generally noise levels are low, despite the presence of AGMK which is far enough away from the alignment not to cause significant elevated noise levels close to the Project area.			
	Physical Cultural Resources - The alignment crosses Almalyk cemetery.			
Air Quality – The location of the AGMK and the general industrial nature of this area of Uzbekistan means that air quality in the project areas is likely to be poor and the airshed is most likely degraded.				

6.3.4. L-19-D

Figure 20: L-19-D Location Map





Figure 22: L-19-D Baseline Conditions				
Physical Environment	Biological Environment			
Topography & Soils - The alignment is generally flat, but with a slight elevation rise from west to east from 300 to 350 masl. The alignment traverses' fertile hydromorphic soils (see Appendix E-1) which are cultivated as shown in the figures above.	Designated Sites - IBA protected area named as "Tuyabuguz water reservoir" is located at the distance 29.46 km from the project line. There is no nationally protected area within 50km of the alignment.			
Geohazards - The alignment is in a low / moderate earthquake zone (see Appendix F-1). No other geohazards have been identified that may affect this line.	Notable Habitat – The alignment follows agricultural land and small villages, meaning that the alignment is heavily modified by human activity and no notable habitat can be found (see Appendix K).			
Hydrology – The alignment crosses several small streams and rivers, none of which are more than 25m wide and will not be affected by the Project works.	Notable Species – As with many of the lines in this region of the country, Turkestan white storks can be found nesting on poles, including on line L-19-D. However, as noted above, this species is classified as LC by the IUCN.			
	Socio-Economic Environment			
And	Administration and Demographics – The alignment is located in Tashkent Region in Yangiyol district. The population of Yangiyol is 61,700 (https://toshvilstat.uz/uz/)			
	Local Economy – The economy of this area of Tashkent region is dominated by agriculture. No large industrial areas are present close to the Project area.			
	Land Use and Landscape – The landscape along the alignment is generally flat and is not considered to be of touristic or cultural importance. Primary land use along the alignment is agricultural land divided by small villages.			
Climate - Tashkent region is defined with an extreme continental climate with	Infrastructure – The alignment crosses numerous local roads and the M-39.			
long hot summers (with temperature up to $+35^{\circ}$ C) and short winters with little snow (minimum temperature -2° C). The average annual air temperature is equal to 15°C, the average temperature of the hottest month of July is + 27°C, and the	Noise – No significant point sources of noise are in the Project area. Nearby roads represent the highest producers of noise.			
average temperature in January, the coldest month, is - 2° C. Precipitation is highest between February and April followed by dry summers and lighter precipitation in the autumn and winter (see Appendix H-2). Wind speeds in this region are generally lower than the rest of the country (see Appendix H-3).	Physical Cultural Resources – None present in the immediate vicinity of the alignment.			
Air Quality – Apart from vehicle emissions, especially around the M-39, air quality is assumed to be good due to the rural setting of the alignment.				

6.3.5. L-22-23

Figure 23: L-22-23 Location Map


Figure 24: L-22-23 Site Photos



Many of the towers along the alignment deteriorating are badly, notably foundations which were originally poorly constructed and are now in a dangerous which condition could result in tower collapse.



Portions of the line traverse agricultural land and pasture land, all of which is heavily modified by human activity.



The alignment crosses one man made reservoir close to the Kazakh border. Some of the spans in this location are more than 400m. This area is not classified as critical habitat, or an important bird area. Another example of the modified flat landscape. Note that the line also runs adjacent to, and across multiple other transmission and distribution lines.



Figure 25: L-22-23 Baseline Conditions				
Physical Environment	Biological Environment			
Topography & Soils – The topography of the alignment is generally flat. Elevation	Designated Sites - The closest NPZ is IBA Balykchi Fish Farm (5.48 km). There are no			
ranges from 260 to 310 masl. Fertile hydromorphic soils dominate this region.	nationally protected areas within 50km of the alignment.			
Soils can be moderately saline in this area (see Appendix E-2).				
Geohazards – No major geohazards have been identified in this area. However,				
mapping indicates that flood risks could be high in the Project area (see Appendix				
F-3).				
Hydrology and Water Use - The Project TL is crossed Bozsuy Canal (crossing it	A HAR AND A			

in I place). The alignment also crosses a man-made reservoir.



Climate - Tashkent region is defined with an extreme continental climate with long hot summers (with temperature up to $+35^{\circ}$ C) and short winters with little snow (minimum temperature -2° C). The average annual air temperature is equal to 15° C, the average temperature of the hottest month of July is $+27^{\circ}$ C, and the average temperature in January, the coldest month, is -2° C. Precipitation is highest between February and April followed by dry summers and lighter precipitation in the autumn and winter (see Appendix H-2). Wind speeds in this region are generally lower than the rest of the country (see Appendix IH3).

Air Quality – The rural setting of the alignment dictates that the air quality is good.



Notable Habitat & Species – Given the agricultural setting of the alignment and its distance from any designated sites no notables species are assumed to be present in large numbers on this area. Turkestan White Storks may be present nesting on some of the towers.

Socio-Economic Environment

Administration and Demographics – The line is located in Tashkent region Chinoz district, although a short portion of the line is located across the border in Kazakhstan. Project works will only be undertaken in Uzbekistan.

Local Economy – The local economy is based on agriculture.

Land Use and Landscape – Land use is predominantly agricultural. No important landscapes can be found in this area.

Infrastructure – The road crosses local roads, and electricity distribution lines and gas distribution lines, all typically found in semi-rural areas.

Noise - No significant point sources of noise are in the Project area. Nearby roads represent the highest producers of noise.

Physical Cultural Resources - The alignment crosses on graveyard.

6.3.6. L-K-K





Figure 28: L-K-K Baseline Conditions					
Physical Environment	Biological Environment				
Topography & Soils – The alignment elevation rises from east to west from around 350 masl to 380 masl in Karshi. For the most part the alignment is situated in irrigated agricultural land with the exception of the portion of the alignment which traverses the urban area of Karshi.	 Designated Sites The closest NPZ is Mubarek State Preserve (18.87 km). There are no internationally designated sites within 50km of the alignment. Notable Habitat and Species – None identified in this heavily modified area. 				
Geohazards - No geohazards have been identified in this area. Landslides and	Socio-Economic Environment				
mudflows are absent due to the flat nature of the landscape. Seismic activity is generally low.	Administration and Demographics – The alignment is located in Kashkadarya region within Karshi District and Karshi City. Administratively, Karshi is a district-level city, It				
Hydrology - The Project TL is crossed Kashkadarya river (crossing it in 1 place). River width is around 130m.	population is 252,600				
	Infrastructure – The alignment passes above one school in Karshi (80 th School) and one railway line.				
A CONTRACTOR	Noise – Noise levels in rural areas are low. In Karshi city noise levels are slightly higher due to traffic noise and general human activity.				
Per Landon - All	Physical Cultural Resources and Cultural Landscape – The alignment crosses three graveyards.				
Climate The climate is dry continental with long, hot and dry summer season; the winter season is short with mild frosts and little snow. The average annual annual precipitation is 400 - 600 mm					
Air Quality – Air quality in the rural areas is assumed to be good. In Karshi air pollution is low according to the air pollution index (Environmental Atlas of					

, Uzbekistan, UNEP)

6.3.7. L-32-K

Figure 29: L-32-K Location Map





The alignment traverses semi desert for almost its entire length. Other high voltage transmission lines run parallel with this line and the A-380 motorway.

Figure 30: L-32-K Site Photos



Access to the line is directly from the A-380 motorway. Closer to Karshi the line moves further away from the road as it passes between two small villages.

Figure 31: L-32-K Baseline Conditions					
Physical Environment	Biological Environment				
 Physical Environment Topography & Soils - The alignment lies at an elevation of around 300 - 320 masl. The landscape is dominated by desert type soils in its first part and by irrigated serozem soils closer to Karshi (see Appendix E-1). Soils can be slight to moderately saline. Geohazards - No geohazards have been identified in this area. Landslides and mudflows are absent due to the flat nature of the landscape. Seismic activity is generally low. Hydrology - No hydrological resources are present close to the alignment. Climate - The climate is dry continental with long, hot and dry summer season; the winter season is short with mild frosts and little snow. The average annual annual precipitation is 400 - 600 mm Air Quality - Air quality may be affected by dust from the desert areas and from 	Biological Environment Designated Sites - The closest NPZ is Mubarek State Preserve (1.87 km).				
the nearby A-380 motorway which runs parallel to the alignment for most of its extent.	 Notable Habitat and Species – The alignment is heavily modified by human activity. It is located close to the A-380 motorway and within agricultural areas which reduces the possibility of notable species being present in large numbers in this area and they are more likely to be found in the core areas of the state preserve. Socio-Economic Environment Administration and Demographics – The alignment is located in Mubarak district of Kashkadarya region. It has an area of 3,070 km² (1,190 sq mi) and its population is 88,200 (2021 est.). Local Economy, Land Use and Landscape – Agriculture is the main economic activity in the area. The flat desert / agricultural landscape has a low aesthetic value. Infrastructure – The alignment crosses some small local roads Noise – Noise levels are relatively high close to the A-380 motorway but decrease as the alignment moves further from the road. Physical Cultural Resources – None present close to the alignment. 				

6.3.8. L-32-M

Figure 32: L-32-M Location Map



Figure 33: L-32-M Site Photos



This short section of line crosses the A-380 from L-32-K and links with a substation close to Mubarek power plant, a I20MW gas fired power plant.

Figure 34: L-32-M Baseline Conditions				
Physical Environment Biological Environment				
Topography & Soils – this line is essential a 'line in, line out' LILO line connecting	Designated Sites - The closest nationally protected area is the Mubarek State Preserve,			
line L-32-M with the Mubarak power plant. The alignment lies at an elevation of	1.82 km from the alignment. The Karnabchul Steppe IBA is located more than 20km			
around 300 masl. The landscape is dominated by desert type soils (see Appendix	north of the alignment.			
E-1).				
Geobazards - No geobazards have been identified in this area. Seismic activity is	the second s			
generally low.	and the second se			
	All the second se			
Hydrology – No hydrological resources are present close to the alignment.	and the second sec			
	The second with the second second			
Climate - The climate is dry continental with long, hot and dry summer season;				
the winter season is short with mild frosts and little show. The average annual				
Air Quality – Air quality is anticipated to be heavily degraded due to the	Notable Habitat – None present in this location.			
presences of the power plant and gas processing plant in this area.	Notable Species – None identified in this location			
	Socio-Economic Environment			
	Administration and Demographics – The alignment is located in Mubarak district of			
	Kashkadarya region. It has an area of $3,070 \text{ km}^2$ (1,190 sq mi) and its population is			
	88,200 (2021 est.).			
	Local Economy - The Muharek Power Plant and gas processing plant is located adjacent			
	to the line and is the main economic activity in this area.			
	······································			
	Land Use and Landscape – Land use is dominated by an industrial landscape.			
	Infrastructure - The alignment crosses the A-380 meterway and get infrastructure			
	associated with the gas power and processing plants			
	Noise – Noise levels are relatively high due to the presence of the A-380 motorway			
	and the gas power and processing plants.			
	Physical Cultural Parameters None present close to the elignment			
	rnysical Cultural Resources – None present close to the alignment.			

6.3.9. L-7-F-I

Figure 35: L-7-F-I Location Map







The alignment comprises a mix of steel frame 'angle' towers and concrete poles. As with many of the steel frame towers, foundations are poorly constructed and slowly eroding.



Figure 37: L-7-F-1 Baseline Conditions					
Physical Environment	Biological Environment				
Topography & Soils – The alignment is located in a flat semi-urban environment at an elevation of approximately 550 masl. Approximately 60% of the alignment is located on agricultural land, in the hydromorphic soils belt (see Appendix E-1). Soils in this region can be slightly saline (see Appendix E-2).	Designated Sites – There are no nationally or internationally designated sites within 50km of the alignment (see Appendix J) Notable Habitat – The alignment is located in a semi-urban environment heavily modified by human activity. No natural, or critical babitat is present				
Geohazards – Ferghana valley is located in a moderate to high earthquake risk zone (MSK VIII). The risk of mudslides and landslides is negligible. Floods are also unlikely to impact this area (see Appendix F).	Notable Species – No notable species have been identified in the project area. No birds were identified nesting on towers.				
Hydrology – No important surface water courses can be found in the Project	Socio-Economic Environment				
area. The alignment only crosses minor drainage ditches and irrigation channels. Climate – Fergana has a cool arid climate. Winters are cold and short, with a daily average low temperature of $-2.8 \degree C (27.0 \degree F)$ and a daily average high of 4.6 $\degree C$ (40.3 $\degree F)$ in January; summers are hot, with an average low temperature of 20.3 $\degree C$ (68.5 $\degree F)$ and an average high of 34.7 $\degree C (94.5 \degree F)$ in July. Annual precipitation is less than 200 millimetres or 8 inches, and most of this falls in winter and spring. Air Quality – Air quality in the agricultural portions of the alignment is anticipated to be good, however, closer to the center of Kirgili heavy industrial activities are present including gas fired power plants. In these areas air quality is expected to be of lower and the airshed possibly degraded by a range of pollutants.	 Administration and Demographics – The alignment is located in Ferghana City, the capital of Ferghana region. The population of Fergana city was approximately 299,200 as of 2022. Tajiks and Uzbeks are the largest ethnic groups, with Russian-speakers comprising about 25% of the city's population Land Use and Landscape – The alignment passes mainly through agricultural land. The remaining portion of the line traverses commercial / industrial areas. There are no areas of aesthetic value. Infrastructure – The alignment crosses several local roads and electricity distribution lines. Noise – Noise levels in agricultural areas are low. Noise levels increase as the alignment moves closer towards the industrial zones. Physical Cultural Resources – None identified within the Project area. 				
	Trysten Culturul Resources – None identified within the Project alea.				

6.3.10. L-Hamza-I

Figure 38: L-Hamza-I Location Map



Figure 39: L-Hamza-I Site Photos



This power line runs parallel to another line. There is an open landfill the nearby. The landfill may attract birds which could collide with the nearby lines.

A portion of the line traverses a semi desert area. Site visits indicated that this area could be an important habitat to terrestrial fauna. Accordingly, a short ecological survey of this zone was completed as part of the IEE.





The alignment starts at the Karakul substation and crosses the motorway from Bukhara to the Turkmenistan border.



Another photo illustrating the semidesert area. The area was used for grazing cattle.

Figure 40: L-Hamza-I Baseline Conditions					
Physical Environment	Biological Environment				
 Topography & Soils – The alignment is flat and is located at an elevation of approximately 200 masl for its entire length. Desert type soils can be found in this region (see Appendix E-1), some portions of which are irrigated although the alignment only briefly touches on the farmed areas. Soils in the central portion of the line are highly saline (see Appendix E-2). NEGU staff have reported that many of the existing concrete poles in the saline areas are being corroded. Geohazards – The alignment is not in an area of significant seismicity compared with the eastern regions of the country (MSK VII), and there are no landslide or mudflow risks in this area. No specific flood issues have been identified, however according to NEGU staff this area suffers from very high winds, which have increased in strength over the past five years, so much so that some towers have collapsed. This could also be due to the combined effect of the saline soil corrosion. Hydrology and Water Use - The Project TL is crossed Amu-Karakul Canal in one place and situated in 0.70 km from the Amu-Bukhara Canal. Climate - The climate is desert, sharply continental, with harsh winters and dry, hot summers. The absolute minimum recorded temperature was -34°C, and the absolute maximum recorded was + 46°C. The average duration of frost in the ryoince is 51 days. Relative humidity varies widely throughout the year, with the highest values being observed in the winter months of December: in January its value is 70-80%. The average annual rainfall is only 186 mm in Bukhara, and 143 mm at Karakul. During the year, the overwhelming proportion of precipitation falls in the winter-spring period: moreover, in spring the amount is about 50% of the annual amount. Air Quality – The rural nature of the alignment means that air quality is good. Dust storms can occur in this region. 	 Designated Sites - The closest NPZ to the Project site is IBA Dendizkul Lake (8.20 km) distant from the site. Notable Habitat & Species – Initial site inspections of the alignment indicated that the desert environment beneath the line could be a sensitive habitat for terrestrial species. A short ecological survey of the site has been completed for this area. The findings of the survey are included in Appendix P. In summary four species listed in the Red Book of Uzbekistan and the IUCN red list were noted at the site: Central Asian tortoise (VU): The number at the site is extremely low. Dressing (VU:D): Traces were found on one of the points. Grey monitor lizard (VU:D): A vulnerable, shrinking subspecies. Traces of a monitor lizard were noted at the southeastern tip of the power line. Sand boa constrictor (NT): Traces of the boa constrictor were found at least 3 places in the eastern end of the power line, passing through areas of open sand. According to the UNEP this area is not critical habitat (see Appendix K) and visual inspections noted that the area was used for cattle grazing and that the landscape is greatly modified. It was also noted that sports hunting occurs in this area. 				
	Socio-Economic Environment				
	 Administration and Demographics – The alignment is located in Bukhara region Local Economy – The local economy is based on agriculture. Some commercial and light industrial activity can be found at the western point of the alignment. Land Use and Landscape – Land use is a mix of agricultural areas, grazing land and desert. The landscape is flat, with no specific aesthetic value. The first portion of the alignment lies adjacent to a large open landfill. Infrastructure – The alignment crosses a railway line and the motorway connecting Bukhara with the Turkmenistan border. Noise – Noise levels are generally low along the alignment except where the line crosses the afore mentioned motorway. Physical Cultural Resources – None identified in this area. 				

6.3.11. L-D-Sh





The project line passes over irrigation channels in Surkhandarya province.

Figure 42: L-D-Sh Site Photos



Alignment located in the 'adyrs'



The line passes through a mix of small villages, agricultural land (shown here) and 'adyrs' the foothills of the Gissar range.

Biological Environment

Topography & Soils – The alignment sits within the foothills (adyrs) of the Gissar range. The elevation of the alignment varies from north to south. Starting in Deanau at an elevation of 505 masl the alignment rises into the 'Adyrs' to an elevation of 650 masl. After this the alignment gradually reduces elevation to around 450 masl at its end point close to Kumkurgon. Soils are a blend of hydromorphic (in irrigated areas) and sierozems in the adyrs. Soils in this area can be moderately saline (see Appendix E).

Geohazards – The alignment is located in a moderate to high seismic risk area (MSK VII – MSK VIII). Mudflows appear to be more of a risk in the project area than landslides (see Appendix F-2 & F4). Birdlife international noted that there was a large mudflow around the Darasay gorge two years ago.

Hydrology - The project line crosses the Halkadjur river at I point (700m width), and the Sangardak (Kizilsu) river (175m width) in the city of Denau and many other smaller sais and canals.



Halkajur River crossing (note a tower

located in the river bed.

Climate - The climate prevailing in Surkhandarya province is continental. Summer is hot and dry, maximum air temperatures in the summer months (July-August) reach +48-50 °C, and on the soil surface 60-70°C. The province is characterized by mild and short winters. Average monthly temperatures in January, the coolest month, range from 2.1 to 3.3°C. Average absolute minimum recorded temperature in the province is between -23 and -25°C. The duration of the frost-free period is 240-270 days (sometimes 300-320 days). Total annual precipitation is low (350-400 mm).

Air Quality – The rural setting of the alignment means that air quality is good. However, dust storms are possible in this region.

Designated Sites - The closest protected area to the project line is IBA protected areas "Darasay gorge" 5km and "South Surkhan Reservoir" – 5.8km. Saker Falcon, I-3 individuals (*Falco cherrug*) IUCN EN (and globally threatened) may be present in the Darasay Gorge along with Cinereous Vulture, 3-7 individuals (*Aegypius monachus*) IUCN NT. Birdlife international have not indicated the existing transmission line as being a threat / pressure to biodiversity, but instead suggest that the nearby railways and quarries are the main threats / pressures.



Notable Habitat & Species – Both of the IBAs are classified as potential critical habitat by UNEP (see Appendix L). However, the alignment is not within or adjacent to these areas. The adyrs can be classified as natural habitat, although they are often heavily grazed and crossed by tracks.

Socio-Economic Environment

Administration and Demographics – The alignment is located in Surkhandarya region and three of its districts (Oltinsoy (pop. 180,000), Denov (pop.392,000) and Kumkurgon (pop. 238,000)).

Economy, Land Use and Landscape – The economy and landscape are dominated by agricultural activities. The landscape in the adyrs, although not a touristic destination, has aesthetic value that should be preserved.

Infrastructure – The alignment crosses one hospital and a railway line.

Noise - The rural setting of the alignment means that ambient noise in the Project area is low.

Physical Cultural Resources - The alignment crosses two graveyards.

6.3.12. L-H-K

Figure 44: L-H-K Location Map







The end point of the line is Kattakurgan substation close to Navoi. A large number of lines converge at this point.

The alignment traverses mainly agricultural land before rising into the semi-desert foothills. As with most of the Project lines, this line runs parallel to a number of other high voltage transmission lines.



Another example of poor quality tower foundations.

Figure 46: L-H-K Baseline Conditions					
Physical Environment	Biological Environment				
 Topography & Soils – The alignment follows an east-west route at an elevation between 450 and 500 masl within the Zarafshan valley. The alignment can be described as flat and avoids the ridge to the south of the alignment. For the most part the alignment is located in irrigated agricultural land where soils are described as hydromorphic. The alignment closer to Navoi deviates from this area into the serozem belt – desert soils (see Appendix E-1) where agricultural activity is absent. These soils are not affected by salinity. Geohazards – This region of Uzbekistan is in a moderate to high-risk seismic zone (MSK VIII). Mudflows and landslides can also occur within the Zarafshan Valley (see Appendix F-2). Hydrology – The alignment crosses numerous small irrigation channels and streams. No major surface water courses or water features can be found along the alignment. Climate - Average temperature in January range from 0.5°C to -3°C. Wintertime lasts between 28 days and 71 days. The absolute minimum recorded temperature is -25°C. The average temperature in July is 28°C, and the absolute maximum temperature being recorded is 42 4°C. Annual precipitation rises from 180-280 	Designated Sites - The closest protected area to the project line is IBA Kattakurgan Reservoir (5.5 km). Data provided by birdlife international indicates that Asian Houbara (<i>Chlamydotis Macqueenii</i>) IUCN VU were breeding in this area 17 years ago. One individual Siberian Crane (<i>Leucogeranus Leucogeranus</i>) was observed here in 2007. The nearest nationally protected area, Nurubod state wildlife sanctuary is more than 20km south of the alignment.				
	Notable Habitat & Species – In general the alignment is located in a modified agricultural landscape. No critical habitat can be found within 5km of the alignment (see Appendix K-2). No notable species have been identified in the agricultural portions of the alignment.				
mm on the west to 425 mm on the east. The winter-spring portion of precipitation	ation Socio-Economic Environment				
mm on the west to 425 mm on the east. The winter-spring portion of precipitation reaches 33-44% of the annual sum. Air Quality – In general major point sources, or mobile sources of significant air pollution are absent in the Project area. Some quarries can be found in the foothills around the valley close to the alignment and levels of dust from these sites could be high. In addition, it is likely that dust storms occur in the desert area closer to Navoi.	 Land Use and Landscape – The flat landscape is dominated by farmed fields with agriculture forming the key economic activity. The foothills closer to Navoi are used as grazing land and for industrial purposes such as quarries. The area has no specific aesthetic value and is not an area for tourism. Infrastructure – The alignment crosses numerous small local roads linking various villages along the alignment. Noise – The rural setting of the alignment means that ambient noise in the Project area is low. 				
	Physical Cultural Resources – The alignment crosses one graveyard.				

7. Environmental & Social Audit

259. This section of the IEE provides the environmental and social audit of the four existing substations to be rehabilitated. The audit is summarized as follows:

- Facilities description, including both past and current activities;
- Audit and site investigation procedure;
- Findings and areas of concern; and
- Corrective action plan that provides the appropriate corrective actions for each area of concern, including timeframes and responsibilities.
- 7.1. Facilities Description

7.1.1. SS Zafar

General Location and Topography

260. Located in the southeastern portion of Tashkent within a flat industrial area (lithium smelter and concrete batching yards). Surrounded by industrial premises except for one large residential villa which is located exactly on the northern boundary of the site. This residential property is located within the site's sanitary protection zone (within the red circle). The Chirchik river is located more than 200 meters north of the substation boundary.

Figure 47: Location of SS Zafar



Equipment and layout

261. The 220/110/10 kV Zafar substation was energized in 1985 but with equipment from 1960/70s e.g., one of the power transformers was manufactured in 1978, the other one in 1984, both transformers have an oil leakage. The 220 kV side is not protected through 220 kV circuit-breakers. The 110 kV circuit-breakers are of oil dead tank design, manufactured in 1969. The structures of the 110 kV disconnecting switches are completely corroded. The existing protection relays are from the 1960/70s, electro-mechanical, the same applies to the switching display panel. The lead-acid batteries are from 1984.

7.1.2. SS Zarafshon

General Location and Topography

262. Located in the remote industrial town of Zarafshan over 190km northeast of Navoi. The SS is located on the edge of an industrial area surrounded by industrial properties to the northeast and by open land in all other directions. The nearest residential properties are more than 200 meters southeast of the site.

Equipment and layout

263. The 220/35/6 kV Zarafshon substation is well maintained but with equipment from the 1960/70s e.g., two 40 MVA power transformers manufactured in 1967, the 220 kV circuit-breakers are of oil dead tank design, manufactured in 1969. Two bays are equipped with circuit-breakers of ABB make, manufactured in 2014. The disconnecting switches of the 2 bays are motor operated whereas those installed in the other bays are motor operated. The 35 kV switchgear is outdoor.

Figure 48: Location of SS Zarafshon



7.1.3. SS Obi Khaet

General Location and Topography

264. Located in the north-western area of the Ferghana valley at an elevation of around 460 masl. The site is surrounded by agricultural land.

Equipment and layout

265. The 220/110/10 kV Obi-Khaet substation was partly rehabilitated in 2016 with the installation of two 200 MVA power transformers manufactured by Zhejiang Jiangshan Transformer Co., Ltd., and several 220 kV and 110 kV bays with equipment from ABB and Alstom. The installation works of the new equipment is sub-standard. The complete 10 kV switchgear was replaced with withdrawable vacuum circuit-breakers from Russia albeit with an outdated technology. One cubicle was out of order due to internal short-circuit.





7.1.4. SS Faysiobod

General Location and Topography

266. Located in the southwest area of Tashkent in a light industrial / commercial setting. The closest residential properties are more than 120m from the norther boundary of the SS.

Equipment and layout

267. Faysiobod substation was commissioned in 1991 but the installed equipment partly is of yesteryear. Both power transformers (2x 200 MVA) have an oil leakage and the OLTC of one power transformer is not functioning. technology. Two 110 kV circuit-breakers have been replaced with new ones of ABB make, manufactured in 2013. Disconnecting switches are manually operated. Three cubicles of the 10 kV switchgear have been replaced through new withdrawable vacuum circuit-breakers (2021) manufactured by Uzbekistan Elektroapparat, all other are also withdrawable but rather old. The existing protection relays are from the 1970s, electro-mechanical. One of the power transformers was under repair, the OLTC out of order.



Figure 50: SS Faysiobod Location

7.2. Audit Procedure

268. The audit has been based on site visits undertaken in June / July 2022 and review of existing data as listed below. The Consultant and the site staff as well as NEGU staff completed an audit questionnaire which can be found in its entirety in Appendix C.

7.3. Audit Key Findings

7.3.1. SS Zafar



A reserve oil tank is located above a bunded area. No signs of leaks or spills were noted from the tank.



Site Safety & Community Issues

269. The site is generally well maintained, fenced with suitable site drainage. As noted above, one residential property is located within the SPZ (100m) adjacent to the site boundary. The site has its own ERP and an incident reporting system. The site is located in an industrial zone, close to a lithium smelter and concrete batching plant.

270. No geohazards, e.g., floods, landslides, etc. are known to affect the site.

271. Fire-fighting equipment is provided at the site but there are no fire alarms. There is an emergency response plan for the SS, an incident reporting system and regular emergency training for staff (including firefighting training) every three months. There is no site-specific grievance mechanism, if complaints are made staff direct them to NEGU head office and provide the phone number and address to make complaints.

Hazardous Materials and Waste

272. Waste materials (including hazardous wastes) are collected from the site by a licensed company. Waste management documentation is kept at NEGU HQ. There is no inventory of waste generated and removed from the site. Waste containers were located around the site but they were not labelled. No waste materials are recycled.

273. SF6 is not used at the site.

274. Lead acid batteries are kept at the site. Filling procedures and bunding need to be improved in this area.

275. Transformers and circuit breakers contain oil. There were visible signs of small leaks beneath transformers. Spills beneath transformers are diverted to an underground oil capture area.

276. According to management, none of the equipment on site contains PCBs. PCB tests were undertaken by the consultant using rapid test kits (see Appendix S) in January 2023 to confirm the accuracy of this statement. The tests were completed on the two transformers to be removed from the site. The test results confirmed PCB values were below 50ppm and are therefore not PCB contaminated equipment. ¹⁰

<u>OHS</u>

277. EMF is not measured at the site. There is a first aid kit at the site but it is unclear who is responsible on site for first aid. First aid training is provided to staff twice a month. PPE is provided to staff, but more detailed inspection of PPE and safety is required at the site. The site is provided with a clean and adequate toilet. Potable water is provided but no facilities for cooking and eating are available.

278. Staff complete an emergency safety drill once every three months and participate in an annual fire safety seminar

<u>Noise</u>

279. Noise levels at the site during normal operational periods should not affect residents outside of the SPZ. However, one property is located adjacent to the substation in the SPZ and noise levels maybe elevated in this area.

ESHS Management

280. There is no dedicated person responsible for and environmental issues at the site. The SS manager is responsible for OHS management.

7.3.2. SS Zarafshon



¹⁰ PCB Contaminated Equipment - Any electrical equipment, including transformers, that contain 50ppm to 499ppm PCB's. PCB Equipment - Any transformer that contains 500ppm PCB's or greater.



Site Safety & Community Issues

281. No geohazards, e.g., floods, landslides, etc. are known to affect the site. The SS is in an industrial zone with a 100m SPZ around the site which is kept in good condition and cannot be accessed by the public. The closest residential properties are 200-300m from the substation. Fire-fighting equipment is provided at the site as well as automatic alarms. There is no emergency response plan for the SS, but there is an incident reporting system and regular emergency training for staff (including firefighting training). There is no site-specific grievance mechanism, however, according to management one complaint was made at night due to high levels of noise during maintenance works.

Hazardous Materials and Waste

282. Waste materials (including hazardous wastes) are collected from the site by a licensed company. Waste management documentation is kept at NEGU HQ but there is no inventory of waste generated and removed from the site. Waste containers were located around the site and labelled. No waste materials are recycled.

283. SF6 is used in two circuit breakers (located outdoors), however spare SF6 is not stored at the site itself. Leaks of SF6 are identified by staff during their routine inspections of the equipment.

284. Lead acid batteries are kept at the site. As noted above, some aspects of their management need to be improved.

285. Transformers and circuit breakers contain oil, some of which appears to be leaking beneath the equipment. Most of the oil appears to be contained within bunded areas. Spills beneath transformers are diverted to an underground oil capture area (the same as the one beneath the oil storage tanks). In theory this system should ensure that leaks and spills of oil are contained on site. However, more detailed inspections of this system should be undertaken by the EPC contractor during the design phase to ensure that that the system is sized correctly and to test the integrity of the system to ensure there are no leaks from bunds, piping and oil capture areas.

286. According to management, none of the equipment on site contains PCBs. PCB tests were undertaken by the consultant using rapid test kits (see Appendix S) in January 2023 to confirm the accuracy of this statement. The tests were completed on the two transformers to be removed from the site. The test results confirmed PCB values were below 50ppm and are therefore not PCB contaminated equipment.

<u>OHS</u>

287. EMF is not measured at the site. There is a first aid kit at the site and a medic. First aid training is provided to staff once a month. PPE is provided to staff, but as noted above a detailed OHS audit is recommended as part of the corrective action plan (CAP) below. According to site management there has not been a major accident or fatality within the last three years. The site is provided with a clean and adequate toilet. Potable water and clean facilities for cooking and eating are also available.

<u>Noise</u>

288. Noise levels at the site during normal operational periods do not affect residents which are outside of the SPZ and located more than 200m from the boundary of the substation.

ESHS Management

289. Nobody at the site has responsibility for environmental management. One OHS specialist works out of the head office in Navoi city.

7.3.3. SS Obi Khaet



In general the site was kept clean and tidy with no major environmental and social issues observed. Transformers were located in bunds. Bunding should be improved to ensure that the gravels beneath the transformers are suitable for oil migration and fire safety.



Site Safety & Community Issues

290. Management was unaware of the sanitary protection zone around the site. They assumed it was 100 meters. They noted that there were no residential properties within this distance of the substation. The site was fenced and secure, no unauthorized access is possible without climbing fences. No geohazards, e.g., floods, landslides, etc. are known to affect the site.

291. There is no site-specific grievance mechanism, if complaints are made staff direct them to NEGU head office and provide the phone number and address to make complaints.

Hazardous Materials and Waste

292. Oil filled transformers and circuit breakers are present at the substation. Transformers were located in bunds connected to below ground oil capture reservoirs. Some small leaks of oil were observed beneath transformers. Management were aware of PCBs, but commented that none of their equipment contained PCBs. The two large transformers at the substation were installed as part of a World Bank project in 2016 and will not be replaced under this Project. PCB tests were undertaken by the consultant using rapid test kits (see Appendix S) in January 2023. The results showed PCB values were below 50ppm.

293. SF₆ is used at the substation. There is a journal kept on site detailing the how much SF₆ is in the system. SF₆ is refilled by a specialist company and no spare SF₆ is kept on site.

294. Waste materials (including hazardous wastes) are collected from the site by a licensed company. Waste management documentation is kept at NEGU HQ but there is no inventory of waste generated and removed from the site. Waste containers were located around the site and labelled. No waste materials are recycled.

<u>OHS</u>

295. EMF monitoring is undertaken annually at the substation. According to substation management none of the results were recorded above national exposure limits. There is a small first aid kit stored on site. All staff receive 6 monthly first aid training. In the event of a serious injury NEGU call an ambulance to take the injured to hospital

<u>Noise</u>

296. There are no receptors close enough to the substation to be affected by noisy equipment

ESHS Management

297. There are no environmental staff at the substation. There are two heads of safety located at branch level. It is unclear how often they visit the site.

Biodiversity

298. White storks were observed nesting in the substation. No birds have been electrocuted and management do not intend to remove them from the site.

7.3.4. SS Fayziobod



Site Safety & Community Issues

299. Management noted that there were no residential properties within the 100m SPZ. The site was fenced and secure, no unauthorized access is possible without climbing fences. No geohazards, e.g., floods, landslides, etc. are known to affect the site.

300. There is no emergency response plan for the SS, but there is an incident reporting system and regular emergency training for staff (including firefighting training).

301. There is no site-specific grievance mechanism, if complaints are made staff direct them to NEGU head office and provide the phone number and address to make complaints.

Hazardous Materials and Waste

302. Oil filled transformers and circuit breakers are present at the substation. Transformers were located in bunds connected to below ground oil capture reservoirs. Some small leaks of oil were observed beneath transformers. Management were not aware of PCBs or their potential health risks. PCB tests were undertaken by the consultant using rapid test kits (see Appendix S) in January 2023. The results showed PCB values were below 50ppm.

303. Waste materials (including hazardous wastes) are collected from the site by a licensed company. Waste management documentation is kept at NEGU HQ but there is no inventory of waste generated and removed from the site. Waste containers were located around the site but not labelled. No waste materials are recycled.

304. Lead acid batteries are kept at the substation. The room is well ventilated, but the same issues exist as found at the substations above, e.g., lack of appropriate bunding, spill kits and epoxy flooring. Further, site staff seemed unaware of the health and safety risks relating to the batteries.

<u>OHS</u>

305. EMF is not measured at the site. There is a first aid kit at the site but no specific person responsible for first aid at the SS. First aid training is provided to staff once a month. PPE is provided to staff, but as noted above a detailed OHS audit is recommended as part of the corrective action plan (CAP) below. No date relating to accidents at the SS was forthcoming. The site is provided with a clean and adequate toilet. Potable water and clean facilities for cooking and eating are also available.

<u>Noise</u>

306. Noise levels at the site were moderately high, but there are no sensitive receptors close enough to the site to be affected by elevated noise levels.

ESHS Management

307. There is no dedicated person responsible for and environmental issues at the site. The SS manager is responsible for OHS management.

7.4. Corrective Actions

308. Based on the findings above, the following corrective actions are recommended (O-CAP-01)

#	Issue	Action	SS Applicability	Timeframe	Responsibility	Cost
I	Waste management	 Keep an inventory of all wastes stored at site and removed from site (CAP-01) Label all waste containers (CAP-02) Develop a plan for recycling of all waste types (CAP-03) 	Ali	March 2023	NEGU	Part of general NEGU operational costs
2	Hazardous materials - Oils	 Develop a procedure for the clean-up of spills and leaks of oil (CAP-04) Install spill kits at substations (CAP-05) 	All	January 2023	NEGU	16 spills kits / 4,000 USD
3	Hazardous materials - Batteries	 Prepare a procedure for the safe filling of lead acid batteries (CAP-07) Ensure all staff have adequate PPE for handing lead acid batteries (CAP-08) Ensure the floors of battery storage areas are coated with epoxy covering (CAP-09) Provide rubber bunds for the storage of batteries (CAP-10) Include a spill kit specifically suitable for spills of lead acid from batteries (CAP-11) 	All	January 2023	NEGU	10 sets of PPE / 2,000 USD Expoxy flooring / 2,000 USD Rubber bunds / 2,000 USD 4 spill kits / 1.000 USD
4	Site Safety	 Any residential properties within SPZs should be removed (CAP- 12) 	Zafar	To be determined	NEGU to coordinate with planning authorities	Not part of project costs
		 Install fire detectors and alarms (CAP-13) Prepare ERPs (CAP-14) 	All	March 2023	NEGU	Part of general NEGU operational costs
5	OHS	1. Complete a detailed OHS audit of each substation (CAP-15)	All	Prior to the commencement of substation works	ADB / NEGU	Auditbyinternationalexpert/25,000 USD
		 Measure EMF levels in the substation annually and compare with international guideline values specified in this IEE (CAP-16) 	Zafar, Zarafshan, Fayziobod	June 2023	NEGU	Part of general NEGU operational costs

 Table 24: Corrective Action Plan

#	Issue	Action	SS Applicability	Timeframe	Responsibility	Cost
6	Biodiversity	 Remove birds nesting at the substation (outside of breeding season) (CAP-17) 	Obi Khaet	January 2023	NEGU	Part of general NEGU operational costs
7	ESHS Management	 I. Ensure that for each substation there is a focal point on site for: a. First Aid b. Environmental Management (CAP-18) 	All	January 2023	NEGU	Part of general NEGU operational costs
8	GRM	I. Develop GRM for workers and local community (CAP-19)	All	March 2023	NEGU	Part of general NEGU operational costs
Total					36,000 USD	
8. Environmental Impacts and Mitigation Measures

8.1. Preamble

309. This portion of the report identifies the environmental and social impacts of the Project and proposes mitigation measures to eliminate the impacts, or where this is not possible, reduce their significance.

8.2. Physical Resources

8.2.1. Air Quality

310. This section discusses emissions of atmospheric pollutants and greenhouse gases during construction and operation of the Project and associated mitigation measures to be adopted.

<u>Aspects of the Project that have the potential to Emit Significant Atmospheric Pollutants and Greenhouse</u> <u>Gases</u>

#	Aspect	Yes	No	Assessment Boundary
	Construction	n Phase		
Ι	Earthworks for Foundations and substations	X		350m from the boundary of
2	Removal of substation equipment	X		the work zones. 11 500 meters
3	Construction vehicles	X		from access roads. ¹²
4	Mobile construction plant (cranes, generators, etc)	X		
5	Construction camps	X		
6	Access Roads	X		
7	Line Stringing		X	
8	Installation of substation equipment		X	N/A
	Operational	Phase		
Ι	Operation of the Transmission Lines		X	N/A
2	Maintenance of Transmission Lines		X	N/A
3	Operation of Substations	X		Within the boundary of the substation

Sensitive Receptors

311. During the construction phase sensitive receptors will mainly be residents affected by dust, and to a lesser degree by combustion emissions. The global environment is a sensitive receptor to greenhouse gas, although any project related emissions will not have a significant contribution to global greenhouse gas emissions.

Potential Impacts

Construction Phase

Release of Exhaust Gases

¹¹ According to the screening guidance of the UK's Institute of Air Quality Management (IAQM) for construction dust, detailed assessment relating to dust generation is required where there is a 'human receptor' within 350m of the boundary of the site.

¹² In accordance with the UK's IAQM Guidance on the Assessment of Dust from Demolition and Construction, detailed assessment of vehicle movements should only be required where 'human' receptors are located within 50m of the route used by construction vehicles on public roads, up to 500m from the project site entrance.

312. During construction, the release of combustion gases will mostly be from vehicles and potentially from mobile sources such as mobile generators. These may locally increase concentrations of atmospheric pollutants (NO_X and SO_2) to a limited extent and over a short time period. Generally, tower sites are located away from residential areas, however, there are a number of sites where construction work sites will be close to residential properties.

<u>Dust</u>

313. Dust impacts may impact upon receptors close to tower excavation sites and close to haul routes. However, the impacts will be relatively short term in any one location as works progress in a linear manner.

Operational Phase

<u>SF</u>6

314. Substations will use sulphur hexafluoride (SF_6) in equipment (circuit breakers) in substations. There are two potentially significant impacts associated with SF₆ which can leak from equipment.

- Health and Safety When an arc is formed in SF₆ gas small quantities of lower order gases are formed. Some of these byproducts are toxic and can cause irritation to eyes and respiratory systems. This is a concern if the interrupters are opened for maintenance or at disposal of the interrupters.
- Greenhouse Gas SF_6 is the most potent greenhouse gas that the Intergovernmental Panel on Climate Change has evaluated. It has a global warming potential that is 23,900 times worse than CO_2 .

315. However, audits of the substations indicate that SF_6 at the sites is adequately managed and therefore potential impacts are likely to be of low significance.

Impact summary and assessment of significance

316. Table 25 provides an assessment of the significance of potential air quality impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	Release of exhaust gases	Nearby communities	М	L	L	L	MIN	ST	SMA	LOW	POS	L
С	Dust	Nearby communities	М	м	L	L	MOD	ST	SMA	LOW	DEF	М
0	Release of SF ₆	NEGU staff & Global environment	L	М	L	L	MOD	LT	EXT	MED	POS	L

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Design Phase

<u>SF</u>6

317. SF₆ is generally well managed at substations, however, the following measures are required to ensure that impacts are not significant:

- Design of any gas insulated equipment will comply with international norms and standards for handling, storage, and management of SF₆ (D-AQ-01).
- Equipment to be hermetically pressure sealed "sealed for life" units and be tested and guaranteed by the supplier at less than 0.1% leakage rate (D-AQ-02).

Pre-construction / Construction Phase

Management Planning

318. The EPC Contractor will, as part of his **Specific Environmental Management Plan** (SEMP), prepare and implement a **Pollution Prevention Plan** (C-SEMP-02). The Plan will include measures to limit air pollution during the construction phase of the Project.

Siting of Facilities and Equipment

319. Stationary emission sources (e.g., portable diesel generators, compressors, etc.) shall be positioned as far as is practical from sensitive receptors (C-AQ-01).

Release of Exhaust Gases and Fugitive Emissions

- Emission sources (vehicles such as excavators) shall be positioned as far as is practical from sensitive receptors (C-AQ-02)
- Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to maximize fuel efficiency and help minimize emissions (C-AQ-03).
- Preferentially the Project will use fuel that has low sulphur content of 0.1%, where practical and available within country (C-AQ-04).
- Construction equipment and vehicles will meet national emissions standards. Belching of black smoke is prohibited (C-AQ-05).
- Limit engine idling to maximum 5 minutes (C-AQ-06).
- The burning of wastes generated by project-related activities is strictly prohibited (C-AQ-07).
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or batterypowered equipment where practicable (C-AQ-08).

<u>Dust</u>

320. Measures that will be adopted to help prevent dust problems from occurring include:

- Ensure an adequate supply of bowsers and carry out watering for dust control at least once a day near residential areas: in dry weather with temperatures of over 25°, or in windy weather. Avoid overwatering as this may make the surrounding muddy (C-AQ-10).
- Vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency) (C-AQ-11).
- A strict Project speed limit of 30km/hr will be enforced for Project vehicles using unmade tracks (C-AQ-12).
- Excavated materials will be stockpiled where practical away from sensitive receptors, such as homes, schools, and health facilities. Where this is not possible, ensure regular watering of stockpiles to prevent dust impacts (C-AQ-I3).
- Earthwork operation will be suspended when the wind speed exceeds 20 km/h in areas within 500 m of any community (C-AQ-14).

- Vehicles carrying fine aggregate materials will be sheeted to help prevent dust blow and spillages (C-AQ-15).
- Only use cutting, grinding, or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems (C-AQ-16).
- Provide workers with N95 dust masks to be worn when ambient conditions are dusty or when dust generating activities take place (C-AQ-17).

Operational Phase

321. <u>SF</u>₆

- Equipment designed and operated so that any leakage will trigger an alarm at the nearest concerned staffed substation requiring O&M staff to rectify the situation immediately (O-AQ-01).
- SF₆ in fire extinguishers provided at substations to be avoided (O-AQ-02).

Residual Impacts

Phase	Potential	Potential	Residual Impact	Residual
	Impact	Impact Significance		Impact Significance
С	Release of exhaust gases	Low	Potential impacts are anticipated to be low. Generic mitigation measures will ensure residual impacts will not be significant.	Not Significant
С	Dust	Moderate	Potential impacts are anticipated to be low. Generic mitigation measures will ensure residual impacts are kept low.	Not Significant
0	SF ₆ Leaks	Low	Following the mitigation measures provided for Sf6 should ensure that leaks of SF ₆ are minimized and do not have significant impacts to workers or to the environment in general.	Not Significant

Table 26: Air Quality Residual Impacts

<u>Monitoring</u>

322. Observational monitoring of air quality impacts and review of designs and plans will be completed per the Project EMP. Instrumental monitoring requirements include:

	Table 27. All Quality - Holicoring Requirements													
Monitoring	Parameters	Frequency	Location	Responsibility	Costs									
Construction														
Instrumental	NOx, SO2, CO	When complaints are received from residents	TBD	EPC Contractor	100 USD per sample.									

Table 27: Air Quality - Monitoring Requirements

8.2.2. Soils and Geology

323. This section discusses potential impacts on soils and geology during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to impact soils and geology

#	Aspect	Yes	No	Assessment Boundary						
Construction Phase										
1	Earthworks for Foundations and substations	X		Within the substation boundary and 20m around tower sites						

UZB: Digitize to Decarbonize - Power Transmission Grid Enhancement Project - Initial Environmental Examination

2	Removal of substation equipment		X	N/A						
3	Construction vehicles		X	N/A						
4	Mobile construction plant (cranes, generators, etc.)	X		20m around equipmen storage areas						
5 Construction camps X Within the camp bounded										
6	Access Roads	X		10 meters either side of access roads						
7	Line Stringing	Х		Immediately beneath the lines						
8	Installation of substation equipment		X	N/A						
	Operational Phase									
1	Operation of the Transmission Lines		Х	N/A						
2	Maintenance of Transmission Lines		X	N/A						
3	Operation of Substations	X		Within the substation boundary						

Key Sensitivities

324. Many sections of the alignments are located within agriculturally productive zones which should be protected in terms of keeping them free from pollution and avoiding disruption of the growing and cropping seasons. Worksites, towers and access roads also located on slopes can be prone to soil erosion. Project infrastructure can also be affected by soil quality.

Potential Impacts

Pre-construction / Construction Phase

Historical Contaminated Land

325. It is possible that historical leaks and spills of oil and fuel have occurred, especially beneath transformers in substations (note that the consultants site visits did not allow for a close enough inspection of the site for safety reasons). Generally, any leaks from transformers should be contained within bunds beneath the transformers and trapped within the underground oil capture tanks. However, other equipment, such as circuit breakers that are not located within bunds, may have leaked and polluted soils (and groundwater). Site visits to the substations did not identify any highly significant areas of pollution (some small patches for oil and staining could be observed) at the sites but given the limited nature of the inspections it is necessary to take a precautionary approach to this issue and assume that soils could be contaminated to some degree. Some areas of the substation will need to be excavated as part of the rehabilitation works. In addition, old transformers will be removed and their bunds (which are likely to contain contaminated gravels) replaced. Any contaminated material will need to be disposed of correctly within hazardous waste landfills.

326. Portions of L-K-S traverse slag heaps, or access roads for slag heaps connected to the AGMK. The composition of the spoil material disposed of at these slag heaps is unknow, but it is likely that they comprise some hazardous elements. Excavation works in these areas could result in health impacts to workers if they are handling toxic soils without adequate PPE or inhaling toxic dust.

Soil Properties and Compaction

327. Soil compaction may occur around access roads and tower pad sites and areas beneath lines during stringing – although methods can be employed to ensure that disturbance beneath lines is kept to a minimum during stringing.

Soil Erosion and Soil Loss

328. Erosion is a natural process by which wind and rain wear away soils that have poor cohesion or are steeply sloping. Where the land surface is disturbed and when vegetation and topsoil are removed, erosion rates increase. After reinstatement of topsoil temporarily removed from the worksites during construction or at the temporary storage areas, the soil is less cohesive and is much more easily erodible in wet weather.

Soil Contamination During Construction

329. The principal potential contaminants associated with the construction activities are the same as those listed below for hydrology. The soil can also be contaminated if substances from hazardous waste storage leach into the ground or if large quantities of raw sewage are discharged onto the ground. This can occur at both work sites and camp sites.

Aggregate Requirements

330. Any aggregate required for construction of tower foundations (e.g. fill material beneath tower pads) or for substation works will be obtained from state licensed quarries and/or borrow pits. Extraction and use of aggregates constitute depletion of non-renewable natural resources. If borrow pits or quarries are poorly sited, extraction can have adverse impacts on ecology, water resources, cultural heritage and communities.

Spoil Disposal

331. Excavated material from tower footings will be backfilled into the excavated area and compacted. Any excess spoil material will be spread around the base of the tower on GoU land. No significant impacts are anticipated from this activity.

Saline soils

332. NEGU indicated, during site visits, the L-Hamza in Bukhara region, is affected by saline soils which are corroding the concrete poles on this alignment.

Operational Phase

Leaks and Spills

333. Without suitable containment measures, it is possible that leaks of oil from oil containing equipment could impact upon soils (and groundwater). This impact is generally of low significance as the soils within the substation are not sensitive, e.g., they are not used for agriculture or for any other recreational use. Further, no groundwater users have been identified in close proximity to the substations. Notwithstanding the above, GIIP dictates that all oil containing equipment (and oil and fuel storage in general) shall be kept within containment bunds to prevent pollution incidents occurring.

Impact summary and assessment of significance

334. Table 28 provides an assessment of the significance of potential impacts to soil and geology before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	Soil Compaction	Soils and agricultural land	м	м	L	-	MOD	ST	SMA	LOW	POSS	L
С	Soil Erosion	Soils and local vegetation	L	М	L	-	MOD	ST	SMA	LOW	UN	L
С	Soil contamination	Agricultural soil and local community	L	М	L	L	MOD	LF	SMA	LOW	POSS	L

Table 28: Potential Impacts to Soils and Geology

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	Aggregate requirements	Ecology, water resources, and communities	L	L	L	-	LOW	ST	SMA	LOW	POSS	L
С	Contaminated land from Substations	Surrounding environment	L	м	L	м	MOD	LT	SMA	MED	POSS	м
С	Contaminated land from AGMK	EPC Contractors staff	L	Н	L	М	MAJ	ST	SMA	MED	POSS	м
0	Concrete Corrosion	Concrete towers	L	Н	L	-	MAJ	LT	SMA	HIG	DEF	н
0	Spills and leaks at substations	Substation	L	L	L	М	MOD	LT	SMA	MED	POSS	м

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UN: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Design Phase

Tower Placement

335. Identify presence of any unstable land and where towers are not on flat land and conduct geotechnical/slope stability analysis with slopes to be graded with drainage installed to minimize landslide risk (D-SG-01). Ensure resulting slope design/topography does not exacerbate surface erosion and/or trigger a landslide (D-SG-02); all disturbed areas are to be revegetated (D-SG-03). Bioengineering methods can be considered for slope protection (D-SG-04).

PCBs

336. PCBs will not be used in any transformers and any other Project facilities or equipment (D-SG-05). Equipment purchased for use on the Project to be accompanied by letter from the manufacturer and material safety data sheet for insulating oil used confirming that it is guaranteed PCB free and labelled as PCB free (D-SG-06).

Contaminated Land

337. The four substations will be surveyed during the design phase to assess the potential for contaminated land to be present in the area of the proposed installation and upgrading works (D-SG-07). If signs of potentially significant contamination are present in this area, e.g., oil storage tanks, old leaking transformers, oil staining, etc. soil sampling and testing shall be undertaken in the work area to determine the level of soil contamination (D-SG-08). A Contaminated Land Management Plan will be completed including specific procedures for intrusive investigation and mitigation measures (D-SG-09).

Saline Soils

338. Designs shall ensure that towers (specifically their foundations) located within saline soil area (mainly along the route of L-Hamza) are constructed from materials resistant to corrosion (D-SG-010).

Pre-construction / Construction Phase

Management Planning

339. The EPC Contractor will, as part of his **Specific Environmental Management Plan** (SEMP), prepare and implement a **Pollution Prevention Plan** (C-SEMP-02) and a **Reinstatement Implementation Plan** (C-SEMP-04). The Plans will include measures to limit soil pollution during the construction phase of the Project and measures to reinstate land affected by construction works.

Soil Compaction and Erosion

340. To avoid compaction impacts outside the cleared areas, i.e. pad sites, vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency) (C-SG-08). Other measures to prevent soil erosion include:

- Upon completion of subsoil and topsoil reinstatement, the Contractor and PIC will inspect disturbed areas jointly for signs of erosion, slope stability, relief, topographic diversity, acceptable surface water drainage capacity and function, and compaction and implement remedial measures, if necessary (C-SG-02).
- Schedule works during the dry season where practical to minimize any exposed areas subject to erosion by surface water runoff (C-SG-03).
- Rehabilitate any disturbed areas beyond footprint of the alignment to at least original condition through revegetation using native species (C-SG-04).
- To avoid compaction impacts outside the cleared areas, i.e., pad sites, vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency) (C-SG-11).
- Temporary erosion control measures will be developed and implemented after initial land disturbance and if construction activity on the working areas is suspended over the winter before reinstatement has been completed (C-SG-12).

Topsoil & Excavated Material

341. On completion of works, stockpiled topsoil will be spread over the surface of disturbed work areas (C-SG-13). Once the topsoil has been replaced it will be stone picked to remove any large stones which are not in keeping with the surrounding soil texture (C-SG-14). Revegetation of the soils will follow using native seed mixes (C-SG-15). Other measures to mitigate impacts to topsoil and to manage excavated material include:

- If topsoil is stored for more than six months, the stacks will be monitored for anaerobic conditions and manual aeration will be undertaken if they develop (C-SG-16).
- Stored subsoil and topsoil will be segregated in a manner that avoids mixing (C-SG-17).
- Topsoil stacks will be free draining. Topsoil will be stored outside the running track used by construction plant, equipment and vehicles (C-SG-18).
- Soil storage areas will be protected from vehicle movements to avoid soil compaction (C-SG-19).
- Excavation will be limited to within the agreed corridor of impact, ideally road reserve (C-SG-20).
- Infertile and rocky material will where possible be reused as fill material around tower foundations and substation foundations. If it needs to be taken off site it will be disposed by licensed waste management operator at designated disposal area suitable for accepting inert wastes (C-SG-21).

Soil Contamination

342. The following mitigation measures will be implemented with the aim of reducing the risk of soil contamination:

- The storage of hazardous materials will be restricted to designated impermeable hazardous materials storage areas located at least 50m from any surface water course or seasonal water channel (C-SG-22).
- A refueling procedure will be developed by the EPC Contractor, which will include a restriction on refueling within 50m of any watercourse (C-SG-23).
- The EPC Contractor's will ensure all material safety data sheets (MSDS) are kept on site with the relevant materials (C-SG24).
- Materials that can potentially react with each other will be segregated during storage (C-SG-25).
- Procedures will be established to determine acceptability of material storage and to promote the minimization of storage volumes (C-SG-26).
- Hazardous chemicals will be securely stored on site in a designated storage area (C-SG-27).
- Relevant personnel will be trained in safe use and handling of hazardous materials (C-SG-28).
- Diesel storage tanks at construction camps will be located in suitably sized and constructed bunded areas that are designed to be impervious to water and fuel. The bund volume will be designed to no less than 110% of the tank volume. Loading and off-loading connections will be located over secondary containment (C-SG-29).
- Regular inspections and maintenance will be carried out of secondary containment areas at camps to confirm that they are functioning effectively (C-SG-30).
- Information will be incorporated into the Site induction process and will outline the role of personnel in the management of waste and emissions from site and spill response procedures (C-SG-31).
- Site induction training will be supplemented by regular 'toolbox' talks with relevant personnel if inspections or audits highlight failings in waste management (C-SG-32). If a spill does occur, the following measures will reduce the associated potential impacts:
 - Spill response equipment (absorbents etc.) will be available in hazardous materials storage areas (C-SG-33).
 - Relevant construction personnel will be trained in use of spill kits and disposal practices (C-SG-34).
 - Vehicles delivering fuel or hazardous liquids will carry appropriate spill kits to allow an initial response to any spill to be deployed (C-SG-35).
 - All mobile plant (excluding vehicles) will be integrally bunded or will be equipped with a bund or drip tray which will be regularly inspected and emptied to prevent rainwater accumulating (C-SG-36).

Borrow Pits

343. Only state licensed borrow pits will be allowed for use (C-SG-37). The EPC Contractor will provide copies of the borrow pit operator's license and permit prior to the PIC before any materials from the borrow pit are delivered to site (C-SG-38).

Contamination from Substations

344. Any soils within work sites that are identified as contaminated shall be removed and disposed of as hazardous materials per any contaminated land management plan (C-SG-39).

Contamination at the AGMK

345. <u>F</u>or all works within 50m of the AGMK EPC Contractors staff will be provided with PPE, including disposable face masks, eye protection and disposable gloves (C-SG-40). Staff will be provided with toolbox training every day before the start of works in these areas warning staff of the hazards of working in these areas and the need for constant application of PPE (C-SG-41). Watering of excavated areas shall be performed daily during works to limit exposure to wind-blown dust (C-SG-42).

Operational Phase

Spills and Leaks at Substations

346. The following requirements are made for containing spills and leaks of hazardous liquids at substations (O-SG-01). These requirements are based on the Institute of Electrical and Electronics Engineers Standards Association (IEEE) Power and Energy Guide for Containment and Control of Oil Spills in Substations (2013).

Volume Requirements

Before a substation oil-containment system can be designed, the volume of oil to be contained should be known. Since the probability of a significant oil spill occurring at a substation is very low, the probability of simultaneous significant spills is extremely low. In general, an oil-containment system should be sized to contain the volume of oil in the single largest oil-filled piece of equipment, plus any accumulated water from sources such as rainwater, melted snow, and water spray discharge from fire protection systems. Interconnection of two or more pits to share the discharged oil volume may provide an opportunity to reduce the size requirements for each individual pit. Expected rain and snow accumulations can be determined from local weather records. A common rule of thumb is to design containment systems to be capable of holding 110% or greater of the volume of the largest oil container or 100% plus 24-hour 25-year storm.

<u>Lining</u>

347. Consideration should be given to sealing or lining any collecting or retention pit if horizontal and vertical

348. (Into underlying soil layers) migration of discharged oil is to be controlled. The installation of a liner of low permeability such as a layer of clay (i.e., bentonite), or a rubber or plastic liner in the pit is a reasonable means of slowing oil movement and enhancing containment. However, concrete is the most widely used option.

Fire Quenching

349. In places where the oil-filled device is installed in an open pit (not filled with stone), the possibility of a pool fire may be considered. If a major discharge occurs and the pooled oil in the pit catches on fire, the equipment will likely be destroyed. Of the passive fire-quenching measures, pits filled with crushed stone are the most effective. The stone filled pit provides a fire-quenching capability designed to extinguish flames if a piece of oil filled equipment catches on fire. An important point to note is that in sizing a stone-filled collecting or retention pit, the final oil level elevation (assuming a total discharge) should be situated approximately 0.3 m (12 in) below the top elevation of the stone. The use of 3.8 cm (1.5 in) or larger diameter stone (washed and uniformly sized) may be considered to permit quicker penetration by the oil to avoid a pool fire.

Oil Retention Pits

350. Oil retention pits shall be included. The pits shall be capable of containing discharged oil in bulk form or floating in bulk form on whatever residual water is present in the pit. When fire-suppression sprays are_used to extinguish a transformer fire, the oil can become emulsified to some degree and could be discharged through a gravity type oil-water separator. This might necessitate that the containment pit be sized to contain both oil and the liquid from the fire-suppression spray and allow for quiescence for oil separation before discharge can occur. It is likely that existing oil pits will be used. The existing pits must be integrity tested and must be connected to an oil-water separator.

Stormwater Management

351. All stormwater systems on site shall be fitted with an oil-water separator.

Warning Alarms and Monitoring

352. In the event of an oil spill, it is imperative that cleanup operations and procedures be initiated as soon as possible to prevent the discharge of any oil, or to reduce the amount of oil reaching navigable waters. Hence, it may be desirable to install an early detection system for alerting responsible personnel of an oil spill.

Control and Response

353. In the event of a spill, control of the oil flow will be required, and even where secondary containment is_successfully employed, some cleanup will be required. It is the function of the Spill Prevention Control and Countermeasures (SPCC) plan to document that_all relevant aspects of the control, containment, and cleanup have been planned for and are executed_correctly at the time of the spill. The content of the SPCC is as follows:

- General information
 - I. Introduction, purpose, and scope
 - 2. Applicable national regulations
 - 3. Applicable corporate policies and procedures
 - 4. Requirements for review and approval
 - 5. Any certification requirements, including that by the PE
- Identification information
 - 1. Substation name, type of facility, mailing address and street address (if different), legal description or GPS coordinates, facility contact phone number, and date and year that the facility began operation
 - 2. Name, title, address and phone numbers for the designated spill prevention and control coordinator(s) including on-site coordinator, responsible supervisor, and applicable company departments and managers (operations, legal, environmental, public relations, etc.)
 - 3. Emergency 24-hour phone number(s) for the designated spill coordinator(s) and any on-site and management personnel to be contacted immediately
 - 4. Map of the substation showing the relative location to the surrounding area, including nearby roads, waterways, wells, sewers, drains, ditches, or other facilities that could be impacted or contaminated by an oil spill or serve as a migratory pathway for a spill
 - 5. Name, address, and 24-hour emergency phone number(s) of the designated spill cleanup contractor(s), and written documentation of emergency response arrangements Designated non-company contacts
- Material used or stored at substation
 - I. Name and trade name for the oil and chemicals of concern
 - 2. Physical characteristics of the oil and chemical including composition, concentration, and possible reactions with other mixtures
 - 3. List of all the equipment containing oil, describing the number of units, quantities of oil present (including total maximum volume), unit identification, unit oil volume(s), and type of tank or container
 - 4. Map or site plan of the substation showing location of tanks and oil-filled equipment, spill discharge control points and predicted direction and path of an oil spill, including locations of transformers, circuit breakers, and other oil-filled electrical equipment; aboveground and below-ground bulk storage tanks; alarms; discharge points; floor drains; secondary oil containment; sump pumps; critical valves; environmental controls, etc.)
 - 5. Security procedures, requirements, and measures employed at the substation
- Spill control and response
 - 1. Staff training requirements, including frequency of training
 - 2. Spill response procedures (including the employee assignments and the specific actions to be taken) describing the methods of containing and cleaning up oil spills, such as skimming, boom

construction and deployment, use of special oil-absorbent materials, use of machinery or special tools, etc.

- 3. Spill response equipment including oil-absorbent material, booms, pumps, vacuum trucks, boats, skimmers, hoses, and other miscellaneous equipment; identifying its location and who
- 4. to contact to obtain it (often a cleanup kit inventory is provided listing quantity of each item required, stock numbers, etc.)
- 5. Spill incident reporting procedures including step-by-step calling procedures for immediate and follow-up notifications, identification of required reports and written notification(s) and their timing (reports should include the location of the spill, material type and quantity spilled, extent of the spill, media impacted and action taken) location, date, and time of spill; water course affected and resulting damage; cause of spill; cost of the damage and cleanup; and actions taken to prevent future spills
- 6. Surveillance requirements including watch and inspection schedule, description of duties, and alarm procedures
- 7. Record-keeping, testing, and inspection requirements, including inspection for oil leaks, tank integrity, secondary containment and environmental control integrity and cleanup equipment
- Secondary oil containment
 - 1. Design, construction, physical features, materials used, intended function, and operation of all secondary containment facilities, including retention pits, valves, pumps, oil-water separators, diking, etc.
 - 2. Volume requirements, dimensions, and calculations, including any special conditions or requirements that should be met to maintain proper operation of the containment system
 - 3. Drainage requirements and restrictions, including release of accumulated water
 - 4. Oil transfer procedures for pipelines, trucks, and oil-handling equipment
 - 5. Maintenance requirements
- Action to be taken in the event of an oil spill
 - I. Determination of the source of the spill
 - 2. Initiation of action to stop source of spill within the limits of training, experience, and safety (e.g., close necessary valves or temporarily plug holes to stop or control spill)
 - 3. Determination of the approximate volume, size of the spill and direction of flow
 - 4. Notification of the appropriate personnel including regulatory agencies
 - 5. Containment of any oil spill by blocking flow to drains and waterways, digging diversion ditches, sandbagging, or through other means
 - 6. Containment of any oil that has reached a waterway to prevent any further spreading downstream (by using booms or other means)
 - 7. Cleanup of oil by using absorbent materials, pumping, and removing oil-saturated earth or stone, as required

354. Oil spill cleanup material should be provided. Materials available and their respective locations should be included in or listed as an attachment to the SPCC plan.

<u>Disposal</u>

355. Contaminated materials such as oil-soaked gravel, soil, rags, and sorbent materials should be handled and disposed of as hazardous waste.

Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
С	Soil Compaction	Low	Soil compaction and soil erosion is not likely to result in highly significant impacts during the	Not significant
С	Soil Erosion	Low	construction phase. Implementation of the proposed mitigation measures will further limit the potential for impacts to occur.	Not significant
С	Soil contamination	Low	Soil contamination would only be of low significance even without mitigation as in general any leaks or spills will be minor and localized. Additional mitigation will ensure that there are no significant residual impacts.	Not significant
С	Aggregate requirements	Low	No residual impacts are anticipated if licensed borrow pits are used.	Not significant
С	Contamination from Substations	Medium	The measures outlined above will ensure that any potentially significant soil contamination is identified and removed from the site to authorized disposal locations. No significant residual impacts are identified as long as these procedures are followed.	Not significant
0	Leaks and spills at substations	Medium	Construction of containment measures according to GIIP will ensure that leaks and spills at substations do not result in significant impacts.	Not significant
0	Saline soils	High	Design measures should ensure that residual impacts associated with alignments in areas of saline soils are not significant.	Not significant

Table 29: Soils and Geology Residual Impacts

<u>Monitoring</u>

356. Observational monitoring of impacts and review and approval of designs, plans and method statements will be completed per the Project EMP. Instrumental monitoring requirements and review include:

Table 30: Soils and Geology - Monitoring Requirements

Monitoring	Parameters / Items	Frequency	Location	Responsibility	Costs				
Construction									
Instrumental	VOCs, Phenols	Once, during rehabilitation depending upon the findings of the site surveys	Beneath all transformers that are removed from site and any other areas of substations that are potentially contaminated and soil excavation is required.	EPC Contractor	400 USD per sample.				

8.2.3. Hydrology

357. This section discusses potential impacts on hydrology during construction and operation of the Project and associated mitigation measures to be adopted.

As	pects o	f the	Project	that	have	the	potential	to	affect	hy	drolog	y
							1					_

#	Aspect	Yes	No	Assessment Boundary
	Construction	n Phase		
Ι	Earthworks for Foundations and substations		X	N/A
2	Removal of substation equipment		X	N/A
3	Construction vehicles		Х	N/A
4	Mobile construction plant (cranes, generators, etc)	X		Within 10m of the plant
5	Construction camps	X		Within 50m from the boundary
				of camp sites
6	Access Roads	X		Within 5m of access roads
7	Line Stringing		X	N/A
8	Installation of substation equipment		X	N/A
	Operational	Phase		
1	Operation of the Transmission Lines		X	N/A
2	Maintenance of Transmission Lines		X	N/A
3	Operation of Substations	X		Within 50m from the boundary
				of the substations

Key Sensitivities and Receptors

358. The key sensitivities in the Project area are the main surface water courses that lines pass over. The key river crossings (over 50m) identified are:

- Bozsuv canal (L-19-23 / L-22-23) 45m width
- Reservoir (L-22-23) 400m width
- Syrdarya River (L-F-CH) 250m width
- Kashkadarya River (L-K-K) 130m width
- Halkajur River (L-D-Sh) 700m width
- Sangardak River (L-D-Sh) 175m width

359. The lines also pass over numerous small streams and canals (less that 50m in width).

360. Initial alignments and tower locations provided by NEGU indicate that all of the tower sites will be located outside of riverbeds, with the exception of the Halkajur river where one tower is placed in the riverbed due to the length of the crossing.

Figure 51: Halkajur River



Source: Google Earth / NEGU

361. Groundwater is unlikely to be impacted by transmission line works unless there are spills and leaks of fuel and oil during construction works at camp sites. Groundwater beneath substations is also a sensitive receptor, although site audits did not reveal the presence of any groundwater users around substations.

Potential Impacts

Pre-construction / Construction Phase

362. The Project will involve the use or generation of some or all the following materials that have the potential to contaminate surface waters:

- Fuels and lubricating oils.
- Paints and solvents.
- Leachate from hazardous waste storage areas at camp sites.
- Raw sewage from camp sites.

363. Most tower sites are located more than 10m from surface water courses and it is considered unlikely that significant contamination of water courses from these materials is likely in these locations. Some tower sites may be located closer than 10m to the water courses and in these locations the potential for contamination of surface water is greater. The possibility of minor groundwater contamination also exists from any spills or leaks of hazardous liquids.

364. A tower may be required within the riverbed of the Halkajur river. Google images show that the river flow is low for most periods of the year and access to this tower site during construction phase is available without working close to the flow of the river and therefore the risk of pollution during construction is low if works are timed to avoid high flow periods.

365. There is also a risk that there could be spills and leaks of oil and other hazardous liquids during substation rehabilitation works. However, no users of groundwater have been identified in areas around the substations and therefore there is no risk to human health via groundwater. Notwithstanding this statement, measures to reduce the risk of spills and leaks at substations during construction are provided below.

366. Although large volumes of water are not anticipated to be required at each worksite, there will be the need for technical water during the construction phase. Uncontrolled exploitation of water resources could impact upon the existing users of the water resources.

Operational Phase

367. Extreme flood events associated with climate change could impact upon the tower foundations and stability of the tower in the Halkajur river. It is also possible the other towers will be constructed in floodplains that could potentially be impacted significantly by extreme flood events in the future.

368. Leaks of oil from substation equipment, could impact upon groundwater, but as noted above there are no groundwater users in the immediate vicinity of the substations. Audits of the substations noted that the bunding around transformers was inadequate (see Section 7). During the rehabilitation works the containment bunding must be constructed in line with GIIP.

Impact summary and assessment of significance

369. Table 31 provides an assessment of the significance of potential impacts to hydrology before implementation of the proposed mitigation measures that are discussed in the rest of this section.

		Table 31		CIICIA		Jaces			<u>8</u>			
Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	Contamination of surface water	Local community, wildlife	L	М	L	L	LOW	ST	INTER	MIN	UN	L
С	Water use	Local community	М	М	L	-	MED	ST	SMA	MIN	DEF	L
С	Contamination of groundwater	None	L	М	L	L	LOW	ST	INTER	MIN	UN	L
0	Extreme flood events	Project infrastructure	L	Н	L	-	HIG	LF	SMA	MOD	POSS	M
0	Leaks and spills from substations	None	-	-	-	-	-	-	-	-	-	N

Table 31: Potential Impacts to Hydrology

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Design Phase

370. Oil containing equipment to be in areas as specified above under Soils and Geology. All wastewater from substations to be connected to existing sewerage system or septic tank with soak away so no untreated wastewater will be disposed of to surface water or ground in operation, septic tank/soakaway effluent to meet national general wastewater standards or IFC wastewater discharge limits, whatever is the most stringent (D-HY-01).

371. Designs shall avoid placing a tower in the riverbed of the Halkajur river. If this is not possible for technical reasons designs shall ensure that the tower is constructed so that foundations cannot be significantly affected by high water levels (D-HY-02). The EPC Contractor should ensure that the findings of the Project CRVA form part of the design of this tower. Such design considerations shall also apply to any other tower constructed within river floodplains (D-HY-03).

Construction Phase

Management Planning

372. The EPC Contractor will, as part of his **Specific Environmental Management Plan** (SEMP), prepare and implement a **Pollution Prevention Plan** (C-SEMP-02). The Plan will include measures to limit surface and groundwater pollution during the construction phase of the Project.

Water Quality

373. The EPC Contractor will be responsible for implementing his Pollution Prevention Plan at construction sites which will include the following measures to reduce the risk of surface water contamination:

- Concrete batching (if required) will be sited at least 50m away from sensitive receptors such as watercourses; wash pits to be lined with an impermeable liner (C-HY-01).
- Treated wastewater will be used for damping down road surfaces to mitigate dust generation (C-HY-02).
- Domestic sewage from camps will be stored and transported to water treatment works or treated through a dedicated site sewage water treatment plant (C-HY-03) before discharge to ground or surface water.
- All wastewater discharges will follow the national standards (MPDs) (C-HY-04).
- Construction camps will be located at least 200m from water courses (C-HY-05).
- All mobile plant will be kept at least 10m distant from surface water and any groundwater wells (C-HY-06).
- Drip trays will be placed below all mobile generators (C-HY-07).
- Potable water will be supplied that meets national drinking water standards and ISO 10500 drinking water parameters (full suite). If this is unavailable, ensure regular supply of bottled water to the site during construction and operational phases (C-HY-08).

Water Use

374. To mitigate impacts to water users the following measures shall be followed:

- The prior agreement of local communities to use their local piped water either temporarily during construction or permanently for substations will need to be obtained (C-HY-09).
- In cases where use of local piped water is not agreed, or piped water is not available, the collect rainwater or import tanked water to the project area (C-HY-10).
- No groundwater will be used in districts without additional groundwater capacity in other districts groundwater will not be used without the agreement of local communities and state authorities responsible for groundwater extraction permits (C-HY-II).

Residual Impacts

			ace water nesidual impacts	
Phase	Potential	Potential	Residual Impact	Residual
	Impact	Impact		Impact
		Significance		Significance

Table 32: Surface Water Residual Impacts

С	Contamination of	Low	None identified	Not		
	surface water			significant		
С	Water use	Low	None identified	Not		
				significant		
С	Contamination of	Contamination of Low The mitigation measures outlined above will				
	groundwater		ensure that residual impacts are not significant.	significant		
0	Extreme flood	Medium	Detail designs shall ensure that towers are	Not		
	events		located and designed in such a way to limit the	significant		
			potential for flood events to impact upon the			
			towers. This measure will ensure that residual			
			impacts are not significant.			

Monitoring

375. Observational monitoring of impacts and review and approval of plans and method statements will be completed per the Project EMP.

8.2.4. Geohazards

376. The Project will not result in, or induce additional geohazards, but it may potentially be affected by Geohazards. This section therefore discusses potential impacts geohazards may have on the Project during construction and operation phases and associated mitigation measures to be adopted.

Key Sensitivities

377. The key sensitivities associated with geohazards are tower sites and lines. Specifically, the following alignments are considered to be susceptible to geohazards:

- L-F-CH potential flood risk
- L-22-23 potential flood risk
- L-Hamza High winds
- L-D-Sh Potential mudflows
- L-H-K Potential landslides and mudslides

378. None of the substations have been identified as being likely to be impacted significantly by geohazards although seismic events can occur anywhere within the country.

Potential Impacts

<u>Floods</u>

379. Potential flood risks are discussed under Hydrology, above.

Seismic Events

380. As mentioned above, most of Uzbekistan is highly seismic and earthquake risk among the proposed activates ranges from low/moderate to high. Seismic activity could damage project infrastructure leading to secondary impacts such as power outages and accidents involving people living close to damaged lines.

<u>High winds</u>

381. According to NEGU, some towers in Bukhara region have collapsed, apparently due to high winds (although their age and impacts from animal burrows may have also affected the towers stability). As with seismic events damaged infrastructure could lead to secondary impacts such as power outages and accidents involving people living close to damaged lines.

Mudflows and Landslides

382. Two of the proposed alignments are in areas identified as being located in landslide/mudflow risk areas. Mudflows and landslides could damage and even destroy towers and lines.

Impact summary and assessment of significance

383. Table 31 provides an assessment of the significance of potential impacts to hydrology before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
0	High winds	Transmission	L	Н	L	-	MAJ	L/F	SMA	MED	POSS	М
0	Seismic events	towers and	М	Н	L	-	MAJ	L/F	SMA	MED	POSS	М
0	Mudflows / Landslides	lines	L	Н	L	-	MAJ	L/F	SMA	MED	POSS	M

Table 33	: Pot	ential	Im	pacts	to	Hy	drolo	ogy

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Design Phase

384. Designing towers using landslide / mudflow prevention design standards and considering earthquake loading as well as locating the facilities in stable areas, as far as possible would avoid landslides and impacts from seismic events (D-GEO-01).

385. Specific attention shall be applied in the design phase to towers on the L-Hamza alignment to ensure that they are not impacted negatively by high winds during the operational phase (D-GEO-02).

Residual Impacts

	Table 54. Geonazard Residual impacts							
Phase	Potential	Potential	Residual Impact	Residual				
	Impact	Impact		Impact				
		Significance		Significance				
0	Seismic events	Medium	None identified as long as earthquake loading,	Not				
			and national design standards are considered.	significant				
0	Mudslides and	Medium	None identified at this stage of the Project as	Not				
	landslides		long as designs adequately consider locations	significant				
			where landslides and mudflows are a specific					
			risk and design towers to be located outside of					
			these prone areas.					
0	High winds	Medium	Incorporating increased wind speeds into designs	Not				
	-		will ensure that impacts are not significant.	significant				

Table 34: Geohazard Residual Impacts

Monitoring

386. Approval of plans and designs will be completed per the Project EMP. Instrumental monitoring requirements and review include:

8.3. Biodiversity

387. This section discusses potential impacts on biodiversity during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to Impact Biodiversity

#	Aspect	Yes	No	Assessment Boundary
	Construction	n Phase		
1	Earthworks for Foundations and substations	X		
2	Removal of substation equipment		Х	N/A
3	Construction vehicles	X		
4	Mobile construction plant (cranes, generators, etc.)		X	N/A
5	Construction camps	X		
6	Access Roads	X		
7	Line Stringing	X		
8	Installation of substation equipment		X	N/A
	Operational	l Phase		
Ι	Operation of the Transmission Lines	X		
2	Maintenance of Transmission Lines	X		
3	Operation of Substations		X	N/A

Sensitive Receptors

- Natural and critical habitat
- Special status fauna
- White Stork

Potential Impacts

388. This section focuses on impacts associated with transmission lines as there are no significant impacts to biodiversity within substations, apart from the issue of nesting birds in Obi Khaet Substation which is addressed as part of general impacts to Turkestan White Stork.

Construction Phase

389. During the construction phase, the key potential impacts to flora, fauna and habitat relate to vegetation clearance within the working corridor, vehicle movements and the siting of construction camps and the presence of workers. The following discusses these generic impacts in more detail:

Activity	Impact	Mitigation
Habitat loss, degradation and simplification	Impacts arise because of vegetation clearance for the preparation of the tower sites; construction of camp facilities / laydown areas etc. Impacts associated with vehicle use include soil compaction, dust emissions from vehicles affecting plants and habitats and laying of temporary roads.	In general, most habitats will be restored naturally around towers following construction resulting in effects of short-term degradation and disturbance only. Only minor long-term habitat loss is expected to occur in the immediate areas beneath the towers although many of these areas are already modified due to the setting of existing towers
		in these locations.
Impacts on	Pollution of soil and groundwater by	Mitigation is described in the hydrology
water resources	cause mortality of vegetation.	

Table 35: Generic Construction Phase Impacts

Activity	Impact	Mitigation
Direct mortality of fauna	Vegetation clearance can lead to direct fatalities of fauna. Indirect fatalities can also occur when excavations (for foundations) are left open.	Locating construction camps away from sensitive areas and enforcing a hunting ban on construction workers will help ensure that there are no significant adverse effects. Speed limits on vehicles and restriction to existing and/or dedicated haul routes will prevent direct mortality and disturbance from vehicles. Pre-clearance site surveys and the movement of animals out of the working corridor will prevent direct mortality. There may be some low level unavoidable direct mortality, but this would not be significant in the short or long term.
Disturbance to sensitive species	Construction noise and visual disturbance can result in short term, localised effects, although many animals will become habituated to the noise. Noise levels in excess of 65dB over the long term or spikes over 70dBs are likely to elicit an adverse response.	Construction noise and visual disturbance will result in short term, localised effects, although many animals will become habituated to the noise. The nosiest activities associated with the development are those from static plant used to excavate trenches and clear vegetation. This may result in a short-term adverse effect. Monitoring by EPC Contractor will ensure that should notable species be breeding in an area, additional mitigation measures (e.g. regarding timing of works) will be implemented as required ((e.g. for birds so that the young have successfully fledged)
Spread of non- native or invasive species	Spread of non-native invasive species will reduce the ecological value of an area.	Pre-clearance surveys of invasive species combined with the demarcation and treatment of non-native species will prevent their spread. Monitoring post-construction will ensure that newly restored areas are not inundated with non-native species from adjacent areas. Use of GIIP such as cleaning of machinery before import to site, wheel washes on site, etc. will avoid import of invasive species.
Poaching	As the majority of mammals and reptiles identified in the baseline studies are subject to poaching. The introduction of temporary workforce to the area may increase risk of poaching / deliberate killing of animals at or near temporary construction camps.	This risk can be reduced by appropriate worker training sessions and implementation of a strict code of conduct with regards to treatment of local fauna.

390. At the tower sites and at construction camps and equipment lay-down areas, clearing vegetation and soil will cause temporary loss of land. Pre-clearance surveys will be used to avoid any unanticipated impact as far as practical. The camps, laydown areas and access roads will be selected by the EPC Contractor following such surveys.

391. If any tree cutting is to be undertaken, compensation planting will be undertaken based on the number of trees to be removed and using an appropriate re-planting ratio as recommended by the relevant country laws "On Protection and Use of Flora" Nº 543-I dated 26.12.1997, Law "On forest" No. 770-I dated 15.04.1999; Resolution of the Cabinet of Ministers "On Regulation of the Use of Biological Resources and Procedure for Licensing Procedures in Environmental Management" Nº 290 dated 20.10.2014; Resolution of the Cabinet of Ministers "On Approval of Certain Legal Texts for Protection of Forests" No. 506 dated 22.11.1999 or based on international best practices.

392. None of the alignments are located within critical habitat according to UNEP mapping and no lines are located in, or immediately adjacent to nationally or internationally designated sites. However, a portion of L-Hamza passes through a modified desert environment. Site surveys of this area identified several terrestrial species that could be affected by construction activities including:

- Central Asian tortoise (VU): Assumed to be present in very low numbers.
- Dressing (VU:D): Traces were found on one of the survey points.
- Grey monitor lizard (VU:D): Traces of a monitor lizard were noted at the southeastern tip of the power line.
- Sand boa constrictor (NT): Traces of the boa constrictor were found at least 3 places in the eastern end of the power line, passing through areas of open sand.

393. An open and uncontrolled landfill is also present at the western point of the alignment. Gerbil burrows can also be found around the foundations of concrete poles in several locations which could cause tower stability issues.

Operational Phase

Screening

394. The key impacts of the Project to consider during the operational phase relate to the potential for bird electrocutions and bird collisions with towers and lines. The alignments selected during the screening process has sought to eliminate all alignments that have potential to have highly significant biodiversity impacts, including their locations close to Important Bird Areas and any other nationally and internationally designated sites. Therefore, impacts associated with the selected alignments in this IEE are likely to be of lower significance in terms of bird electrocutions and collisions.

<u>Bats</u>

395. Impacts to bats have been excluded from further study based on a review of recent literature which suggests there is no national or international (published, peer reviewed) literature on bat fatalities from power line collision. ¹³ in addition, Orbach & Fenton (2010) cite only *'anecdotal reports'* of bats colliding with other stationary objects including television towers. One bird study in California did however report a single (unidentified) bat found during a search for bird carcasses surrounding a 110 kV transmission line (Dedon *et al.*, 1989).

Bird Electrocutions

396. Electrocutions occur when a bird completes a circuit by simultaneously touching two energized parts or an energized part and a grounded part of electrical equipment on a power pole, specifically with the span of its wings. According to the America Eagle Foundation the majority of electrocutions occur on medium-voltage distribution lines (4kV to 34.5kV),¹⁴ the reason being that the spacing between conductors are oftentimes narrow enough to be bridged by a bird's wingspan. Also, poles that contain closely spaced energized parts (such as transformers) can be especially hazardous to birds off all sizes. This finding corresponds with that of the US Fish and Wildlife Service (FWS) which state that most bird electrocutions occur on distribution lines and poles compared with transmission lines. Birds can be electrocuted on transmission lines; however, it is rare and there is a lack of data on the scale of this problem. ¹⁵ ¹⁶

397. Consultations undertaken as part of this project indicated that the White Stork often can be found nesting on transmission towers in the Project area. There is little data available on the rate of electrocution of this species due to its nesting habits in Uzbekistan. However, in Europe, over a 16-

¹³ EirGrid Evidence Based Environmental Studies. Study 3: Bats. December 2015

¹⁴ American Eagle Foundation. Promote Avian Friendly Power Lines. https://www.eagles.org/take-action/avian-friendly-power-lines/

¹⁵ https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/electrocutions.php

¹⁶ Guidance on appropriate means of impact assessment of electricity power grids on migratory soaring birds in the Rift Valley / Red Sea Flyway. GEF, UNDP, Birdlife International. 2015

year period, it was estimated that approximately 25% of juvenile and 6% of adult white storks died annually from power-line collisions and electrocution.¹⁷

398. <u>Power Line Bird Collisions</u> – Collisions occur when birds fly into wires. Bird size, agility, experience, flocking, territorial or courtship activities, weather, time of day, human activities, configuration and location of the line, line placement, and line size can all contribute to these collisions. Many species of birds are especially vulnerable to collisions with high voltage transmission lines because of the height of these structures with respect to flight altitude, and because of their low visibility, whereas many species are potentially less vulnerable to collisions with distribution lines. ¹⁸ During consultations it was noted that Turkestan White Stork collisions were common on L-KS-A in the area around a sewage treatment works.

399. It is important to note that the Project involves rehabilitation of existing lines, and no new lines will be established and no new impacts created.

Impact summary and assessment of significance

400. Table 36 provides an assessment of the significance of potential biodiversity impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	Degradation/ fragmentation of habitat caused during site clearing (for camps, access roads, etc.)	Terrestrial wildlife	L	L	L	L	MIN	ST	SMALL	LOW	DEF	L
С	Loss of Habitat / Biodiversity	Terrestrial and aquatic wildlife	L	М	L	L	MOD	ST	SMALL	LOW	DEF	L
С	Physical damage (road kills, accident, loss of roosts/nesting sites, etc.)	Terrestrial wildlife – birds, bats, etc.	L	L	L	L	MIN	ST	SMALL	MED	POS S	L
С	Poaching	Terrestrial wildlife	L	L	L	L	MIN	ST	SMALL	MED	POS S	L
С	Vehicle Movements	Terrestrial wildlife	М	L	L	L	MIN	ST	SMALL	MED	POS S	L
С	Construction noise / light	Terrestrial wildlife	Μ	L	L	L	MIN	ST	SMALL	MED	DEF	L
С	Spread of non-native / invasive species	Terrestrial Habitats	Μ	Μ	L	L	MIN	ST	SMALL	MED	POS S	L
0	Bird Electrocution	Birds	L	Н	L	L	MAJ	LT	SMALL	HIGH	UN	Μ
0	Bird Collisions	Birds	М	н	L	L	MAJ	LT	SMALL	HIGH	POS S	М

 Table 36: Potential Impacts to Biodiversity

 Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS:

 Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

¹⁷ Reducing death by electrocution of the white stork *Ciconia Ciconia Journal of the Society of Conservation Biology*. 2011

¹⁸ Avian mortalities due to transmission line collisions: a review of current estimates and field methods with an emphasis on applications to the Canadian electric network. Avian Conservation and Ecology, 2013

Mitigation and Management Measures

Design Phase

Bird Electrocution

401. The FWS have indicated that electrocutions from transmission lines are rare and according to recent technical papers electrocution mitigation can be far more controlled than collision mitigation since the problem is a physical one, whereby a bird bridges certain clearances on a pole structure, the solution is relatively straightforward, and involves ensuring that a bird cannot touch the relevant components.¹⁹ However, some studies have identified White Stork as being at specific risk of electrocution from power lines (although the reports do not differentiate between voltages, e.g. transmission or distribution).

402. Nonetheless, the WBG EHS Guidelines for Electric Power Transmission and Distribution provide the following mitigation to reduce the risk of bird electrocution, and this will be applied to the Project:

• Maintaining 1.5 meter (60-inch) spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware (D-BIO-01).

403. There is a nationally important population of White stork (LC) in the vicinity of the Project and although the species is not internationally threatened a relatively small change in this local population may affect the Uzbekistan population. This species shows a strong preference for nesting on tall man-made structures. Approximately 34% of nests in the local population are on steel high voltage electricity pylons.

404. The Consultant attempted numerous times, through NEGU to consult with the Uzbek Society for the Protection of Birds (UzSPB) to determine the most suitable design measures for this species. Unfortunately, NEGU were unable to arrange a meeting.

405. However, based on international best practice for these species it is recommended that nesting platforms provide the best option for the protection of these species as nesting deterrents are only likely to move the birds to other nearby towers which will not have the energy component spacing recommended above. The following measures will be followed by both the EPC Contractor supported by a national ornithologist employed by the PIC:

- Where possible, towers with nests (as identified by the PIC Ornithologist) should remain in-situ to continue to provide nesting sites for the Stork (D-BIO-02a).
- Nests shall remain in place where towers are to remain in-situ after line decommissioning (D-BIO-02b).

406. Where this is not possible, and towers will be decommissioned the PIC Ornithologist will:

- Identify all nests on towers to be removed.
- Monitor the nests on towers to be removed for one breeding season to determine if immature storks are "practicing" the construction of nests which they don't use later or if they are "summer nests" used only for resting and sleeping by adult storks. ^{20,21} (D-BIO-02c)
- 407. Based on the findings EPC Contractor will:

¹⁹ Guidelines on How to Avoid or Mitigate Impact of Electricity Power Grids on Migratory Birds in the African-Eurasian Region. AEWA Conservation Guidelines No. 14. 2012

²⁰ Building platforms under such structures is pointless and may lead to luring the storks to power lines, which are dangerous to them.

²¹ A Guide to the Protection of White Stork. The Polish Society for Bird Protection. 2012

- Remove towers at the end of the breeding season, not before or during (D-BIO-02d).
- Ensure designs for the following lines include nest platforms:
 - a. L-19-23
 - b. L-F-CH
 - c. L-KS-A
 - d. L-19-D
 - e. L-22-23

408. Nest platform designs will be based on the requirements of Suggested Practices for Avian Protection on Power Lines (2006). ²² (D-BIO-02e). Designs will be reviewed and approved by the PIC Ornithologist.

409. <u>Bird Collisions</u> – The following measures are recommended during the construction phase to reduce the potential for bird collisions:

- Provision of bird's reflector on top of every tower (D-BIO-03).
- Provision of line marking devices on all lines to avoid birds' collision with transmission lines. The spacing and location of the marking devices on the lines will be based on the recommendations of the PIC Ornithologist who will complete bird surveys (over one season) of all lines prior to the start of construction and prepare site specific **Bird Marker Survey Reports** for each line which will be submitted to the EPC Contractor for implementation. (D-BIO-04).

410. It is vitally important that the markers are placed on the earth line on the top of the tower. According to some reports, this can reduce collision accidents by 50-85%. ²³ At close range, birds recognize the relatively thick conductor cables and perform obstacle avoidance maneuvers, that can lead them crashing into the thin neutral cable.

Other Issues

411. At the northern end of the power line, there are burrows of red-tailed gerbil at the base of power line pylons. These burrows may be causing subsidence around the poles. In this regard, when planning construction work on the reconstruction of power lines, it is necessary to control, and, if necessary, regulate the number of individual species of rodents on the site by specialized services (D-BIO-06).

412. Although beyond the remit of this Project it is recommended that NEGU work with state authorities responsible for the landfill to move the landfill a safe distance from the project site to prevent birds gathering close to the transmission line (D-BIO-05).

Construction Phase

413. <u>General Construction Mitigation</u> - The following is proposed to reduce or mitigate general construction impacts on ecology and nature conservation:

Objective	Actions								
Minimize impac	The worksites shall be fenced (C-BIO-06). Vehicle movements will be restricted to								
footprint	defined access routes and demarcated working areas (unless in the event of an								
-	emergency) to reduce unnecessary impacts to habitat (C-BIO-07). Sensitive habitats that								
	need to be avoided during construction will be marked for protection (C-BIO-08).								

Table 37: General Mitigation Measures

²² https://www.nrc.gov/docs/MLI224/MLI2243A39I.pdf

²³ http://birdsandpowerlines.org/cm/media/Protecting_birds_on_powerlines.pdf

Minimize impacts on sensitive species	Pre-construction surveys will be undertaken along all routes and at camp locations to identify any need for site or species-specific mitigation measures (C-BIO-09) with specific attention paid to L-Hamza. Any notable species recorded prior to construction will be surveyed and translocated prior to construction if needed (C-BIO-10).
Tree Protection	Compensation planting will be undertaken to off-set the essential removal of any trees (C-BIO-11). An inventory will be made of all trees felled during the Project construction phase, in accordance with the requirements of national legislation. Any Red Book species will be identified and protected via fencing or bunting throughout the construction phase in the specific location of works (C-BIO-12).
Avoid invasive species	No species that are considered likely to out-compete the indigenous plant species will be used in seed mixes. No invasive species will be used in seed mixes for erosion control or bio-restoration (C-BIO-13). The Contractor shall inspect and wash all plant and equipment prior to shipping to the country of use with the aim of ensuring, as far as it is free from soil and plant material (C-BIO-14).
Reinstatement of works areas	Temporary works areas will be reinstated to near original condition (as compared to preconstruction survey reports or adjacent areas) (C-BIO-15). Reinstatement will be undertaken as early as practicable and in accordance with the Reinstatement Implementation Plan (C-BIO-16).
Recontouring	Recontouring should be sympathetic and in keeping with the surrounding landscape, and as approved by the Project, where this is not precluded by risk to integrity of the pipeline or erosion considerations (C-BIO-17).
Monitoring and restoration	A monitoring plan will be developed to determine the success of bio-restoration activities, including the appropriateness of species composition. The re-establishment of vegetation will be monitored following reinstatement until it has reached Project near- and long-term re-vegetation targets (C-BIO-18). The Project will seek to achieve an increasing trend in vegetation re-growth and species diversity (specifically species composition) in reinstated areas with reference to nearby areas undisturbed by Project activities, as recorded by the percent similarity and commonality indices (C-BIO-19).
Erosion control	Any areas that have a high erosion risk will be reseeded using an appropriate seed mix (C-BIO-20).
Poaching	Worker training sessions (C-BIO-21) and implementation of a strict code of conduct with regards to treatment of local fauna (C-BIO-22).
Bird Nesting Periods	Avoidance of construction activities during the nesting season near sensitive sites (C-BIO-23). Removal of nests from substations outside of nesting season (C-BIO-24)

414. <u>Sensitive Habitats</u> - To prevent impacts to sensitive habitats, the following requirements regarding siting of facilities shall be followed:

- Construction camps shall not be located:
 - Within 100m of any irrigation channel.
 - Within 250m of any natural surface water course.
 - Within any of the identified areas of natural habitat or any other sensitive habitat identified by the EPC Contractors ESO (C-BIO-27).

Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
С	General Construction Impacts	Low	The mitigation measures provided, including the requirements for pre-work surveys, combined with the generally modified environments in which the alignments are located, will ensure that residual impacts are not significant.	Not significant
0	Bird Electrocution	Medium	The proposed mitigation measures should help reduce the potential for bird electrocutions but may not entirely eliminate this issue.	Low

Table 38: Residual Biodiversity Impacts

0	Bird Collisions	Medium	Like electrocutions, the proposed solutions to	Low
			limit bird collisions may not entirely eliminate	
			this issue.	

<u>Monitoring</u>

415. Observational monitoring of impacts and review of designs and plans will be completed per the Project EMP.

8.4. Economic Development

8.4.1. Economy and Employment

416. This section discusses the impacts of the Project on the economy, employment and livelihoods during construction and operation of the Project and associated mitigation measures to be adopted. A discussion of land acquisition and compensation is provided below under the section on Land Use.

Aspects of the Project that have the potential to Impact Upon the Economy and Employment

417. Project activities will provide opportunities for companies at the international, national, and possibly regional, level to supply goods and services. The Project is expected to affect the local economies, employment, skills and livelihoods primarily by:

- Employing local people temporarily to carry out construction work on the Project.
- Local purchases of goods and services directly by the Project and workers, particularly in communities located in the vicinity of construction workforce camps.
- Potential in-migration of individuals/households to take advantage of economic opportunities created by the Project.

Key Sensitivities

- High expectations among local people that they will be employed.
- Concern that jobs should be given to local people and only to non-locals where no suitably qualified locals are available.
- Concern that jobs will not be allocated fairly between communities.
- Job availability for women.
- Food and healthcare costs.

Potential Impacts

418. In the construction phase the following beneficial impacts may occur:

- Increase in available jobs and incomes.
- Enhanced skills among local workforce.
- Increase in sales for local businesses.
- 419. The following adverse impacts may occur:
- Un-met employment expectations.
- Resentment between local people who are employed by the Project and those whose applications were unsuccessful.
- Frustration and resentment if local workers perceive that foreign workers are receiving better pay or conditions for exactly the same job.
- Resentment from business owners whose offer of goods and services is refused.

- Tensions resulting from cultural differences, anti-social behavior of construction workforce, potential prostitution and attraction of 'economic migrants' at camp sites. This is discussed further below under Community Health and Safety.
- Increased inflation, particularly of food and housing costs.
- Accidents to livestock resulting in loss of income/adverse livelihood impact. This is discussed further below under Community Health and Safety.
- Local small- and medium-sized enterprises and public-sector organizations 'losing' key workers to the Project.
- Subsistence farmers taking up jobs and land being neglected making it difficult to re-start farming when jobs cease following retrenchment.

Impact summary and assessment of significance

420. Table 39 provides an assessment of the significance of potential impacts to the local economy and employment before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	Increased jobs	Local and Regional communities	М	н	н	-	MAJ	ST	INTER	MED	DEF	м
С	Enhanced skills	Local and Regional communities	М	М	М	-	MOD	LT	INTER	HIGH	DEF	н
С	Increased sales for local businesses	Local businesses	L	М	М	-	MOD	ST	SMALL	LOW	DEF	L
С	Unmet employment expectations	Local communities	L	Н	Н	-	MAJ	ST	SMALL	MED	POSS	м
С	Loss of key workers to the proiect	Local communities	L	М	М	-	MOD	ST	SMALL	LOW	POSS	L

Table 39: Potential Impacts to Local Economy and Employment

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

421. <u>Employment</u> - Targets for local recruitment from the local communities will be agreed with the EPC Contractor and NEGU (C-EEL-01). The Project will seek to manage employment expectations by explaining the number and type of opportunities in advance to local communities via the NEGU PMU Safeguards Specialist. Unskilled labor will be preferentially recruited from the Project affected communities (C-EEL-02). Applications for employment will only be considered if submitted via the official application procedure (C-EEL-03).

422. Recruitment procedures will be transparent, public and non-discriminatory and open with respect to ethnicity, religion, sexuality, disability or gender (C-EEL-04). Clear job descriptions will be provided in advance of recruitment and will explain the skills required for each post (C-EEL-05). Job

vacancies will be advertised in the local communities through appropriate and accessible media (consistent with employment targets) (C-EEL-06).

423. <u>Procurement of goods and services</u> – Environmental considerations will be included in the Project procurement process (C-EEL-07). A plan will be developed and implemented that will aim to discourage and prevent the workforce from purchasing goods from informal vendors, to discourage vendors from establishing themselves at construction camp fence-lines in the hope of securing additional business (C-EEL-08). Taking into account relevant commercial considerations as appropriate, the Project will seek to purchase goods and services from within Uzbekistan and will monitor such purchases (C-EEL-09).

424. <u>Community relations</u> - A Company policy limiting alcohol consumption in construction camps will be applied (C-EEL-10) by the EPC Contractor. An employee Code of Conduct will be prepared and issued to all recruits and camp residents during the employee induction process (C-EEL-11). The Project will review measures to mitigate community health and safety impacts regularly, and consult community leaders every six months, informing them on the status of implementation and results, and discussing any changes needed to the 'Pollution Prevention Plan' or the 'Community Health, Safety and Security Plan' in advance of proposed changes (C-EEL-12).

425. The Employee Code of Conduct will prohibit the workforce from participating in illegal activities, including use of illegal drugs, bribery and corruption or requesting or receiving gifts from communities (C-EEL-13). The EPC Contractor company policy limiting alcohol consumption in construction camps will be applied (C-EEL-14).

426. Workforce training will include a briefing on camp rules and awareness of local social issues and sensitivities (C-EEL-15). No unauthorized access to, or use of, camp facilities will be allowed (C-EEL-16).

427. No hunting, fishing and unauthorized gathering of products (including plants and cultural heritage artefacts) by the workforce will be allowed (C-EEL-17).

428. A range of recreational facilities will be provided within the camps to reduce the need for finding recreation in the local community (C-EEL-18).

Residual Impacts

Phase	Potential	Potential	Residual Impact	Residual
	Impact	Impact Significance		Impact Significance
С	Unmet employment expectations	Medium	Although efforts will be made to manage employment expectations, it is likely that members of the local community who are not selected for job are likely to be disappointed with the selection process. However, the numbers are likely to be relatively small and therefore the impacts not be significant.	Not significant
С	Loss of key workers to the project	Low	No significant residual impacts are anticipated.	Not significant

Table 40: Economy, Employment and Livelihoods Residual Impacts

<u>Monitoring</u>

429. Observational monitoring of impacts and review of designs, plans and other documents will be completed per the Project EMP.

8.4.2. Social Infrastructure (including Utilities)

#	Aspect	Yes	No	Assessment Boundary				
	Construction Phase							
Ι	Earthworks for Foundations and substations	Х		Within 20 radius of tower sites				
2	Removal of substation equipment		Х	N/A				
3	Construction vehicles		Х	N/A				
4	Mobile construction plant (cranes, generators, etc)		X	N/A				
5	Construction camps	Х		Within 50 meters of camp sites				
6	Access Roads	Х		On all access roads				
7	Line Stringing		Х	N/A				
8	Installation of substation equipment		Х	N/A				
	Operationa	l Phase						
Ι	Operation of the Transmission Lines		Х	N/A				
2	Maintenance of Transmission Lines		X	N/A				
3	Operation of Substations		Х	N/A				

Aspects of the Project that have the potential to Impact Upon Social Infrastructure

Key Sensitivities

- Utility consumers
- Road users
- No educational facilities, schools or other recreational facilities have been identified.

Potential Impacts

430. The main potential impacts during construction are as follows:

- Temporary loss or reduction in utility supply to consumers.
- Wear/degradation of road surface by using local roads for access to the alignment and substations, construction vehicles will cause wear of the surface.
- Traffic congestion and delays (road closures), particularly during movement of long or heavy loads.

Impact summary and assessment of significance

431. The table below provides an assessment of the significance of potential impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	Temporary loss of utility supply	Local community / businesses	М	М	L	-	MOD	ST	SMALL	LOW	POSS	L
С	Wear / degradation of road surface	Local Road Users	L	М	L	-	MOD	ST	INTER	MED	POSS	L
С	Road congestion / delays	Local Road Users	М	М	L	-	MOD	L/F	SMALL	LOW	POSS	L

Table 41: Potential Impacts to Social Infrastructure

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

432. The EPC Contractor will be responsible for preparing and implementing his **Traffic Management Plan** (TMP) which will be approved by both the PIC and the relevant regulatory authority in Uzbekistan for the control of traffic (C-SEMP-05).

433. In addition, the EPC Contractor will:

- Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions at least 72 hours before the disruptions (C-IU-01);
- Allow for adequate traffic flow around construction areas via diversions or temporary access roads (C-IU-02);
- If temporary access roads are to be constructed with a gravel surface, they will be routinely watered by the EPC Contractor during dry weather to reduce dust impacts (C-IU-03);
- Provide adequate traffic signs, appropriate lighting, well-designed traffic safety signs, barriers and flag persons for traffic control (C-IU-04); and
- The authorities will be notified when oversize heavy loads need to be transported and the loads will be escorted by the Project (C-IU-05).

434. Regarding utilities, during construction all electricity and gas supply networks in the Project area will be kept operational, particularly during the winter months (C-IU-06). Some electricity distribution lines may require temporary relocation during the construction phase and as such the EPC Contractor will be responsible for liaising with the relevant distribution branch to ensure they remain operational (C-IU07). Should utilities need relocating in a different location the EPC Contractor will consult with the relevant utilities and local community to ensure that there is no change in supply because of these changes (C-IU-08).

435. During wire installation, guard structures will be erected over highways, railroads, power lines, structures, and other barriers. Guard structures may not be required for small roads. In such cases other safety measures such as barriers, flagmen, or other traffic control will be used (C-IU-I3).

Residual Impacts

Phase	Potential	Potential	Residual Impact	Residual
	Impact	Impact		Impact
		Significance		Significance
С	Temporary loss of	Low	No significant impacts have been identified.	Not
	utility supply		Additional mitigation measures will ensure	significant
С	Wear /	Low	impacts remain of low significance.	Not
	degradation of			significant
	road surface			
С	Road congestion /	Low		Not
	delays			significant

Table 42: Social Infrastructure Residual Impacts

Monitoring

436. Observational monitoring of impacts and review of designs, plans and other documents will be completed per the Project EMP.

8.4.3. Land Acquisition and Compensation

437. This section discusses the issue of land acquisition and compensation and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to cause Land Acquisition and Compensation

438. This project will require:

- Permanent land acquisition required for the construction of power transmission towers; and
- Temporary land acquisition for tensioning electric wires on power lines.
- 439. No land acquisition is required for substation rehabilitation.

Sensitive Receptors and Potential Impacts

440. The impacts and the number of AH/AP are summarized in the following table:

#	Type of Impact	Permanent Temporary impact impact		Remarks
I	Number of Provinces	7		Tashkent, Kashkadarya, Fergana, Bukhara, Surkhandarya, Navoi, Samarkand
2	Number of districts	-	23 ²⁴	
3	Number of affected massives	89 ²	25	
4	The length of the line in KM	344.	77	Including all 12 lines
5	Total Affected land area (ha)	35.65	352.30	
5.I	Affected agricultural cultivated land area (ha)	-	200.64	
5.2	Affected Orchard/ Garden land area (ha)	-	23.05	
5.3	State and Reserve lands (ha)	-	128.71	
5.4	Structure/Household lands (ha)	35.65	-	
6	Number of severely AHs structure	24		Residential and business structures in 7 lines areas.
7	Number of vulnerable AHs	-		Will be identified during the final socio-economic survey
8	Number of affected fruit trees	-		Will be identified by the evaluation company during the final LARP preparation
9	Number of affected residential structures	36		Tashkent, Kashkadarya, Fergana, Surkhandarya, Samarkand
10	Number of affected non- residential structures	140		Tashkent, Kashkadarya, Fergana, Bukhara, Surkhandarya, Samarkand
11	Number of affected business structures	6		Tashkent, Kashkadarya, Surkhandarya
12	Number of total AHs	125	50	
13	Number of total APs	625	50	

Table 43: Summary of Impact

Impact summary and assessment of significance

441. Table 44 provides an assessment of the significance of potential land acquisition and compensation impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

²⁴ With double counting

 $^{^{\}rm 25}$ With double counting

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
C/0	Land Acquisition and Crop and tree loss	Land owners and users	М	М	Н	L	HIGH	LT	Small	MED	DEF	м

Table 44: Potential Impacts

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

442. <u>Land Use</u> (permanent and temporary) - The key mitigation for land use is implementation of the LARP (C-LU-01). The LARP will be updated during the detailed design phase by the EPC Contractor.

443. LARP Implementation will start after the endorsement of the final LARP by the government and approval by ADB. The EA shall plan all activities related to the land acquisition and resettlement to ensure that compensation is paid before taking possession of land and commencement of civil works. Public consultation, monitoring, and grievance redress will be undertaken intermittently throughout the project duration. Construction will be initiated when all compensations and entitlements are fully paid. The completion of LARP implementation will be documented through the LARP implementation compliance report submitted by the EA/PMU and approved by ADB.

444. In addition, the following measures will be applied:

- Provide advance notice to harvest the crops and where feasible, adjust the construction schedule harvest crops; construction works shall not exceed more than one crop season at a particular stretch (C-LU-02).
- Saving the top-soil and restoration of land will be done by the EPC Contractor to previous use and farmers will be allowed to continue their cultivation post the construction (C-LU-03).
- Ensure continuous consultation with affected households and residents; the schedule of the civil
 works shall be consulted with the farmers to schedule irrigation supply during the irrigation season
 (C-LU-04).

Residual Impacts

Phase	Potential Impact	Potential Impact Significance	Residual Impact	Residual Impact Significance
C	Land Acquisition and Crop and tree loss	Medium	No significant impacts are anticipated if the LARP is implemented correctly. A GRM has been prepared to manage complaints received during this process. Other temporary impacts during the construction phase will be managed by the LARP as noted above.	Not significant

Table 45: Land Acquisition and Compensation Residual Impacts

Monitoring

445. No specific monitoring is required other than set out in the Project LARP.

8.4.4. Waste Management & Hazardous Materials

446. This section discusses the impacts of waste management and hazardous materials during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to generate waste and spoil material

#	Aspect	Yes	No	Assessment Boundary				
	Construction							
Ι	Earthworks for Foundations and substations	X		Withing 50m of work sites				
2	Removal of substation equipment	X		Within 50m of substations and waste disposal areas				
3	Construction vehicles	X		Within camp sites and construction zones				
4	Mobile construction plant (cranes, generators, etc)	X		Within 50 m of construction zones				
5	Construction camps	Х		Within 100m of site boundary				
6	Access Roads		Х	N/A				
7	Line Stringing		X	N/A				
8	Installation of substation equipment	Х		Within substation boundary				
	Operational Phase							
1	Operation of the Transmission Lines		Х	N/A				
2	Maintenance of Transmission Lines	X		Within RoW				
3	Operation of Substations	X		Within substation boundary				

Key Sensitivities

Waste

447. The key sensitivities are the local environment along the alignments and the local communities that are located close to the alignments and around the substations (although they are almost entirely located beyond the substations SPZ). Improper management and disposal of liquid and solid wastes could result in localized pollution of soils and groundwater and possibly surface water.

Hazardous Materials

448. The key sensitive receptors are the EPC Contractors staff and NEGU staff operating the substations.

Potential Impacts

Waste

449. Disposal of waste materials, both hazardous and non-hazardous, from transmission line worksites can be difficult to manage due to the de-centralized nature of the works along the alignments. Without suitable waste containers and without adequate training, workers could dump waste materials haphazardly around the work sites which could create pollution events. Waste management is easier to control at the substations.

450. A more significant waste management issue is the large volume of large waste materials which will be generated from removal of the old towers and conductors as well as old equipment from substations. This waste will include large volumes of scrap metal, reinforced concrete poles, concrete foundations (these may be left in-situ at many tower sites) and conductor wires.

Hazardous Materials

<u>SF</u>6

451. SF_6 can have impacts to health of workers and the environment, all of which is discussed above under air quality.

<u>Asbestos</u>

452. Asbestos containing materials are present in substations (mainly in the form of asbestos cement roofing). Rehabilitation of control rooms and other buildings may require demolition of existing structures which may contain asbestos. Demolition works may result in asbestos containing materials being broken or crushed and producing airborne asbestos fibers. Inhaling asbestos fibers increases the risk of cancer.

<u>PCBs</u>

453. Polychlorinated Biphenyl's (PCBs) are a persistent organic pollutant; a highly hazardous chemical. PCBs can potentially be found in oil containing equipment at substations, specifically in older equipment such as transformers and circuit breakers. PCBs, when they leak from equipment, are hazardous to human health as well as an environmental pollutant. Testing of equipment to be removed did not identify the presence of PCB's above 50ppm.

Other Hazardous Liquids

454. Other general hazardous liquids will be stored at work sites and at substations, e.g., fuel, solvents, etc. Spills and leaks of these liquids can result in soil and water pollution. This issue is discussed above under Soils and Hydrology.

Lead Acid Batteries

455. Issues are discussed as part of the environmental and social audit (Section 7).

Impact summary and assessment of significance

456. Table 46 provides an assessment of the significance of potential waste management and spoil disposal impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	Improper management and disposal of solid / liquid waste	Local community / agricultural land	L	М	L	L	MIN	MF	SMA	LOW	POSS	L
С	Improper management and disposal of hazardous waste	Local community / agricultural land	L	Н	L	L	MOD	MF	SMA	LOW	POSS	L
С	Management of Asbestos	EPC Contractors Staff	м	н	L	-	MAJ	ST	SMA	MED	DEF	м

Table 46: Waste and Hazardous Materials Potential Impacts

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures Waste Management

Construction Phase

Management Planning

457. The EPC Contractor will, as part of his **Specific Environmental Management Plan** (SEMP), prepare and implement a **Waste Management Plan** (C-SEMP-10). The Plan will include measures to limit impacts of waste during the construction phase of the Project. The plan shall include the following items listed below.

General Measures

- To ensure waste management is adequately controlled during both the construction phase of the Project, the EPC Contractor will be responsible for ensuring that the waste hierarchy is followed including prevention, minimization, reuse and recycling (C-WA-01).
- The impact of waste generation on environment during construction will be mitigated by proper storage, maximum reuse and recycling of waste and timely removal of unusable waste to agreed location according to national waste management regulations (C-WA-02).
- The EPC Contractor has an obligation to provide regular training of staff in waste management issues (C-WA-03).

Recycling

- All recyclable waste (plastic, metal, paper, etc.) will be sorted on source and sent for recycling where facilities for recycling of these materials exist (C-WA-04).
- The waste management plan should set clear guidelines for the recycling of scrap metal from steel towers and conductors (C-WA-05).

Liquid Waste

458. Provide septic tanks for the camp sites servicing less than 150 employees. State authorized company to remove the liquid waste regularly (C-WA-06). For larger sites, provide multiple septic tank facilities, or package wastewater treatment plants (C-WA-07).

459. Domestic and Inert Waste from Worksites and Camps

460. Collect domestic waste in containers fitted with lids to avoid attraction of scavengers, scattering around. The lid will also protect waste from rain and snow (C-WA-08).

461. Remove domestic waste to the nearest landfill under agreement with state authorized waste management companies (C-WA-09).

462. Provide garbage bins and facilities within the project site for temporary storage of domestic solid waste and construction waste (C-WA-10).

463. Waste storage containers will be covered, tip-proof, weatherproof and scavenger proof (C-WA-11).

464. Ensure that wastes are not haphazardly dumped within the project site and adjacent areas (C-WA-I2).

Old Equipment

465. Old towers and conductors shall be removed from site for recycling or landfilling immediately following the removal of the tower. They shall not be left on private property or in any way that could be deemed a hazard to local people (C-WA-I3).

466. Equipment from substations shall be removed from the substation prior to the competition of works and sent to an appropriately licensed waste management facility. Old equipment shall not be left at the substation after works are completed (C-WA-14).
467. Contaminated soils and gravels from substations will also be disposed of as hazardous waste (C-WA-17).

Hazardous Waste

- At worksites and camps where, hazardous waste is generated the EPC Contractor will ensure compliance with the following safety measures:
 - a. Use containers suitable for each type of waste (C-WA-18);
 - b. Prohibit use of damaged containers. Check integrity of containers regularly (C-WA-19);
 - c. Mark containers adequately specifying the waste types (C-WA-20);
 - d. Provide secondary containment for hazardous waste liquids (C-WA-21);
 - e. Do not mix various waste streams (C-WA-22).
 - f. Hire state authorized contractor for hazardous waste removal and keep agreements with hazardous waste management company's active (C-WA-23).
 - g. Keep copies of waste manifests on site (C-WA-24). Keep a record of waste on-site and waste removed (C-WA-25).

<u>Asbestos</u>

468. Works on areas of existing substations which require demolition of existing structures will require a competent surveyor to complete an asbestos survey. If asbestos is present to develop an Asbestos Management Plan in line with ADB Good Practice Guidance for the Management and Control of Asbestos: Protecting Workplaces and Communities from Asbestos Exposure Risks, the content of which is provided in the box below.

Box 2: Content of an Asbestos Management Plan

An asbestos management plan is a plan that states how asbestos in the workplace will be managed. There may be national requirements for information which needs to be included in an asbestos management plan. As a guide, the information recorded in an asbestos management plan should include at a minimum the following information:

- Asbestos identification in the workplace, including a link to the asbestos register
- An outline on how the risks for each ACM are controlled, e.g., some ACM may require labelling, others may require prohibition in drilling, etc.
- Control measures on the management of asbestos and ACM in the workplace, such as safe work method statements
- Procedures for accidents, incidents and emergencies involving asbestos in the workplace
- Responsibilities in implementation of the plan
- Worker requirements for conducting asbestos work, e.g., licences/permit requirement, training, responsibilities, supervision, health surveillance, etc.
- Air monitoring requirement during each type of asbestos work
- Requirement of communication of the plan to workers and other relevant stakeholders
- An asbestos management plan should be prepared and reviewed by competent people experienced in assessing asbestos risk and control measures, and in carrying out activities in the workplace that may risk ACM exposure.

The plan should be regularly reviewed and revised (including after an incident) to ensure it is up to date international best practice. The employer/managers responsible for the workplace should ensure the asbestos management plan be adequately resourced and communicated to all workers who may conduct work that may disturb or have the potential to be exposed to asbestos.

Source: Good Practice Guidance for the Management and Control of Asbestos: Protecting Workplaces and Communities from Asbestos Exposure Risks. ADB, March 2022

469. Removal and disposal of asbestos will be in accordance with the management plan. Site will need to be confirmed "clean" before any works on the actual SS will be started (C-WA-26).

Training

470. Conduct bi-monthly training of workers on pollution prevention control including good housekeeping and how to clean up oil/fuel spills and dispose of contaminated sorbent material which would be treated as a hazardous waste. Include emergency preparedness and response procedures (drills) in case of spill. To include training for subcontractors before commencement of works (C-WA-27).

Operational Phase

General Waste Management (hazardous and non-hazardous waste)

471. NEGU will be responsible for ensuring waste management and disposal in line with national waste management regulations (O-WA-01). They will also be responsible for implementing the corrective actions specified in the corrective action plan including those for lead acid batteries.

Residual Impacts

Phase	Potential Impact	Potential Impact	Residual Impact	Residual Impact
		Significance		Significance
С	Improper	Low	None, if the mitigation measures above are	Not
	management and		applied at licensed waste management facilities.	significant
	disposal of solid /			
	liquid waste			
С	Improper	Low		Not
	management and			significant
	disposal of			
	hazardous waste			
С	Management of	Medium	Until the asbestos survey and method	Medium
	Asbestos		statements are completed, there still remains	
			the possibility of impacts to workers.	

Table 47: Waste and Hazardous Materials Residual Impacts

Monitoring

Observational monitoring of impacts and review of designs, plans and other documents will be completed per the Project EMP.

8.5. Social and Cultural Aspects

8.5.1. Community Health & Safety

472. This section discusses potential health and safety impacts to the local community during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to affect Local Community

#	Aspect	Yes	No	Assessment Boundary							
	Construction Phase										
1	Earthworks for Foundations and substations		X	N/A							
2	Removal of substation equipment		Х	N/A							
3	Construction vehicles	X		All access roads							
4	Mobile construction plant (cranes, generators, etc)	X		Within 50 meters of the							
				equipment							
5	Construction camps	X		Within 200 meters of camp							
				sites							

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6	Access Roads	X	All access roads						
7	Line Stringing	X	Within RoW						
8	Installation of substation equipment		X N/A						
	Operational Phase								
Ι	Operation of the Transmission Lines	X	Within RoW						
2	Maintenance of Transmission Lines	X	Within RoW						
3	Operation of Substations	X	Within immediate vicinity of						
			substations						

Note: these assessment boundaries do not account for noise and air quality issues which are discussed in separate sections.

Key Sensitivities

473. Local population along transmission line alignments.

474. The residential property next to Zafar SS.

Potential Impacts

Construction Phase

475. The Project has the potential to increase the threats to community safety and security during the construction phase. The key types of impacts are likely to be:

- Potential conflict between security personnel and local community members resulting in injuries.
- Increased hazards (e.g. open excavations) and increased risk of accidents.
- Increased risk of road/traffic accidents causing injuries or fatalities. Project activities will result in
 increased traffic flows on certain roads that are used by local residents (e.g. where such roads are
 used as access routes).

476. The most likely potential impacts on community health in the construction phase are:

- Increase in disease vectors such as rodents (if food/drink is not stored properly and solid/liquid wastes are not managed adequately) with accompanying increased incidence of vector-borne diseases.
- Increased risk of enhanced incidences of communicable diseases arising from interaction between workers living in the construction camps with local people. With potentially a peak of 200 people (mostly men) living in construction camps there will be a risk of communicable diseases (e.g. COVID-19, TB, and sexually transmitted diseases such as HIV/AIDS) passing through the workforce and possibly into the community.
- Increased risk of water-borne diseases if liquid and solid waste management is not implemented effectively.

Operational Phase

477. Due to the location and presence of security staff and security perimeter fencing, no operational phase impacts are anticipated relating to the substations with the exception of potential health impacts to the resident located adjacent to Zafar SS.

<u>EMF</u>

478. Based on a recent in-depth review of the scientific literature, the World Health Organization (WHO) concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields. ²⁶ However, to be prudent, this issue has been considered further as part of this IEE.

²⁶ https://www.who.int/peh-emf/about/WhatisEMF/en/index1.html

479. Transmission line voltages range from 110kV to 220kV. According to data provided by National Grid ²⁷ typical fields beneath 275 – 400kV lines are below GIIP reference levels and maximum fields beneath a 132kV line are below GIIP reference levels. It is also noted that no residential properties will be permitted beneath transmission lines, and within a 12m buffer area from the transmission center line (all such properties will be expropriated in line with the recommendations of the Project LARP). Finally, as a reference point it is noted that there is no restriction in the UK on EMF grounds on how close a house can be to an overhead line.

Impact summary and assessment of significance

480. Table 48 provides an assessment of the significance of potential impacts to local community before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	Accidents at work sites	Local community / Livestock	L	М	М	-	MOD	ST	SMALL	LOW	UN	L
С	Accidents involving construction vehicles	Local community / Livestock	М	М	Н	-	HIGH	ST	SMALL	MED	UN	М
С	STDs	Local community / Livestock	L	М	L	-	MOD	ST	SMALL	LOW	POSS	L

 Table 48: Potential Impacts to Community

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Sanitary Protection Zone

481. The residential property adjacent to Zafar SS should be removed for health and safety reasons.

Management Planning

482. The EPC Contractor will, as part of his **Specific Environmental Management Plan** (SEMP), prepare and implement a **Community Health and Safety Plan** (C-SEMP-07).

483. The EPC Contractor will be required to implement the Grievance Procedure provided in Section 9.4 Grievance Redress Mechanism, to provide opportunity for residents to raise concerns (C-CHS-01).

Standards and Safety Codes

 $[\]frac{27}{https://www.nationalgrid.com/sites/default/files/documents/13791-Electric%20and%20Magnetic%20Fields%20-%20The%20facts.pdf}$

484. The EPC Contractor shall ensure that all Project infrastructure are constructed in accordance with national safety codes. This will ensure that residential properties are protected from any potential accident at any of the Project sites (C-CHS-02). This shall include:

- Use signs, barriers (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas);
- Grounding conducting objects (e.g. fences or other metallic structures) installed near power lines, to prevent shock.

Hazardous Work Sites

- Fence and sign immediate working area to prevent public access during construction works (C-CHS-03).
- Do not leave hazardous conditions (e.g., unlit open excavations without means of escape) overnight unless no access by public can be ensured (C-CHS-03a).
- All Project infrastructure will be labeled / signposted in accordance with national regulations to inform the public of the specific safety risks of each item (C-CHS-04).
- All work sites will be appropriately signposted and isolated (through fencing or bunting) to prevent encroachment into these areas (C-CHS-05).

Community Liaison

485. The Project will review measures to mitigate community health and safety impacts regularly and will consult with local communities every six months, informing them on the status of implementation and results, and discussing any changes needed to the Pollution Prevention Plan or the Community Health and Safety Plan in advance of proposed changes (C-CHS-06).

486. The EPC Contractors Environmental and Social Officer will participate in, or deliver safety awareness training to, local children in schools (C-CHS-07). Particular emphasis will be placed on talking to children and explaining the dangers of construction sites and open excavations.

487. Tower worksites and any additional temporary workspaces will be surveyed and set out (i.e., marked out and, where necessary, fenced off). The contractor will be required to keep within the designated footprint (C-CHS-08).

488. Construction traffic warning signs will be positioned at road crossings and other appropriate locations as determined by the Project, for example along access routes before they are used by construction traffic (C-CHS-09).

Risk of accident to local people and livestock particularly from traffic

489. A strict Project speed limit of 30km/hr will be enforced for Project vehicles using unmade tracks (C-CHS-10).

490. Temporary traffic control measures will be employed at road crossings and junctions (flagmen, temporary traffic lights) where a safety risk assessment has identified traffic control measures will reduce the risk of traffic accidents (C-CHS-II).

491. Random drug and alcohol testing of the workforce will be conducted, recorded, and audited regularly (C-CHS-12).

492. At sensitive locations where traffic will be using local roads, and particularly where schools and markets are close to the road, awareness of safety issues will be raised through village meetings and classroom lessons (C-CHS-I3).

493. Temporary traffic control (e.g., flagmen) and signs will be provided where necessary to improve safety and provide directions (C-CHS-14). Where traffic is diverted around crossings, traffic control or careful selection of the exit from the working areas will be provided with the aim of ensuring vehicles join the road in a safe manner (C-CHS-15).

494. Night-time driving will be by exception only, as approved by the PIC, to minimize driving risk and disturbance to communities (C-CHS-16).

495. People will be actively discouraged from using Project access roads unless deemed necessary to reach homes or other important sites (through use of signage, public education, leaflets etc.) (C-CHS-17).

496. Vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency) (C-CHS-18).

Risk of conflict between community members and security personnel leading to injury

497. The Project will implement the 'Voluntary Principles on Security and Human Rights' (C-CHS-19).

498. During construction, due diligence will be applied to selection of security providers, rules of engagement will be devised, and training provided to all personnel. Performance will be monitored and audited periodically (C-CHS-20).

Sexually transmitted Disease

499. A worker education and awareness program regarding the risks and prevention measures associated with STDs including HIV/AIDS and other communicable diseases (e.g., TB) will be implemented (C-CHS-21).

500. The Project will make information on communicable diseases and STDs available to communities' close to the camps (C-CHS-22).

Operational Phase

501. During the operational phase NEGU shall provide education / public outreach to prevent public contact with potentially dangerous high voltage equipment (O-CHS-01).

Residual Impacts

Phase	Potential	Potential	Residual Impact	Residual
	Impact	Impact		Impact
		Significance		Significance
С	Accidents at work	Low	The mitigation measures proposed will ensure	Not
	sites		that there are no significant impacts.	significant
С	Accidents	Medium	No significant residual impacts identified after	Not
	involving		application of the required mitigation measures.	significant
	construction			
	vehicles			
С	STDs	Low	No significant residual impacts identified.	Not
				significant

Table 49: Community Residual Impacts

Monitoring

502. Observational monitoring of impacts and review of designs, plans and other documents will be completed per the Project EMP.

8.5.2. Workers' Rights and Occupational Health and Safety

Aspects of the Project that have the potential to cause OHS issues

503. The main Project-related activities that may result in OHS issues are:

- Accidents involving the use of heavy equipment.
- Accidents involving working at height.

- Accidents involving live power lines and equipment.
- Accidents involving construction vehicles.
- Accidents due to lack of, or poor application of, personal protective equipment (PPE).
- Poor sanitary conditions at camps and work sites.
- Lack of first aid and medical facilities.
- Unsafe substations
- Exposure to EMF.

504. Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labor abuses and to ensure fair treatment, remuneration and working and living conditions. These issues need to be considered not only for workers who are directly employed by the Project but also sub-contractors.

Potential Impacts

Construction Phase

505. The Project is expected create at least 200 direct employment opportunities per transmission line and 50 per substation during the peak of the construction period. Most workers will be engaged by the EPC Contractor and will consist of an unskilled, semi-skilled to skilled workforce. During the operational phase maintenance works will be undertaken by existing NEGU staff. The substation will be staffed by approximately 20 NEGU staff working in shifts, and four security guards.

506. The expected impacts on worker rights and H&S because of construction, activities and Project operation are as follows:

- Risk to workers H&S due to hazardous construction activities; and
- Violation of workers' rights.

507. Construction activities will involve the operation of heavy equipment and trucks, working at height, construction traffic, use of electric devices, handling of hazardous materials and other hazardous activities. Due to the nature of the activities being undertaken during construction, worker H&S is a key risk with the potential for accidents that may result in injuries and fatalities as well as lost man-hours.

Operational Phase

508. The National Institute for Occupational Safety and Health (NIOSH) and other US government agencies do not consider EMF a proven health hazard.²⁸ However, according to the WBG electric utility workers typically have a higher exposure to EMF than the general public due to working in proximity to electric power lines.²⁹

509. Working with live equipment during maintenance of the line and operation of the substation also involves safety risks specifically relating to working at height and electrocution. Issues relating to working with SF⁶ are discussed above under the heading of air quality.

Impact summary and assessment of significance

510. Table 50 provides an assessment of the significance of potential OHS impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

²⁸ https://www.cdc.gov/niosh/docs/96-129/default.html

²⁹ WBG EHS Guidelines. Electric Power Transmission and Distribution. 2007.

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	Accidents involving workers	Contractors staff / sub- contractors	М	М	L	М	MOD	ST	SMALL	MED	POSS	м
С	Workers' rights ignored.	Contractors staff / sub- contractors	М	L	L	L	MIN	ST	SMALL	LOW	POSS	L
0	Health and Safety of Workers	NEGU Staff	М	М	L	М	MOD	LF	SMALL	MED	POSS	М

Table 50: Potential Workers Rights and OHS Impacts

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Design Phase

511. For control buildings provide adequate natural and/or artificial lighting levels to meet the IFC EHS Guidelines on Occupational H&S (Table 2.3.3. Minimum Limits for Workplace Illumination Intensity) and take a life-cycle approach to detailed design, considering the use of construction materials and the energy and water efficiency of the building during operation adopting the "green building" concept e.g., using natural ventilation for reducing the need for air conditioners (O-OHS-01).

512. Control building design will provide for sanitation and welfare facilities as per national regulations and international GIIP including indoor toilets with hand washing facilities (one to six workers) and a dedicated cooking area / clean eating area / rest area for staff on-site etc. (O-OHS-02).

513. Design of control building to include emergency exits with emergency exit signage (O-OHS-03). Automatic fire alarms and fire suppression systems shall be provided in control buildings (O-OHS-04).

Construction Phase

514. <u>Occupational Health and Safety</u> - An Occupational Health and Safety (OHS) Plan will be prepared by the EPC Contractor to manage worker safety (C-SEMP-06). The OHS Plan will include a specific section relating to **Emergency Response Procedures**. The EPC Contractor shall ensure that the OHS plan is strictly implemented through his Health and Safety Officer. The Contractor shall also prepare a **Construction Camp Management Plan** (C-SEMP-09).

515. In addition, the EPC Contractor will provide a series of safety training courses and meetings as follows:

- Initial Safety Induction Course: All workmen will be required to attend a safety induction course before they are allowed access to the work site (C-OHS-01).
- Periodic Safety Training Courses: Periodic safety course will be conducted not less than once every two months (C-OHS-02). All EPC Contractor (and any sub-contractor) employees will be

required to participate in relevant training courses appropriate to the nature, scale and duration of the works. Training courses for all workmen on the Site and at all levels of supervision and management. A list of training participants names and time-stamped photographic evidence of the training will be provided by the EPC Contractor to the PIC for his records.

Safety Meetings: Regular safety meetings will be conducted monthly (C-OHS-03). The PIC will be
notified of all safety meetings in advance. The PIC may attend in person or by representative at
his discretion. The minutes of all safety meetings will be taken and sent to the PIC within seven
(7) days of the meeting and will include a list of participants names and time-stamped photographic
evidence of the training.

516. The EPC Contractor will regularly inspect, test, and maintain all safety equipment (including firefighting equipment), scaffolds, guardrails, working platforms, hoists, ladders, and other means of access, lifting, lighting, signing and guarding equipment (C-OHS-04). Lights and signs will be kept clear of obstructions and legible to read (C-OHS-05). Equipment, which is damaged, dirty, incorrectly positioned or not in working order, will be repaired, or replaced immediately by the EPC Contractor (C-OHS-06).

517. Workers will be provided (before they commence works) with of appropriate PPE suitable for electrical work such as safety boots, harnesses, helmets, gloves, protective clothes, goggles, and ear protection at no cost to the workers (C-OHS-07).

518. In addition to the above, the following general OHS measures shall be implemented by the EPC Contractor:

- All construction plant and equipment used on or around the Site will be fitted with appropriate safety devices (C-OHS-08). These will include but not be limited to:
 - Effective safety catches for crane hooks and other lifting devices, and
 - Functioning automatic warning devices and, where applicable, an up-to-date test certificate, for cranes and hoists.
- Zones with noise level above 80 dBA must be marked with safety signs and appropriate PPE must be worn by workers (C-OHS-09).
- Portable toilet facilities for workers at road work sites will be provided (C-OHS-10).
- Fencing on all areas of excavation greater than 2 m deep will be installed along with warning signs (C-OHS-11).
- Ensure sufficient fresh air supply to confined workspaces (C-OHS-12).
- Keep air inlet filters clean and free of dust and microorganisms (C-OHS-13).
- Ensure reversing signals are installed on all construction vehicles (C-OHS-14).
- Implement fall prevention and protection measures whenever a worker is exposed to the hazard
 of falling more than two meters, falling into operating machinery or through an opening in a work
 surface (C-OHS-15). Note: fall prevention/protection measures may include installation of
 guardrails with mid-rails and toe boards at the edge of any fall hazard area, proper use of ladders
 and scaffolds by trained employees, use of fall prevention devices, including safety belt and lanyard
 travel limiting devices to prevent access to fall hazard, fall protection devices such as full body
 harnesses, etc.
- Mark the areas where risk of injuries from falling objects exist with rope or flagging to minimize risks and injuries (C-OHS-16).
- Provide spotters. Employ flag persons to control traffic when construction equipment is entering or leaving the work area (C-OHS-17).
- A suitably staffed and equipped health clinic for all workers is to be provided on site (C-OHS-18).
- First aid kits (compliant with OSHA standard 1910.266 App. A) will be provided at all work sites (C-OHS-19).

519. The Contractor shall keep a log of both training records and safety incidents including near misses (C-OHS-20).

520. The following specific mitigation measures for OHS, based on WBG guidelines shall be implemented:

521. <u>Live Power Lines</u> - Workers may be exposed to occupational hazards from contact with live power lines during construction, maintenance, and operation activities. Prevention and control measures associated with live power lines include:

- Only allowing trained and certified workers to install, maintain, or repair electrical equipment (C-OHS-21);
- Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines (C-OHS-22);
- Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards. Qualified or trained employees working on transmission or distribution systems should be able to achieve the following:
 - i. Distinguish live parts from other parts of the electrical system
 - ii. Determine the voltage of live parts
 - iii. Understand the minimum approach distances outlined for specific live line voltages
 - iv. Ensure proper use of special safety equipment and procedures when working near or on exposed energized parts of an electrical system (C-OHS-23);
- Workers should not approach an exposed energized or conductive part even if properly trained unless:
 - i. The worker is properly insulated from the energized part with gloves or other approved insulation; or,
 - ii. The energized part is properly insulated from the worker and any other conductive object; or, the worker is properly isolated and insulated from any other conductive object (live-line work) (C-OHS-24);
- Where maintenance and operation are required within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions should be defined in an OHS safety plan (C-OHS-25).

522. <u>Working at Height and on Poles and Structures</u> - Workers may be exposed to occupational hazards when working at elevation during construction, maintenance, and operation activities. Prevention and control measures for working at height include:

- Testing structures for integrity prior to undertaking work (C-OHS-26);
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others (C-OHS-27);
- Establishment of criteria for use of 100% fall protection (typically when working over 2 meters above the working surface, but sometimes extended to 7 meters, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point (C-OHS-28);
- Installation of fixtures on tower components to facilitate the use of fall protection systems (C-OHS-29);
- Provision of an adequate work-positioning device system for workers. Connectors on positioning systems should be compatible with the tower components to which they are attached (C-OHS-30);
- Hoisting equipment should be properly rated and maintained, and hoist operators properly trained (C-OHS-31);
- Safety belts should be of not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident (C-OHS-32);
- When operating power tools at height, workers should use a second (backup) safety strap;

- Signs and other obstructions should be removed from poles or structures prior to undertaking work (C-OHS-33); and
- An approved tool bag should be used for raising or lowering tools or materials to workers on structures (C-OHS-34).

523. <u>Workers' Rights</u> - Regarding workers' rights, the development of the Project the EPC Contractor shall:

- Set targets for local employment based on initial assessment of the labor market for unskilled and semi-skilled work force (C-OHS-36).
- For unskilled the EPC Contractor shall use a 'ballot' system to ensure that employment is fair and not weighted to connected people for unskilled roles. Repatriation of locals through recruitment measures will use online resources (C-OHS-37).
- Provisions in the EPC Contractors contract are to include as far as practicable items to address the collective bargaining, retrenchment, worker accommodation and non-employee worker gaps, to ensure that ILO and Lender requirements are met (C-OHS-38). At a minimum, the EPC Contractor shall ensure the following measures are followed:
 - The development and implementation by the EPC Contractor of Human resources policies to hire, train, assess, and reward the project workforce. These policies should prevent any form of discrimination in the workplace and ensure that all employees are treated fairly and equally.
 - Policies should exclude the use of child or forced labor in the project, and that national and international requirements for non-employee workers and supply chain workers are also reflected in these policies.
 - A grievance mechanism for workers will need to be provided for the workforce to be able to raise reasonable workplace concerns. The EPC Contractor will inform the workers of the grievance mechanism at the time of hiring and make it easily accessible to them.
 - The workers will additionally not be restricted from joining or forming workers organizations or from bargaining collectively, and the EPC Contractor will not discriminate or retaliate against workers who form or join collectives or bargain collectively.
 - Prepare a retrenchment plan, with the aim of reducing the impacts of cessation of employment contracts including for example and as appropriate, the implementation of a transparent retrenchment process and mechanisms of consultation with the workforce. The Contractor will explain the temporary nature of jobs during the recruitment process and explain to workers the need to prepare for losing jobs and to manage their income wisely while employed.

524. All employees will receive at least the minimum wage as defined by Uzbek legislation (C-OHS-39). All workers will have contracts describing their job description and conditions of work and will have the contents explained to them (C-OHS-40).

525. The EPC Contractor will hire a team of Health and Safety Specialists to implement and manage the tasks listed above.

526. <u>Sub-Contractors</u> - All Project sub-contractors will be supplied with copies of the SEMP (C-OHS-41). Provisions will be incorporated into all sub-contracts to ensure the compliance with the SEMP at all tiers of the sub-contracting (C-OHS-42). All subcontractors will be required to appoint a safety representative who will be available on the Site throughout the operational period of the respective sub-contract unless the PICs approval to the contrary is given in writing (C-OHS-43). In the event of the PICs approval being given, the PIC, without prejudice to their other duties and responsibilities, will ensure, as far as is practically possible, that employees of sub-contractors of all tiers are conversant with appropriate parts of the SEMP. To implement the above items the EPC Contractor will designate a qualified environmental, health and safety personnel (C-OHS-44).

527. <u>Training</u>

528. Contractor to conduct their own trainings for their construction management and provide all workers and visitors on site, irrespective of them being formally or informally employed by the contractor, subcontractor or third party with an EHS induction before being allowed on site – induction to cover orientation on EHS requirements and roles and responsibilities in relation to EMP implementation, dos and don'ts in relation to the construction site, employer provided staff accommodation, code of conduct and interaction with local communities (C-OHS-45).

529. Ensure topics covered by training and induction include, but are not limited to, good housekeeping at all times; environmentally safe and sound waste management practices; hygiene and communicable disease prevention including COVID-19 and HIV/AIDS; gender-based violence and sexual exploitation, abuse and harassment prevention; code of conduct, interaction with local communities and culturally acceptable practices; biodiversity conservation awareness; fire safety prevention; prohibition on trapping, hunting, fishing, or poaching by workers; chance find procedures; H&S including use of PPE; etc (C-OHS-46).

530. Contractors to carry out awareness raising for all construction workers about the GRM at the start of their employment on site including disseminating GRM contact details on noticeboards at construction site offices and at employer provided staff accommodation. Suggestion boxes to be provided for construction workers at construction site offices and at employer provided staff accommodation (C-OHS-47).

531. Prepare with guidance of labor experts a worker Code of Conduct and information video/brochure/leaflet for distribution to all workers during induction addressing culturally acceptable practices etc. (C-OHS-48).Code must be informed by the CSEMP and address the following aspects:

- Zero tolerance in respect of health and safety
- Requirement on always wearing PPE on site
- Zero tolerance of bribery or corruption
- Respect for local community and customs, avoiding community conflict situations especially in tribal areas

532. Zero tolerance of illegal and unacceptable activities/behavior, including but not limited to engagement in: prostitution; gender-based violence/sexual exploitation, abuse, and harassment; illegal sale or purchase of alcohol; sale, purchase, or consumption of drugs; gambling; fighting (C-OHS-49).

533. Conduct daily toolbox talks on pertinent topics related to the day's work and weekly training on occupational health and safety for all construction workers including refreshers. To include training for subcontractors before commencement of works (C-OHS-50).

534. Ensure workers with a specific role have attended specialized health and safety trainings related that role e.g., health and safety stewards, first aiders, fire safety officers, as well as ensuring workers have received task-specific trainings for working at height, demolition, working with electricity, etc (C-OHS-51).

535. Only allow suitably trained and qualified workers to work on electrical equipment and at height, these workers must have training record of attending suitable training course on electrical safety and working at height and be provided with and wear the appropriate PPE for their role (C-OHS-52).

536. Untrained workers must not be permitted to work with live electricity or to work at height (C-OHS-53).

537. Conduct monthly training involving all workers on emergency preparedness and response procedures (drills) in case of an occupational or community health and safety incident during construction works including fire, natural disaster, disease outbreak etc. To include training for subcontractors before commencement of works (C-OHS-54).

538. Conduct daily toolbox talks on pertinent topics related to the day's work and weekly training on occupational health and safety for all construction workers including refreshers. To include training for subcontractors before commencement of works (C-OHS-55).

539. Ensure workers with a specific role have attended specialized health and safety trainings related that role e.g., health and safety stewards, first aiders, fire safety officers, as well as ensuring workers have received task-specific trainings for working at height, demolition, working with electricity, etc (C-OHS-56).

Grievances

540. The EPC Contractor shall establish a formal Grievance Mechanism for workers and carry out awareness raising amongst formally and informally employed workers including those of subcontractors about the GRM at the start of their employment, including details of how to submit a grievance to PMU and/or the EPC Contractor. GRM will be available to all workers for receiving and handling complaints about unfair treatment or unsafe living or working conditions, ensuring no coercion nor reprisal (C-OHS-57).

Fatalities

541. In the event of any fatality occurring during the construction phase at any Project work site, provide ADB with the details of the fatality within one day of the event occurring in a Fatality Report (C-OHS-58). Appendix R provides sample incident notification forms and incident root cause investigation and corrective action forms to be used by the Project.

Operational Phase

Substations

542. <u>The following mitigation measures will be implemented for substations during the operational phase:</u>

- Provide fully stocked, in-date first aid kit installed in a prominent, signed position, first aid posters and emergency contacts to also be displayed (O-OHS-01).
- Provide eye wash station and water supply to shower located near storage areas for fuel/oil/chemicals (O-OHS-02).
- Provide sand buckets, full of sand, placed in a prominent, signed location near to fire-risk locations such as transformers and oil storage areas (O-OHS-03).
- Provide fire extinguishers (including for oil and electric fires) in a prominent, signed location near to fire-risk locations such as transformers and oil storage areas with service and expiration dates clearly labelled along with posters on fire safety (O-OHS-04).
- All electrical hazards will feature written and visual warning signs that meet the IEEE standards to include the ISO 7010 "Hazard Type: Electrical Symbol" warning of the risk of electrocution (O-OHS-05).
- Design to ensure all lighting is of energy efficient LED type with solar powered LED lighting where practical Use of fluorescent/HPSV lamps will be avoided since they are less energy efficient/classed as hazardous waste for purposes of disposal (O-OHS-06).
- Outdoor lighting to be installed must be of low intensity with little or no blue wavelength and operated using passive infrared (PIR) technology movement sensors set at person height so as not to be kept permanently on overnight, it must be directional and shielded, so light does not fall outside substation boundaries (O-OHS-07).

<u>EMF</u>

543. Electric utility workers typically have a higher exposure to EMF than the general public due to working in proximity to electric power lines. Occupational EMF exposure will be prevented or

minimized through the preparation and implementation of an EMF safety program based on WBG guideline (O-OHS-08) including the following components:

- Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities;
- Training of workers in the identification of occupational EMF levels and hazards;
- Establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers;
- Implementation of action plans to address potential or confirmed exposure levels that exceed
 reference occupational exposure levels developed by international organizations such as the
 International Commission on Non-Ionizing Radiation Protection (ICNIRP), and the Institute of
 Electrical and Electronics Engineers (IEEE). Personal exposure monitoring equipment should be
 set to warn of exposure levels that are below occupational exposure reference levels (e.g., 50%).
 Action plans to address occupational exposure may include limiting exposure time through work
 rotation, increasing the distance between the source and the worker, when feasible, or the use of
 shielding materials.

544. All other occupational health and safety will be managed according to national regulations during the operational phase of the Project (O-OHS-09). However, it is recommended that a long-term program of OHS training by International OHS specialists is provided to NEGU to help strengthen their OHS knowledge and procedures (O-OHS-10).

Phase	Potential Impact	Potential Impact	Residual Impact	Residual Impact
		Significance		Significance
С	Accidents	Medium	Inclusion of specific mitigation measures	Not
	involving workers		recommended by the WBG for transmission line	significant
	5		projects as well as the requirements for	•
			preparation and implementation of an OHS	
			plan, training of staff and provision of health and	
			safety specialist on the EPC Contractors team	
			should ensure that no significant residual OHS	
			impacts remain during the construction phase.	
			In addition, the EPC Contractor will be	
			responsible for following all of the relevant	
			national health and safety standards.	
С	Workers' rights	Low	Impact significance is considered to be low.	Not
	ignored.		Residual impacts will be low.	significant
0	Accidents	Medium	Mitigation measures proposed should help	Low
	involving workers		reduce the potential for accidents to occur.	
			However, based on the experience of the	
			Consultants preparing this Project IEE, accidents	
			cannot be completely ruled out during the	
			lifecycle of the Project. A training program will	
			help NEGU in the longer term.	

Table 51: OHS Residual Impacts

Monitoring

545. Observational monitoring of impacts and review of designs, plans and other documents will be completed per the Project EMP.

8.5.3. Noise and Vibration

546. This section discusses the impacts of noise and vibration during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to generate noise and vibration

#	Aspect	Yes	No	Assessment Boundary
	Construction	n Phase		
1	Earthworks for Foundations and substations	Х		Within 500m
2	Removal of substation equipment	Х		
3	Construction vehicles	Х		
4	Mobile construction plant (cranes, generators, etc)	Х		
5	Construction camps	Х		
6	Access Roads	Х		
7	Line Stringing	Х		
8	Installation of substation equipment	Х		
	Operationa	l Phase		
Ι	Operation of the Transmission Lines	Х		Within 250m of the RoW
2	Maintenance of Transmission Lines	Х		Within 250m of the RoW
3	Operation of Substations	X		Within 100m of the substation
				boundary

Sensitive Receptors

547. Sensitive noise receptors include people living and working close to work sites as well as health, educational and religious facilities. These sensitive receptors can be found along all of the transmission lines to varying degrees although the vast majority of the transmission lines are located in rural areas where few sensitive receptors are located.

548. The SPZ around substations means that there are no residential receptors in these areas (with the exception of the residential property located adjacent to Zafar substation constructed illegally in the SPZ). Further there are no sensitive receptors within 200m of the center of all four substations (most of the works will be focused in the central area of the substations where the transformers are located).

Potential Impacts

Pre-construction / Construction Phase

549. The combination of machinery being used at any one time during the construction phase will vary and noise levels will fluctuate accordingly. The following table indicates the timescale for various activities and the types of equipment required.

#	Activity	Timescale	Equipment	Typical Sound
		Per Tower		10m*
I.	Access roads	2 days	Grader**	82
			Bulldozer (20t)	81
			Pick-up truck	75
2	Clearing and grading activities	2 days	Grader**	82
		-	Bulldozer (20t)	81
			Pick-up truck	75
3	Transporting materials to the	2 days	Pick-up truck	78
	tower site	-	Lorry (4 axle)	80
4	Constructing foundations and	2 weeks	Excavator (22t)	71
	anchors		Bulldozer (20t)	81
			Backhoe (8t)	88

Table 52: Construction Activities and Sound Levels

			Pneumatic Tools	95
			Pick-up truck	75
			Lorry (4 axle)	80
5	Assembling and Raising the	l week	Crane (110t)	67
	towers		Pick-up truck	75
			Lorries (4 axle)	80
6	Earthing Tower	2 days	Auger drill	79
			Pick-up truck	75
			Backhoe (8t)	88
7	Unreeling and Installing the	2/3 days	Mobile Bullwheel tensioners	85
	Conductors		Crane (110t)	67
			Mobile Winch	85
			Pick -up trucks	75
			Lorries (4 axle)	80
8	Restoring the Site	2 days	Bulldozer (20t)	81
	-	-	Backhoe (8t)	88

* Based on BS 5228 – 1:2009 – Assumes each piece of equipment working 25% of the day

** Based on data from US DOT FHA (https://www.nrc.gov/docs/ML1805/ML18059A141.pdf)

550. Based on these activities the following noise levels can be assumed based on each piece of equipment in operation for 25% of a ten-hour working day. ³⁰

Activity	Sound Level dBA LAEQ 10 HR						
	10m	100m	150m				
I/ Access Roads	79	59	55				
2/ Clearing and Grading	79	59	55				
3 / Transporting materials to the tower site	75	56	53				
4 / Constructing foundations and anchors	90	70	67				
5 / Assembling and Raising the towers	75	55	52				
6 / Earthing Tower	83	63	59				
7 / Unreeling and Installing the Conductors	83	63	59				
8 / Restoring the Site	83	63	59				

Table 53: Estimated Noise Levels for Various Construction Activities

551. The table above indicates that most of the construction activities are likely to result in some intermittent elevated noise levels for short periods of time (approximately 3 weeks in the location of each tower and approximately 6 months at substations).

552. It is possible that some construction traffic moving through the villages to the tower sites may induce some very low levels of vibration – however, the volume of heavy construction vehicles travelling will be low and as such no significant vibration impacts are anticipated. It is possible that blasting could be required at some tower sites, this could result in high levels of localized vibration around the work sites.

Operational Phase

553. Literature studies undertaken by EirGrid indicates that "Corona Noise" only becomes a significant issue from 350-500 kilovolts (kV) and above. This would suggest that significant "Corona Noise" impacts may not be likely for 110 kV and 220 kV transmission lines. ³¹

³⁰ Assumptions are based on the consultants experience of High Voltage transmission line construction projects in Uzbekistan (Northwest Region Power Transmission Line Project). Construction noise levels are also aligned with other recent ESIAs prepared by NEGU for EBRD (Navoi - Besopan Transmission Line Upgrade, Uzbekistan).

³¹ EirGrid Evidence Based Environmental Studies Study 8: Noise. Literature review and evidence based field study on the noise effects of high voltage transmission development. EIRGrid, 2016

554. The 100m SPZ means that operational noise levels will not have significant impacts beyond this distance from the substation boundary. Further, the Project involves the installation of modern equipment which will have noise levels lower than, or at a maximum, the same as existing equipment meaning that there would be no increase in noise levels from the SS of more than 3dBA above existing ambient noise levels.

Impact summary and assessment of significance

555. Table 54 provides an assessment of the significance of potential noise and vibration impacts before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	General construction activities	Local community	L	М	L	М	MOD	ST	SMALL	MOD	DEF	м

 Table 54: Noise and Vibration Potential Impacts

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Pre-construction / Construction Phase

556. Camp sites shall not be located within 500 meters of residential or other sensitive receptors (C-NV-01). The following general measures to manage noise levels are required.

- Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to help minimize noise emissions (C-NV-02).
- Work will be undertaken in daytime hours only in accordance with WBG definitions (C-NV-03).
- Noise generating construction-related activities will be avoided during evenings, school hours, prayer times, religious or cultural events near the sensitive receptors (C-NV-04).
- Construction noise in the vicinity of houses must be limited to project standards as defined in the Project IEE (C-NV-05).

- If these noise levels are exceeded, the contractor will be required to implement additional noise mitigation measures such as adjusting his working methods or placing of temporary noise barriers to ensure the noise standard is met (C-NV-06).
- Use low noise generating equipment e.g., less than 55dBA sound pressure level at 1m (C-NV-07).
- The use of horns in areas where sensitive receptors are located (houses, schools, clinics, temples, etc.) will be prohibited (C-NV-08).
- Residents will be forewarned of planned activities that are considered by the Project to be noisy (e.g., trench excavation / drilling) (C-NV-09).
- If complaints are received from the local population regarding elevated noise levels, temporary noise screens shall be installed around the work site, shielding the identified receptors from the source of noise (C-NV-10).
- Construction workers exposure to noise should not exceed the levels set out in the General EHS Guidelines on Occupational Health and Safety otherwise the hearing protection is to be provided (C-NV-11).
- Ensure that all unpaved access roads are kept as far as possible from residential properties to avoid vibration from the movement of heavy construction vehicles (C-NV-12).
- Where rock is encountered, the holes for tower footings shall preferably be drilled, but where blasting is to be resorted to as an economy measure, it shall be done with the utmost care to minimize the use of concrete for filling the blasted area (C-NV-13).
- EPC Contractor to avoid soil compaction, piling, blasting and other vibration inducing activities as much as possible; in locations where this is unavoidable Contractor to identify properties within the zone of influence and undertake pre-construction structural surveys to identify level of risk (C-NV-14). If risk of structural damage to properties identified due to current condition, consider alternative construction method or temporary relocation of occupants during works if at risk (C-NV-15). Consider need to install monitors during construction to monitor structural movement. Structural or cosmetic damage to be repaired by Contractor to at least pre-project condition at their own cost (C-NV-16).

Residual Impacts

Phase	Potential	Potential	Residual Impact	Residual
	Impact	Impact		Impact
		Significance		Significance
С	General	Medium	Some short-term elevated noise impacts may	Low
	construction		occur in villages during the daytime. The use of	
	noise &		temporary mobile noise barriers should reduce	
	Vibration		the noise levels to acceptable levels during the	
			working day.	

Table 55: Residual Noise and Vibration Impacts

Monitoring

557. Observational monitoring of impacts and review of designs, plans and other documents will be completed per the Project EMP. Instrumental monitoring as follows:

Monitoring	Parameters	Frequency	Location	Responsibility	Costs			
Construction Phase								
Noise	Laeq (1 hour)	When	At the location of the	EPC	150 USD	per		
		complaints	complaint	Contractor	site			
		are received						

Table 56: Noise & Vibration - Monitoring Requirements

		from residents					
Vibration	PPV	At locations where blasting is required. Prior to and during blasting works	At the location of the blasting	EPC Contractor	300 site	USD	per

8.5.4. Physical Cultural Heritage and Cultural Landscape

558. This section discusses the impacts upon physical cultural heritage (PCR) and cultural landscape during construction and operation of the Project and associated mitigation measures to be adopted.

Aspects of the Project that have the potential to generate impacts to PCR and Cultural Landscape

#	Aspect	Yes	No	Assessment Boundary
	Construction	n Phase		
1	Earthworks for Foundations and substations		Х	N/A
2	Removal of substation equipment		Х	N/A
3	Construction vehicles		Х	N/A
4	Mobile construction plant (cranes, generators, etc)		X	N/A
5	Construction camps	Х		Within 20m of the camp site
				boundary
6	Access Roads	Х		Within 5m of any new access
				roads
7	Line Stringing	X		Within the alignment RoW
8	Installation of substation equipment		X	N/A
	Operational	l Phase		
1	Operation of the Transmission Lines	Х		Within 10km of transmission
				lines
2	Maintenance of Transmission Lines		X	N/A
3	Operation of Substations		X	N/A

Sensitive Receptors

559. Several graveyards have been noted within the right of way of Project transmission lines.

- L-19-23 one graveyard
- L-22-23 one graveyard
- L-K-K three graveyards
- L-D-Sh two graveyards
- L-H-K one graveyard

560. No landscapes of significant cultural importance have been identified. Boysun, located in Surkhandarya is a nominated UNESCO cultural and historical landscape. However, line L-D-W does not encroach in this area.

Potential Impacts

Construction Phase

561. During line stringing impacts are anticipated to be of low significance as lines can be strung without having to impact directly on the land beneath the conductors. However, for safety reasons there will be periods during the stringing when access to these areas is not permitted. Less than five

towers are located within graveyards themselves. Construction activities in the graveyards could impact upon graves.

562. Establishment of construction camps and access roads will not have direct impacts on known PCR, but it is possible that any earth moving activities in these areas could impact upon unidentified archeological objects and sites. Likewise excavation works for towers could result in chance finds, although in general new towers will be located in the locations of old towers.

Operational Phase

563. No significant cultural landscapes have been identified that would be affected by the Project.

Impact summary and assessment of significance

564. Table 57 provides an assessment of the significance of potential impacts to PCR and cultural landscape before implementation of the proposed mitigation measures that are discussed in the rest of this section.

Phase	Potential Impact	Receptors	No. of Receptors Affected	Sensitivity of Receptors	Level of Public Concern	Risk of Exceeding Legal Threshold	Magnitude	Timeframe	Spatial Scale	Consequence	Probability	Significance
С	Impacts to graveyards	Graveyards	L	Н	L	-	MAJ	ST	SMA	MED	DEF	м
С	Unanticipated PCR	Unidentified PCR	L	Н	L	-	MAJ	ST	SMA	MED	UN	L

Table 57: PCR Potential Impacts

Key: H: High / M: Medium / L: Low / MAJ: Major / MOD: Moderate / MIN: Minimum / H/F: High Frequency / M/F: Low Frequency / L/F: Low Frequency / LT: Long term / MT: Medium Term / ST: Short term / MED: Medium / DEF: Definitely / POSS: Possible: / UNLIKE: Unlikely. Cells shaded in blue are positive impacts.

Mitigation and Management Measures

Graveyards

565. Where towers are located in graveyards the EPC Contractor should relocate the towers outside of these areas primarily to respect the alignment SPZ (D-PCR-01).

Chance Finds

566. In the event of any chance finds during the construction works procedures shall apply that are governed by GoU legislation and guidelines (C-PCR-01). A chance finds procedure shall also be developed by the EPC Contractor (C-PCR-02).

567. The chance find procedure is a project-specific procedure that outlines actions required if previously unknown heritage resources, particularly archaeological resources, are encountered during project construction or operation. A Chance Find Procedure, as described in IFC Performance Standard 8, is a process that prevents chance finds from being disturbed until an assessment by a competent specialist is made and actions consistent with the requirements are implemented. The

procedure is applicable to all activities conducted by the personnel, including EPC Contractors, that have the potential to uncover a heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during construction activities. Procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority.

568. Appendix P provides a sample chance find procedure which the EPC Contractor could adopt. <u>Residual Impacts</u>

Phase	Potential	Potential	Residual Impact	Residual
	Impact	Impact		Impact
		Significance		Significance
С	Impacts to graveyards	Medium	Relocating towers outside of graveyards will	Not significant
			ensure there are no residual impacts.	
С	Unanticipated PCR	Low	Implementation of a chance find procedure	Not significant
			will ensure that residual impacts are not	-
			significant	

Table 58: Residual PCR Impacts

<u>Monitoring</u>

569. Observational monitoring of impacts and review of designs, plans and other documents will be completed per the Project EMP.

8.6. Cumulative Impacts

570. It is possible that other projects not associated with NEGU could be on-going in areas close to the proposed alignments and substations, for example road upgrading. However, due to the large geographical spread and number of activities under this project it is not possible to identify all projects that may result in cumulative impacts.

571. The main cumulative impacts are the sum of the impacts associated with all of the proposed activities. This IEE includes mitigation measures for all transmission lines and substations to ensure that there are only a few residual impacts of low significance remaining. The cumulative impact of the rehabilitation works after mitigation is therefore of low significance.

8.7. Induced Impacts

572. The Project intends to rehabilitate existing lines to provide continuous, uninterrupted power to the population. No additional lines will be constructed that may induce development in the Project area.

8.8. Transboundary Impacts

573. As noted earlier in the report, a portion of L-22-23 (around 5km) passes through Kazakhstan. All works funded under this project will take place within the border of Uzbekistan and no construction activities will be performed in Kazakh territory. As such no transboundary impacts are anticipated.

9. Stakeholder Engagement, Information Disclosure and Grievance Mechanism

9.1. Public Consultation Requirements

574. According to the ADB Safeguard Policy Statement (2009):

- "The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. Meaningful consultation is a process that:
- Begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle;
- Provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people;
- Is undertaken in an atmosphere free of intimidation or coercion;
- Is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and
- Enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.
- Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results are to be documented and reflected in the environmental assessment report."

575. The national legal requirements of Georgia with regards to stakeholder engagement and information disclosure are outlined below.

9.2. Stakeholder Engagement Activities

9.2.1. General Principles

576. The following general principles will govern stakeholder engagement activities:

- The content of documents for public comment will provide accessible and adequate information on the Project, and not create undue fears (regarding potential negative impacts) or expectations (regarding potential positive impacts such as job creation, etc.);
- Written information will be accompanied by visual illustrations and explanations as needed to build understanding of the project;
- The information will be disclosed in the local language(s) where needed and in a manner that is accessible and culturally appropriate, taking into account any vulnerable people;
- If key issues of particular concern arise, workshops may be offered to explain technical processes, assessment techniques, and quality assurance measures to verify results and ensure mitigation procedures are followed; and
- Efforts will be made to explain not only the proposed project and EIA process, but also applicable national laws and legislations, international principles and standards and how the RD will address compliance.

9.2.2. Key Stakeholder Engagement Findings to Date

577. To date eight consultation sessions have been undertaken relating to the preparation of this IEE. The sessions we undertaken between June 2022 and September 2022. Initially two sessions were held in Ferghana and Samarkand regions in June. Following on from these initial consultations further

sessions were held in Tashkent, Bukhara, Navoi, Kashkadarya and Surkhandarya regions in September 2022. The sessions were arranged and coordinated by NEGU with presentations from the Consultant team. The tables below summarize the key findings of the sessions. Appendix M provides the consultation attendance sheets, photos from the sessions as well as the project information brochures handed out during the sessions. Further, at the request of ADB additional consultation has been carried out in the Project area through distribution of 'project information brochures', or PIBs. Over one hundred PIBs have been distributed by NEGU to residents. The PIBs contain basic information about the Project and its potential impacts and provide contact details for feedback. This IEE will be updated if and when feedback from stakeholders are received on the PIBs.

#	Line	Comment	Initial Response	Project actions in response to engagement	IEE reference
1.	Ferhghna	The road should not be closed while works are on-going, including while stringing over roads.	Noted, although there could be the requirement for temporary road closures during the line stringing works.	Road closures will only happen where safety regulations require it. Any road closures will be communicated with the local community at least 72 hours in advance of works.	C-IU-01
2.	L-F-CH / L-22- 23	What is the safety protection zone area for 110 and 220 kV lines?	NEGU official provided the response.	None required	N/A
3.	L-F-CH / L-22- 23	Can the alignment be changed to avoid our property?	Possibly. This issue will be followed up with NEGU and design consultants.	Micro-alignment changes to avoid some properties will be proposed as outlined in section 4.4 – Analysis of Alternatives	Section 4.4 – Analysis of Alternatives
4.	L-KS-A	There are lots of dead birds (cranes) around the area of the sewage treatment plant. It gets foggy around that area during some periods of the year and birds cannot see the lines there.	Noted.	Bird diverters have been recommended for this area to help birds see lines.	D-BIO-04
5.	L-KS-A	Will EMF affect people living under the lines?	Nobody should be living under any of the lines as this is part of the safety protection zones established to ensure that nobody lives in these areas.	The Project LARP includes provisions to compensate and resettle any people living under lines.	See project LARP.
6.	L-D-W	The lines are too far away from residents to have any health and safety issues.	Noted.	None required	N/A
7.	L-D-W	This area is quite dusty and it can affect the efficiency of the line.	Noted, we will pass this information on to the technical team.	None required	N/A
8.	L-Hamza	Will electricity be switched off during the construction phase?	It is possible that there could be temporary disruptions to power supply.	Provisions are made in the IEE to ensure that power is provided at all times.	C-IU-10/C-IU- 11
9.	L-K-K / L-32-K	What will happen to the electricity supply during construction phase?	It is possible that there could be temporary disruptions to power supply.	Provisions are made in the IEE to ensure that power is provided at all times.	C-IU-10 / C-IU- 1 I

 Table 59: Comments and Responses

10.	L-K-K / L-32-K	Will vibration from vehicles delivering poles	No, we do not anticipate significant	None required.	N/A
		affect buildings?	vibration impacts due to the movement		
			of a small number of vehicles.		
11.	L-D-W	What happens to distribution lines when	It is possible that there could be	Provisions are made to consult with	C-IU-10/C-IU-
		transmission lines are constructed above	temporary disruptions to power supply.	locals before any disruptions to	11
		them? Is there any disruption to power		power supply and to provide at least	
		supply?		48 hour's notice ahead of power	
				outages.	

9.3. Information disclosure

578. In compliance with ADB's SPS (2009) the draft IEE will be provided for disclosure on the ADB and NEGU Website (in local language).

579. With regards to information disclosure, ADB is committed to working with NEGU to ensure that relevant information (whether positive or negative) about social and environmental safeguard issues is made available in a timely manner, in an accessible place, and in a form and language(s) understandable to affected people and to other stakeholders, including the general public, so they can provide meaningful inputs into project design and implementation.

9.4. Grievance Redress Mechanism

9.4.1. General

580. Grievance Redress Mechanisms (GRMs) are locally based, formalized way to accept, assess, and resolve community feedback or complaints. They provide predictable, transparent, and credible processes to all parties, resulting in outcomes that are relatively low cost, fair, and effective. They build on trust as an integral component and facilitate corrective action and pre-emptive engagement. GRMs also set out a timeframe in the resolution of complaints.³² The Project GRM will serve as a venue for receiving and addressing project-affected peoples' concerns and grievances about environment, socio-economic, and land acquisition related impacts. It will address concerns promptly through an understandable and transparent process that is accessible to all members of the community, gender responsive and culturally appropriate. The overall approach of the GRM is to deal with grievances at a local level first in an efficient manner and escalate to the next level or higher level of authority if grievance cannot be resolved.

581. The ADB Accountability Mechanism (AM) provides an independent forum and process for people to voice and seek solutions to their problem as well as alleged non-compliance by ADB with its operational policies and procedures. As ADB adheres to early problem prevention and problem-solving, Project complaints and concerns should first be addressed promptly and effectively at the Project, through the GRM, and operational levels. The AM is the "last resort" process for dealing with problems and compliance issues that were not prevented or solved at GRM and operational levels.

582. The GRM should be established and operated in compliance with the Uzbek Regulations and ADB Policy requirements.

583. The ADB's 2009 Safeguards Policy Statement³³ requires the borrower/client to establish a mechanism that will receive and facilitate the resolution of affected persons' concerns and grievances about physical and economic displacement and other Project impacts, paying particular attention to vulnerable groups.

584. Along with the ADB requirements on development of a grievance redress mechanism by the EA, as indicated above, grievance redress procedure in Uzbekistan is also regulated by the national legislation of Republic of Uzbekistan, in particular by the "Law on the order of submission of appeals of physical and legal entities" (#378, 03 December 2014). According to this regulation, the application or complaint shall be considered within fifteen days from the date of receipt in the state authority, which is obliged to resolve the issue on the merits. If an additional study, set of additional/supporting documents or check procedure is needed, the term of complaint's resolving may be extended for up to one month.

585. The submission procedure for grievances and citizens' applications was discussed during the public consultations in the project area and also agreed with the representatives of NEGU.

³² World Bank. 2014. Global Review of Grievance Redress Mechanisms in World Bank Projects. Washington, DC. © World Bank.

³³ ADB. 2009. Safeguards Policy Statement. Manila.

9.4.2. Existing Complaint Handling Mechanism in Uzbekistan

586. The National law on the appeals of individuals and legal entities obliges state authorities to deal with requests and provides a clear framework to handle the case. This law has recently replaced previous law on the requests of citizens and gives the right for individuals and legal entities to file requests. The requests can be in the form of applications, proposals and complaints and submitted in three ways: oral, written, and digital format.

587. Any citizen in Uzbekistan has several channels to air his/ her complaints.

On village (or mahalla) level

- Physical visit to Mahalla Citizens' Assembly Office to meet with Chair;
- Call to President's Virtual reception (tel. number is 1000 or 0-800-210-00-00) or send message to President's Virtual reception online (<u>www.pm.gov.uz</u>);
- Call to hotlines established at each district or regional Khokimiyat;
- Send written complaint (letter) to district/regional Khokim/ line Ministry/President;
- Attend meetings with district/regional Heads of sections on integrated socio-economic development of regions (4 sections established in each district);
- Attend meetings with leadership of line ministries and agencies that have to regularly meet with citizens in rural areas.

588. If citizen is not satisfied with reply provided by Mahalla Chair, or he has received incomplete response, citizen can apply to upper level, specifically to District Khokimiyat.

District level

- Physical visit to Khokimiyat on citizens reception days to meet with district Khokim or deputy Khokims
- Call to hotlines established in each Khokimiyat
- Physical visit to public reception offices under President's Virtual reception and established in each district nationwide
- Call to President's Virtual reception (tel number is 1000 or 0-800-210-00-00) or send message to President's Virtual reception online (www.pm.gov.uz)
- Send written complaint (letter) to district Khokim/ line Ministry/President
- Attend meetings with district/regional Heads of Sections on integrated socio-economic development of regions (4 sections established in each district)
- Attend meetings with leadership of line ministries and agencies that have to regularly meet with citizens in rural areas
- If a citizen is not satisfied with reply provided on district level, or he has received incomplete response, citizen can apply to upper level, specifically to Regional Khokimiyat.

Regional level

- Physical visit to Khokimiyat on citizens reception days to meet with regional Khokim or deputy Khokims
- Call to hotlines established in each Khokimiyat
- Physical visit to public reception offices under President's Virtual reception and established in each regional center nationwide
- Call to President's Virtual reception (tel number is 1000 or 0-800-210-00-00) or send message to President's Virtual reception online (www.pm.gov.uz)

- Send written complaint (letter) to regional Khokim/ line Ministry/President
- Attend meetings with regional Heads of Sectiond on integrated socio-economic development of regions (4 sectiond established in each district)
- Attend meetings with leadership of line ministries and agencies that have to regularly meet with citizens in rural areas

9.4.3. GRM Developed for this Project

589. As mentioned above, the GRM developed by NEGU for the ADB Loan 3285-UZB is being adopted for this project. The GRM is available to people living or working in nearby areas. The project GRM will be disseminated via the LARP disclosure meetings during the DMS exercise in the leaflets that will be distributed to people through local Hokimiyat, the makhalla, village assembly of citizens or farmers councils. In case there will be any person impacted by or concerned about the project activities he/she has the right to participate in the GRM. They should have easy access to it and be encouraged to use it. The proposed GRM does not replace the known mechanisms of complaint and conflict resolution envisaged by the legal system of Uzbekistan, but it attempts to minimize the use of it to the extent possible.

590. The PMU has in place a simple and accessible GRM. The GRM provides some avenues and levels for grievance resolution and appeals process. The primary objective behind the project-specific grievance mechanism is to ensure a timely and user-friendly solution to the complaints received from the people living near to subprojects. However, the project GRM does not prevent any person to approach the governmental legal system to resolve their claims at any stage of the grievance redress process. An aggrieved person may address their complaints to the courts at any time of the GRM process and not only after using and being dissatisfied with the GRM outcome.

591. <u>Level I (Makhalla / Village Assembly).</u> Under this project grievance redress mechanism, complaints can be submitted to the district level Hokimiyat, makhalla, village assembly of citizens, farmer councils, Contractor or directly to project. The makhalla/village assembly and Site Engineer of the project will try to resolve or clarify the issue within 2 weeks. Unresolved issues will be referred to the PMU in Tashkent.

592. <u>Level 2 (Project Management Unit)</u>. The NEGU through its PMU on a regular basis (weekly) and as per immediate request will check with the project whether any complaint is received by the Site engineer. The PMU, on receipt of a complaint from the project or any other local bodies, will immediately take the following actions:

- Will inform the complainant of an acknowledgement within five days;
- If required, establish a complaint handling team with members: Head of PMU, representatives from the EA, District Hokimiyat, Land Resources, and Cadastral Department, and Makhalla or Village Assembly of Citizens or/and Farmer's Councils, or/and Women Association.

593. Complaint handling. The complaint handling team will be headed by one of the EA management staff members designated for handling grievances of the project.

- The team will consult with the complainant and gather their concerns;
- The team will also take advice from an independent valuation company (in case of grievances related to valuation);
- All complaints will be resolved in 15 days, and in case additional details are required, a maximum of 30 days will be used to address and close the complaint;
- If the complaint is not addressed by the project grievance mechanism team, the PMU will inform ADB and the District Hokimiyat regarding the issue.

594. District or provincial Hokimiyat will also have 15 calendar days to resolve the complaint.

595. <u>Court.</u> An aggrieved person may submit his/her complaint to an appropriate court of law at any stage of the grievance redress process at their expense, irrespective of the outcome of the project level GRM. Accessing a court of law is not a part of the GRM process.

9.4.4. Contact Details

596. The PMU will be responsible for recording the complaints, steps taken to address a grievance, a minute of the meetings, and preparation of a report for each complaint. The complaint handling process will be reported to ADB through the quarterly project implementation report as well as the semi-annual LARP implementation monitoring report.

597. GRM Records and documentation

598. The PMU under NEGU already established a GRM under the Loan 3285-UZB. The regional branch of NEGU which is the NEGS is responsible for collecting complaints and grievances from AHs and people living near the construction sites. There are 7 regions that will be involved in this project. NEGS also collects complaints made by AHs through contractors working directly on the sites. People in village areas typically register a complaint directly with the makhalla and hokimiyat. Hokimiyat receives complaints verbally and in writing in accordance with the national legislation, which are officially recognized and documented. Therefore, the Safeguard specialist at PMU will regularly contact the Hokimiyat for any complaints by the AHs.

599. NEGS will be the entry point for receiving a complaint or known as a Focal Grievance Point (FGP). Moreover, NEGS will ensure local monitoring of LARP implementation assisting PMU in all LARP related implementation activities. NEGS will keep a record of complaints received for its use as well as for review by ADB during regular missions. The grievance mechanism applies equally to all affected households and for the population living in the project area.

600. The complaint handling process will be reported to ADB through project progress reports as well as the semi-annual LARP implementation monitoring reports. All grievances received from the population shall be registered in a logbook which is available at levels I and 2 at the site office of the Contractor, each makhalla committee of subproject area districts and PMU Tashkent office. Besides, there are also logbooks in the Hokimiyats where the grievances of the population are usually registered. Even so, the information received by the Contractor for grievances and applications from the aggrieved persons and the measures undertaken should be submitted to the representatives of PMU on the project site for the accounting of all grievances. Thereafter the information on all received grievances will be collected at the PMU.

9.5. ADB's Accountability Mechanism

601. In addition to the project level GRM required by ADB's SPS, ADB also has an Accountability Mechanism (AM) Policy (May 2012). However, while the project level GRM is the responsibility of the EA, the Accountability Mechanism is the responsibility of ADB. The accountability mechanism provides opportunities for people (2 or more complainants) that are adversely affected by ADB-financed projects to express their grievances, seek solutions, and report alleged violations of ADB's operational policies and procedures, including safeguards policy. ADB's accountability mechanism comprises (i) a consultation phase led by ADB's special project facilitator to assist people adversely affected by ADB-assisted projects in finding solutions to their concerns and (ii) providing a process through which those affected by projects can file requests for compliance review by ADB's Compliance Review Panel.

602. ADB's accountability mechanism can be considered a last resort mechanism. The affected people are first expected to exhaust grievance handling mechanisms described in this draft LARP and the ADB operations department concerned (ADB Uzbekistan Resident Mission) before lodging a complaint with ADB's Accountability Mechanism.

603. Table 60 shows the contact details of persons whom citizens may approach for their complaint and concerns.

9.6. GRM Records and documentation

604. The PMU under NEGU already established a GRM under the Loan 3285-UZB. The regional branch of NEGU which is the NEGS is responsible for collecting complaints and grievances from AHs and people living near the construction sites. There are 7 regions that will be involved in this project. NEGS also collects complaints made by AHs through contractors working directly on the sites. People in village areas typically register a complaint directly with the makhalla and hokimiyat. Hokimiyat receives complaints verbally and in writing in accordance with the national legislation, which are officially recognized and documented. Therefore, the Safeguard specialist at PMU will regularly contact the Hokimiyat for any complaints by the AHs.

605. NEGS will be the entry point for receiving a complaint or known as a Focal Grievance Point (FGP). Moreover, NEGS will ensure local monitoring of LARP implementation assisting PMU in all LARP related implementation activities. NEGS will keep a record of complaints received for its use as well as for review by ADB during regular missions. The grievance mechanism applies equally to all affected households and for the population living in the project area.

606. The complaint handling process will be reported to ADB through project progress reports as well as the semi-annual LARP implementation monitoring reports. All grievances received from the population shall be registered in a logbook which is available at levels I and 2 at the site office of the Contractor, each makhalla committee of subproject area districts and PMU Tashkent office. Besides, there are also logbooks in the Hokimiyats where the grievances of the population are usually registered. Even so, the information received by the Contractor for grievances and applications from the aggrieved persons and the measures undertaken should be submitted to the representatives of PMU on the project site for the accounting of all grievances. Thereafter the information on all received grievances will be collected at the PMU.

9.7. ADB's Accountability Mechanism

607. In addition to the project level GRM required by ADB's SPS, ADB also has an Accountability Mechanism (AM) Policy (May 2012).³⁴ However, while the project level GRM is the responsibility of the EA, the Accountability Mechanism is the responsibility of ADB. The accountability mechanism provides opportunities for people (2 or more complainants) that are adversely affected by ADB-financed projects to express their grievances, seek solutions, and report alleged violations of ADB's operational policies and procedures, including safeguards policy. ADB's accountability mechanism comprises (i) a consultation phase led by ADB's special project facilitator to assist people adversely affected by ADB-assisted projects in finding solutions to their concerns and (ii) providing a process through which those affected by projects can file requests for compliance review by ADB's Compliance Review Panel.

608. ADB's accountability mechanism can be considered a last resort mechanism. The affected people are first expected to exhaust grievance handling mechanisms described in this draft LARP and the ADB operations department concerned (ADB Uzbekistan Resident Mission) before lodging a complaint with ADB's Accountability Mechanism.

³⁴ https://www.adb.org/contact?target=Hmzj1IzfKqMSRDKA0C6/kg==&name=Complaint%20Receiving%20Officer&referrer=node/81970

Nº	Line ID	Province	Responsible body	Organization	Position	Contact details
I	All Lines	All Provinces	Batirov Azizbek	JSC "National Electricity Grid of Uzbekistan"	Social and Environmental Specialist	Adress: Tashkent, Osiyo street, 42 Tel: + 998 71 236-68-38 +99871-236-68-08 Email: northwest220g3@gmai.com
2	L-19-23 L-F-CH L-KS-A L-19-D L-22-23	Tashkent	Mustafaev Nurjan	JSC "National Electricity Grid of Uzbekistan" Tashkent province branch	Head of the line area	+998 93 501-64-35 Email: northwest220g3@gmai.com
3	L-D-Sh	Surkhandarya	Mirzaev Toshbolta	JSC "National Electricity Grid of Uzbekistan" Surkhandarya province branch	Chief specialist	+998 93 526-00-69 Email: <u>northwest220g3@gmai.com</u>
4	L-K-K L-32-K L-32-M	Kashkadarya	Mahamov Davron	JSC "National Electricity Grid of Uzbekistan" Kashkadarya province branch	Chief specialist	+998 93 422-99-31 Email: <u>northwest220g3@gmai.com</u>
5	L-Hamza I	Bukhara	Mirzaev Samat	JSC "National Electricity Grid of Uzbekistan" Bukhara province branch	Chief specialist	+998 93 459-80-08 Email: <u>northwest220g3@gmai.com</u>
6/7	L-H-K	Samarkand Navoiy	Abdurahmanov Abdumurod	JSC "National Electricity Grid of Uzbekistan" Samarkand province branch	Chief specialist	+998 99 554-07-12 Email: <u>northwest220g3@gmai.com</u>
8	L-7F-1-2	Fergana`	Karimov Dilshod	JSC "National Electricity Grid of Uzbekistan" Fergana province branch	Chief specialist	+998 99 600-75-77 Email: <u>northwest220g3@gmai.com</u>

Table 60: Addresses of persons to whom citizens may address their complaint and concerns

10. Environmental Management Plan

10.1. Introduction

609. The EMP provides the overall Project environmental management framework. It provides summary information of the types of impacts, which are described in detail in **Section 8**. It also provides detailed information about the required mitigation and monitoring measures, their implementation arrangements reporting requirements. In addition, the approximate costs of the EMP are outlined.

10.2. Environmental Management Plans

610. The following tables provide the environmental mitigation and observational monitoring for the Project during the design, pre-construction / construction and operational phases.

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Implementation Responsibility	Monitoring Responsibility	Cost (USD)
	OHS	CAP-15	Complete a detailed OHS audit of each substation	NEGU	PIC	25,000
Corrective Actions	Community safety	CAP-12	Any residential properties within SPZs should be removed	NEGU to coordinate with planning authorities	N/A	Not part of project costs
Air Quality	SF ₆	D-AQ-01	Design of any gas insulated equipment will comply with international norms and standards for handling, storage, and management of SF ₆	EPC Contractor	PIC	Part of project construction costs
		D-AQ-02	Equipment to be hermetically pressure sealed "sealed for life" units and be tested and guaranteed by the supplier at less than 0.1% leakage rate	EPC Contractor	PIC	Part of project construction costs
		D-BIO-01	Maintaining 1.5 meter (60-inch) spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware.	EPC Contractor	PIC Ornithologist	Part of project construction costs
Biodiversity	Bird Electrocution	D-BIO-02	Ensure designs for the following lines include nest platforms: f. L-19-23 g. L-F-CH h. L-KS-A i. L-19-D j. L-22-23 Nest platform designs will be based on the requirements of Suggested Practices for Avian Protection on Power Lines (2006).	EPC Contractor	PIC Ornithologist	500 USD per nest, assume 50. 25,000 USD total

Table 61: Design Phase EMP

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Implementation Responsibility	Monitoring Responsibility	Cost (USD)
		edm-bio- I	To protect the birds from electric shock, to prevent contamination and insulation overlapping, a bird guard will be installed on the ends of the crossheads of intermediate supports, as well as on the crossheads of anchor-angle supports, where the stub is to be looped by means of a suspension string, above each suspension set.	EPC Contractor	PIC Ornithologist	Part of project construction costs
	Bird Collisions & Sensitive	D-BIO-03	Provision of bird's reflector on top of every tower	EPC Contractor	PIC Ornithologist	50,000 USD
		D-BIO-04	Bird survey prior to the start of individual line construction (all lines) for one season to determine the location and need for bird marker devices on lines. The survey will indicate what birds are at risk on specific sections of the lines and indicate what marker devices are needed and at what intervals along the line.	PIC Ornithologist	NEGU	Surveys - 36,000 USD (based on 3,000USD per survey)
	Species	D-BIO-04	Provision of line marking devices (flappers, balls, etc).	EPC Contractor	PIC Ornithologist	Marking Devices – 670,000 (based on 35USD per flapper)
		D-BIO-05	Move the landfill a safe distance from the project site to prevent birds gathering close to the transmission line	GoU	None	Not part of project costs
		D-BIO-04a	Control, and, if necessary, regulate the number of individual species of red-tailed gerbil on the site by specialized services.	EPC Contractor	PIC	2,000
	Sensitive Habitat and Designated Sites	D-BIO-05	Micro-alignment changes will be adopted where it is possible to avoid undisturbed areas of Adyr habitat and locate towers on already disturbed sites.	EPC Contractor	PIC	Part of project design costs
		D-BIO-06	Where micro alignment changes are not possible the sensitive habitat will be mapped before construction and the methodology in Ομινδκα! Μ	EPC Contractor	PIC	Part of project construction costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Implementation Responsibility	Monitoring Responsibility	Cost (USD)
			сточник ссылки не найден. will be followed by the EPC Contractor			
	Erosion	EDM-SG- 06	Tower sites will be sloped as necessary to prevent erosion	EPC Contractor	PIC	Part of project construction costs
	Tower Placement	D-SG-01	Identify presence of any unstable land and where towers are not on flat land and conduct geotechnical/slope stability analysis with slopes to be graded with drainage installed to minimize landslide risk	EPC Contractor	PIC	Part of project design costs
		D-SG-01	Ensure resulting slope design/topography does not exacerbate surface erosion and/or trigger a landslide	EPC Contractor	PIC	Part of project design costs
	PCBs	D-SG-05	PCBs will not be used in any transformers and any other Project facilities or equipment	EPC Contractor	PIC	Part of project construction costs
Soils		D-SG-06	Equipment purchased for use on the Project to be accompanied by letter from the manufacturer and material safety data sheet for insulating oil used confirming that it is guaranteed PCB free and labelled as PCB free	EPC Contractor	PIC	Part of project construction costs
	Soil contamination	EDM-SG- 09	Oil pit will be provided (impermeable bunded area of 110% capacity) in the transformer pad area to ensure collection of any potential oil leak or still to the ground. Designs shall be in accordance with IEEE Power and Energy Guide for Containment and Control of Oil Spills in Substations (2013).	EPC Contractor	PIC	Part of project construction costs
		D-SG-07	The four substations will be surveyed during the design phase to assess the potential for contaminated land to be present in the area of the proposed installation and upgrading works	EPC Contractor	PIC	Part of project construction costs
		D-SG-08	If signs of potentially significant contamination are present in this area, e.g., oil storage tanks, old leaking transformers, oil staining, etc. soil sampling and testing shall be undertaken in the work area to determine the level of soil contamination	EPC Contractor	PIC	5,000

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Implementation Responsibility	Monitoring Responsibility	Cost (USD)
		D-SG-09	A Contaminated Land Management Plan will be completed including specific procedures for intrusive investigation and mitigation measures	EPC Contractor	PIC	Part of project construction costs
	Soil Salinity	D-SG-010	Designs shall ensure that towers (specifically their foundations) located within saline soil area (mainly along the route of L-Hamza) are constructed from materials resistant to corrosion	EPC Contractor	PIC	Part of project design costs
Hydrology	Wastewater	D-HY-01	All wastewater from substations to be connected to existing sewerage system or septic tank with soak away so no untreated wastewater will be disposed of to surface water or ground in operation, septic tank/soakaway effluent to meet national general wastewater standards or IFC wastewater discharge limits, whatever is the most stringent	EPC Contractor	PIC	Part of project construction costs
	Floodplains	D-HY-02	Designs shall avoid placing a tower in the riverbed of the Halkajur river. If this is not possible designs shall ensure that the tower is constructed so that foundations cannot be significantly affected by high water levels	EPC Contractor	PIC	Part of project design costs
	Climate Change	D-HY-03	The findings of the Project CRVA will form part of the design of the above mentioned tower. Such design considerations shall also apply to any other tower constructed within river floodplains	EPC Contractor	PIC	Part of project design costs
Geohazards	Landslides, mudflows and earthquakes	D-GEO-01	Designing towers using landslide / mudflow prevention design standards and considering earthquake loading as well as locating the facilities in stable areas, as far as possible would avoid landslides and impacts from seismic events	EPC Contractor	PIC	Part of project design costs
	High winds	D-GEO-02	Specific attention shall be applied in the design phase to towers on the L-Hamza alignment to ensure that they are not impacted negatively by high winds during the operational phase	EPC Contractor	PIC	Part of project design costs
Community Health and Safety	EMF	D-CHS-01	The Project will respect all national safety protection zone regulations, including those for EMF	EPC Contractor	PIC	Part of project design costs
Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Implementation Responsibility	Monitoring Responsibility	Cost (USD)
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		D-CHS-02	Where properties cannot be avoided in the design and where they are present within the sanitary protection zone the properties will be expropriated following the procedures outlined in the Project LARP. The LARP will be updated during the design phase to include any such properties	EPC Contractor	PIC	Part of LARP costs
Occupational Health and Safety	Control	O-OHS-01	For control buildings provide adequate natural and/or artificial lighting levels to meet the IFC EHS Guidelines on Occupational H&S (Table 2.3.3. Minimum Limits for Workplace Illumination Intensity) and take a life-cycle approach to detailed design, considering the use of construction materials and the energy and water efficiency of the building during operation adopting the "green building" concept e.g., using natural ventilation for reducing the need for air conditioners	EPC Contractor	PIC	Part of project construction costs
	Duildings	O-OHS-02	Control building design will provide for sanitation and welfare facilities as per national regulations and international GIIP including indoor toilets with hand washing facilities (one to six workers) and a dedicated cooking area / clean eating area / rest area for staff on-site etc	EPC Contractor	PIC	Part of project construction costs
		O-OHS-03	Design of control building to include emergency exits with emergency exit signage	EPC Contractor	PIC	Part of project construction costs
		O-OHS-04	Automatic fire alarms and fire suppression systems shall be provided in control buildings	EPC Contractor	PIC	Part of project construction costs
Total						763,000 (excluding CAP costs)

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
General Environmental Management		C-SEMP-01	The EPC Contractor will be responsible for preparing a Specific Environmental Management Plan.	SEMP	EPC Contractor / Prior to the start of construction	PIC and NEGU PMU (through their safeguard specialist) to review and approve Plan / Prior to the start of construction	Part of general Construction Phase costs
	SEMP and Management Plans	C-SEMP-02	As part of his SEMP, the EPC Contractor will be responsible for preparing and implementing his Pollution Prevention Plan.	Pollution Prevention Plan	EPC Contractor / Prior to the start of construction	PIC and NEGU PMU (through their safeguard specialist) to review and approve Plan / Prior to the start of construction	Part of general Construction Phase costs
		C-SEMP-04	As part of his SEMP, the EPC Contractor will be responsible for preparing and implementing his Reinstatement Implementation Plan.	Reinstatement Implementation Plan	EPC Contractor / Prior to the start of construction	PIC and NEGU PMU (through their safeguard specialist) to review and approve Plan / Prior to the start of construction	Part of general Construction Phase costs
		C-SEMP-05	The EPC Contractor will be responsible for preparing and implementing his Traffic Management Plan which will be approved by both the PIC and the relevant regulatory authority in Uzbekistan for the control of traffic.	Traffic Management Plan	EPC Contractor / Prior to the start of construction	PIC and NEGU PMU (through their safeguard specialist) to review and approve Plan / Prior to the start of construction	Part of general Construction Phase costs
		C-SEMP-06	An Occupational Health and Safety Plan will be prepared by the EPC Contractor to manage worker safety.	Occupational Health and Safety	EPC Contractor / Prior to the start of construction	PIC and NEGU PMU (through their safeguard specialist) to review and approve Plan / Prior to the start of construction	Part of general Construction Phase costs
		C-SEMP-07	As part of his SEMP, the EPC Contractor will be responsible for preparing and implementing	Community Health and Safety Plan	EPC Contractor / Prior to the start of construction	PIC and NEGU PMU (through their safeguard specialist) to review and	Part of general Construction Phase costs

Table 62: Pre-construction / Construction Phase EMP

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			his Community Health and Safety Plan.			approve Plan / Prior to the start of construction	
		C-SEMP-09	As part of his SEMP, the EPC Contractor will be responsible for preparing and implementing his Construction Camp Management Plan.	Construction Camp Management Plan	EPC Contractor / Prior to the start of construction	PIC and NEGU PMU (through their safeguard specialist) to review and approve Plan / Prior to the start of construction	Part of general Construction Phase costs
		C-SEMP-10	As part of his SEMP, the EPC Contractor will be responsible for preparing and implementing his Waste Management Plan.	Waste Management Plan	EPC Contractor / Prior to the start of construction	PIC and NEGU PMU (through their safeguard specialist) to review and approve Plan / Prior to the start of construction	Part of general Construction Phase costs
	Permits and Licenses	C-PL-01	The applicable discharge permits will be obtained for MPEs, MPDs, etc., prior to the discharge commencing.	SEMP	EPC Contractor / Prior to the start of construction	PIC and NEGU PMU (through their safeguard specialist) to review permits / Prior to the start of construction	Part of general Construction Phase costs
Air Quality	Dust Control	EDM-AQ- 01	Dust control measures will be implemented on all roads within 250m of residential / sensitive receptors.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
		C-AQ-10	Ensure an adequate supply of bowsers and carry out watering for dust control at least once a day near residential areas: in dry weather with temperatures of over 25°, or in windy weather. Avoid overwatering as this may make the surrounding muddy.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs

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		C-AQ-11	Vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency).	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	No cost
		C-AQ-12	A strict Project speed limit of 30km/hr will be enforced for Project vehicles using unmade tracks.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	No cost
		C-AQ-13	Excavated materials will be stockpiled where practical away from sensitive receptors, such as homes, schools, and health facilities. Where this is not possible, ensure regular watering of stockpiles to prevent dust impacts	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
		C-AQ-14	Earthwork operation will be suspended when the wind speed exceeds 20 km/h in areas within 500 m of any community.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
		C-AQ-15	Vehicles carrying fine aggregate materials will be sheeted to help prevent dust blow and spillages.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
		C-AQ-16	Only use cutting, grinding, or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction,	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			e.g., suitable local exhaust ventilation systems				
		C-AQ-17	Provide workers with N95 dust masks to be worn when ambient conditions are dusty or when dust generating activities take place	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
	Siting of Equipment	C-AQ-01	Stationary emission sources (e.g., portable diesel generators, compressors, etc.) shall be positioned as far as is practical from sensitive receptors.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	No cost
		C-AQ-02	Emission sources (vehicles such as excavators) shall be positioned as far as is practical from sensitive receptors	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	No cost
	Release of Exhaust Gases	C-AQ-03	Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to maximize fuel efficiency and help minimize emissions.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
	and Fugitive Emissions	C-AQ-04	Preferentially the Project will use fuel that has low sulphur content of 0.1%, where practical and available within Uzbekistan.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
		C-AQ-05	Construction equipment and vehicles will meet national emissions standards. Belching of black smoke is prohibited	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
		C-AQ-06	Limit engine idling to maximum 5 minutes	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard	No cost

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						specialist) to undertake daily site inspections	
		C-AQ-07	Controlled or uncontrolled burning of waste will not be allowed.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	No cost
		C-AQ-08	Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery- powered equipment where practicable	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
Hydrology	Drainage	EDM-HY- 01	The final surface level of tower sites shall be at least 0.5 m above the existing ground level and shall be constructed in such a way as to be adequately drained to prevent washouts and flooding impacts to adjacent properties.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
		EDM-HY- 02	Junctions between new tracks and existing roads shall not impede or damage the latter nor any associated drainage channels, irrigation infrastructure, etc.).	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
	Water Quality	C-HY-01	Concrete batching (if required) will be sited at least 50m away from sensitive receptors such as watercourses; wash pits to be lined with an impermeable liner.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	No cost
		C-HY-02	Treated wastewater will be used for damping down road surfaces to mitigate dust generation.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	No cost

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		C-HY-03	Domestic sewage from camps will be stored and transported to water treatment works or treated through a dedicated site sewage water treatment plant before discharge to ground or surface water.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
		C-HY-04	All wastewater discharges will be in compliance with the national standards (MPDs).	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
		C-HY-05	Construction camps will be located at least 200m from water courses.	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to approve camp locations	No cost
		C-HY-06	All mobile plant will be kept at least 10m distant from surface water and any groundwater wells	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	No cost
		C-HY-07	Drip trays will be placed below all mobile generators	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake daily site inspections	Part of general Construction Phase costs
		C-HY-08	Potable water will be supplied that meets national drinking water standards and ISO 10500 drinking water parameters (full suite). If this is unavailable, ensure regular supply of bottled water to the site during construction and operational phases	OHS Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review water quality results or water supply on a routine basis	Part of general Construction Phase costs

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	Water Use	C-HY-09	The prior agreement of local communities to use their local piped water either temporarily during construction or permanently for substations will need to be obtained	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review agreements periodically	Part of general Construction Phase costs
		C-HY-11	No groundwater will be used in districts without additional groundwater capacity – in other districts groundwater will not be used without the agreement of local communities	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Erosion	EDM-SG- 01	Access roads shall not be cut into a hillside immediately below a tower.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		EDM-SG- 02	Plans for access roads in steep terrain will be submitted to the PIC for approval.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review and approve plans	No cost
Soils and Geology		EDM-SG- 03	Stability of slopes over 30% shall be checked and approved by the PIC prior to selection of foundation to be used.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review and approve slopes	No cost
		EDM-SG- 04	Access roads will be graded and sloped to prevent unnecessary flow of water across the tower sites and to minimize soil erosion.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		EDM-SO- 05	New earth access tracks shall be suitably compacted	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

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		EDM-SG- 06	Tower sites will be sloped as necessary to prevent erosion	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		EDM-SG- 07	Natural flows will be diverted around the site and the site protected by grading, placing rip- rap, or other erosion control measures	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		EDM-SG- 08	The foundation for the substation structures, transformer pads, cable trenches, rails, and other equipment will be constructed in accordance with the approved detailed design	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-02	Upon completion of subsoil and topsoil reinstatement, the Contractor and PIC will inspect disturbed areas jointly for signs of erosion, slope stability, relief, topographic diversity, acceptable surface water drainage capacity and function, and compaction and implement remedial measures, if necessary	Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-03	Schedule works during the dry season where practical to minimize any exposed areas subject to erosion by surface water runoff	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-04	Rehabilitate any disturbed areas beyond footprint of the alignment to at least original condition through revegetation using native species	Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

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		C-SG-11	To avoid compaction impacts outside the cleared areas, i.e. pad sites, vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency)	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-12	Temporary erosion control measures will be developed and implemented after initial land disturbance and if construction activity on the working areas is suspended over the winter before reinstatement has been completed	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) undertake routine monitoring	Part of general Construction Phase costs
	Topsoil	C-SG-13	On completion of works, stockpiled topsoil will be spread over the surface of disturbed work areas	Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
-		C-SG-14	Once the topsoil has been replaced it will be stone picked to remove any large stones which are not in keeping with the surrounding soil texture	Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-15	Revegetation of the soils will follow using native seed mixes	Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-16	If topsoil is stored for more than six months, the stacks will be monitored for anaerobic conditions and manual aeration	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

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			will be undertaken if they develop.				
		C-SG-17	Stored subsoil and topsoil will be segregated in a manner that avoids mixing.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-18	Topsoil stacks will be free draining. Topsoil will be stored outside the running track used by construction plant, equipment and vehicles.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-19	Soil storage areas will be protected from vehicle movements to avoid soil compaction.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-20	Excavation will be limited to within the agreed corridor of impact, ideally road reserve	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-SG-21	Infertile and rocky material will where possible be reused as fill material around tower foundations and substation foundations. If it needs to be taken off site it will be disposed by licensed waste management operator at designated disposal area suitable for accepting inert wastes	Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Soil Contamination	C-SG-22	The storage of hazardous materials will be restricted to designated impermeable hazardous materials storage areas located at least 50m from	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			any surface water course or seasonal water channel.				
		C-SG-23	A refueling procedure will be developed, which will include a restriction on refueling within 50m of any watercourse.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review procedure and undertake routine monitoring	Part of general Construction Phase costs
		C-SG-24	All material safety data sheets (MSDS) are kept on site with the relevant materials.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-SG-25	Materials that can potentially react with each other will be segregated during storage.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-SG-26	Procedures will be established to determine acceptability of material storage and to promote the minimization of storage volumes.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-27	Hazardous chemicals will be securely stored on site in a designated storage area.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-28	Relevant personnel will be trained in safe use and handling of hazardous materials.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

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		C-SG-29	Diesel storage tanks at construction camps will be located in suitably sized and constructed bunded areas that are designed to be impervious to water and fuel. The bund volume will be designed to no less than 110% of the tank volume. Loading and off-loading connections will be located over secondary containment.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-30	Regular inspections and maintenance will be carried out of secondary containment areas at camps to confirm that they are functioning effectively.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-31	Information will be incorporated into the Site induction process and will outline the role of personnel in the management of waste and emissions from site and spill response procedures.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-32	Site induction training will be supplemented by regular 'toolbox' talks with relevant personnel if inspections or audits highlight failings in waste management.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-33	Spill response equipment (absorbents etc.) will be available in hazardous materials storage areas.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	250 USD per work site / assume 50 worksites at

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							any time / 12,500 USD
		C-SG-34	Relevant construction personnel will be trained in use of spill kits and disposal practices.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-35	Vehicles delivering fuel or hazardous liquids will carry appropriate spill kits to allow an initial response to any spill to be deployed.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	250 USD per vehicle / assume 50 vehicles at any time / 12,500 USD
		C-SG-36	All mobile plant (excluding vehicles) will be integrally bunded or will be equipped with a bund or drip tray which will be regularly inspected and emptied to prevent rainwater accumulating.	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-SG-37	Only state licensed borrow pits will be allowed for use.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review licenses	Part of general Construction Phase costs
	Borrow Pits	orrow Pits C-SG-38	Provide copies of the borrow pit operator's license and permit prior to the PIC before any materials from the borrow pit are delivered to site.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review data	No cost
	Contamination from Substations	C-SG-39	Any soils within work sites that are identified as contaminated shall be removed and disposed of as hazardous materials per any contaminated land management plan	SEMP Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

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(a	Contamination at AGMK	Contamination t AGMK C-SG-40	for all works within 50m of the AGMK EPC Contractors staff will be provided with PPE, including disposable face masks, eye protection and disposable gloves	OHS Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
			Staff will be provided with toolbox training every day before the start of works in these areas warning staff of the hazards of working in these areas and the need for constant application of PPE	OHS Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
			Watering of excavated areas shall be performed daily during works to limit exposure to wind- blown dust	OHS Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-01	Keep within the designated footprint of the set-out work areas.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
Biodiversity		D-BIO-02a	Where possible, towers with nests should remain in-situ to continue to provide nesting sites for the Stork.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No costs
	General	D-BIO-02b	Where towers are to remain in- situ after line decommissioning nests shall remain in place.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No costs
		D-BIO-02c	Where towers will be decommissioned NEGU will engage a qualified ecologist to:	SEMP	EPC Contractor / Ecologist	PIC and NEGU PMU (through their safeguard specialist) to review findings	5,000 USD

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			• Identify all nests on towers to be removed.				
			 Monitor the nests on towers to be removed for one breeding season to determine if immature storks are "practicing" the construction of nests which they don't use later or if they are "summer nests" used only for resting and sleeping by adult storks. 				
		D-BIO-02d	Remove towers at the end of the breeding season, not before or during.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		EDM-BIO- 03	The right of way of the alignment and any additional temporary workspaces will be surveyed and set out (i.e. marked out and, where necessary, fenced off).	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-03a	Existing third-party services and sensitive receptors that need to be avoided during construction will be marked.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		EDM-BIO- 04	Vegetation will be selectively removed under or near the conductors to provide adequate electrical clearance as required by National Standards.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		EDM-BIO- 05	Camp sites shall be selected to avoid the cutting of mature vegetation.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review and approve site locations	No cost

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		EDM-BIO- 06	Following stringing and tensioning of all conductors, the guard structures will be removed, and the area restored.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake final monitoring of the restored site	Part of general Construction Phase costs
		C-BIO-06	The tower worksites shall be fenced.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-07	Vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency) to reduce unnecessary impacts to habitat.	SEMP Traffic Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-08	Sensitive habitats that need to be avoided during construction will be marked for protection with bunting.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-09	Pre-construction surveys will be undertaken along the route and at camp locations to identify any need for site or species-specific mitigation measures.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs (environmental team costs)
		C-BIO-10	Any notable species recorded prior to construction will be surveyed and translocated prior to construction if needed.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs (environmental team costs)
		C-BIO-11	Compensation planting will be undertaken to off-set the essential removal of any trees.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	To be determined based on number of trees to be cut.
		C-BIO-12	An inventory will be made of all trees felled during the Project	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard	Part of general Construction

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			construction phase, in accordance with the requirements of national legislation. Any Red Book species will be identified and protected via fencing or bunting throughout the construction phase in the specific location of works.			specialist) to undertake routine monitoring	Phase costs (environmental team costs)
		C-BIO-13	No species that are considered likely to out-compete the indigenous plant species will be used in seed mixes. No invasive species will be used in seed mixes for erosion control or bio- restoration.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-14	Inspect and wash all plant and equipment prior to shipping to the country of use with the aim of ensuring, as far as it is free from soil and plant material	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-15	Temporary works areas will be reinstated to near original condition (as compared to preconstruction survey reports or adjacent areas).	SEMP Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-16	Reinstatement will be undertaken as early as practicable and in accordance with the Reinstatement Implementation Plan.	SEMP Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-17	Recontouring should be sympathetic and in keeping with the surrounding landscape, and as approved by the Project, where this is not precluded by	SEMP Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

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			risk to integrity of the pipeline or erosion considerations.				
		C-BIO-18	The re-establishment of vegetation will be monitored following reinstatement until it has reached Project near- and long-term re-vegetation targets.	SEMP Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-19	The Project will seek to achieve an increasing trend in vegetation re-growth and species diversity (specifically species composition) in reinstated areas with reference to nearby areas undisturbed by Project activities, as recorded by the percent similarity and commonality indice,	SEMP Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-20	Any areas that have a high erosion risk will be reseeded using an appropriate seed mix	SEMP Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-21	Work training sessions relating to prevention of poaching shall be regularly implemented.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to attended sessions	Part of general Construction Phase costs (environmental team costs)
		C-BIO-22	Implementation of a strict code of conduct with regards to treatment of local fauna.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-BIO-23	Avoidance of construction activities during the nesting season near sensitive sites.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		C-BIO-24	Removal of nests from substations outside of nesting season	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs (environmental team costs)
		C-BIO-25	If trees are removed, compensation planting will be undertaken based on the number of trees to be removed and using an appropriate re-planting ratio (species and region specific).	SEMP Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	To be determined based on number of trees to be cut.
		C-BIO-26	Translocation of existing individuals may also be considered. and suitable protection will be provided to protect them from grazing	SEMP Reinstatement Implementation Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Sensitive Habitat and Designated Sites	C-BIO-27	 Construction camps shall not be located: Within 100m of any irrigation channel. Within 250m of any natural surface water course. Within any of the identified areas of natural habitat or any other sensitive habitat identified by the EPC Contractors ESO. 	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
Economy Employment and	Employment	C-EEL-01	Targets for local recruitment from the local communities will be agreed with the EPC Contractor and NEGU.	SEMP	EPC Contractor / NEGU	N/A	No cost
Livelihoods		C-EEL-02	The Project will seek to manage employment expectations by	N/A	NEGU	N/A	No cost

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			explaining the number and type of opportunities in advance to local communities via NEGU Safeguards Specialist.				
		C-EEL-03	Applications for employment will only be considered if submitted via the official application procedure.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-EEL-04	Recruitment procedures will be transparent, public and non- discriminatory and open with respect to ethnicity, religion, sexuality, disability or gender.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-EEL-05	Clear job descriptions will be provided in advance of recruitment and will explain the skills required for each post.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-EEL-06	Job vacancies will be advertised in the local communities through appropriate and accessible media.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-EEL-07	Environmental considerations will be included in the Project procurement process.	N/A	NEGU	ADB	No cost
	Procurement	C-EEL-09	Taking into account relevant commercial considerations as appropriate, the Project will seek to purchase goods and services from within Uzbekistan and will monitor such purchases.	SEMP	EPC Contractor	N/A	Part of general Construction Phase costs
	Staff conditions and Community Relations	C-EEL-10	A Company policy limiting alcohol consumption in construction camps will be applied.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		C-EEL-11	An employee Code of Conduct will be prepared and issued to all recruits and camp residents during the employee induction process.	SEMP Code of Conduct	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-EEL-12	Review measures to mitigate community health and safety impacts regularly, and consult community leaders every six months, informing them on the status of implementation and results, and discussing any changes needed to the Pollution Prevention Plan or the Community Health and Safety Plan in advance of proposed changes.	SEMP Pollution Prevention Plan Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to attend meetings	Part of general Construction Phase costs
		C-EEL-13	The Employee Code of Conduct will prohibit the workforce from participating in illegal activities, including use of illegal drugs, bribery and corruption or requesting or receiving gifts from communities.	SEMP Code of Conduct	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-EEL-15	Workforce training will include a briefing on camp rules and awareness of local social issues and sensitivities.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-EEL-16	No unauthorized access to, or use of, camp facilities will be allowed.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-EEL-17	No hunting, fishing and unauthorized gathering of products (including plants and	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			cultural heritage artefacts) by the workforce will be allowed.				
		C-EEL-18	A range of recreational facilities will be provided within the camps to reduce the need for finding recreation in the local community.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Land acquisition	C-LU-01	Implement the LARP before the commencement of construction.	LARP	NEGU	ADB	Per LARP costs
Land Acquisition and Compensation	Impacts to Agricultural Land	C-LU-02	Provide advance notice to harvest the crops and where feasible, adjust the construction schedule harvest crops; construction works shall not exceed more than one crop season at a particular stretch.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-LU-03	Saving the top-soil and restoration of land will be done by the EPC Contractor to previous use and farmers will be allowed to continue their cultivation post the construction.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-LU-04	Ensure continuous consultation with affected households and residents; the schedule of the civil works shall be consulted with the farmers to schedule irrigation supply during the irrigation season	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
Waste Management & Hazardous Materials	General	EDM-WM- 01	Construction sites, material storage yards, and access roads will be kept in an orderly condition throughout the construction period.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		EDM-WM- 02	Refuse and trash will be removed from the sites and disposed of in an approved manner (e.g., in an approved landfill).	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		EDM-WM- 03	In remote areas, trash and refuse could be removed to a construction staging area and contained temporarily until such time as it could be hauled to an approved site.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		EDM-WM- 04	No open burning of construction trash will be permitted.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No costs
		EDM-WM- 05	Contaminants such as oils, hydraulic fluids, antifreeze and fuels will not be dumped on the ground, and all spills will be cleaned up.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-WA-01	Ensure that the waste hierarchy is followed including prevention, minimization, reuse and recycling	Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-WM-03	Provide regular training of staff in waste management issues.	Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Recycling	C-WM-04	All recyclable waste (plastic, metal, paper, etc.) will be sorted on source and sent for recycling where facilities for recycling of these materials exist.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		C-WM-05	The waste management plan should set clear guidelines for the recycling of scrap metal from steel towers and conductors	Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-WM-06	Provide septic tanks for the camp sites servicing less than 150 employees. State authorized company to remove the liquid waste regularly.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-WM-07	For larger sites, provide multiple septic tank facilities, or package waste water treatment plants.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-WM-08	Collect domestic waste in containers fitted with lids to avoid attraction of scavengers, scattering around.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Domestic and	C-WM-09	Remove domestic waste to the nearest landfill under agreement with state authorized waste management companies.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review contracts	Part of general Construction Phase costs
	Inert Waste	C-WM-10	Provide garbage bins and facilities within the project site for temporary storage of domestic solid waste and construction waste.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-WM-11	Waste storage containers will be covered, tip-proof, weatherproof and scavenger proof.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		C-WM-12	Ensure that wastes are not haphazardly dumped within the project site and adjacent areas.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-WM-13	Old towers and conductors shall be removed from site for recycling or landfilling immediately following the removal of the tower. They shall not be left on private property or in any way that could be deemed a hazard to local people	Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Old Equipment	C-WM-14	Equipment from substations shall be removed from the substation prior to the competition of works and sent to an appropriately licensed waste management facility. Old equipment shall not be left at the substation after works are completed	Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-WM-17	Contaminated soils and gravels from substations will also be disposed of as hazardous waste	Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Hazardous	C-WM-18	Use containers suitable for each type of waste.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Waste	C-WM-19	Prohibit use of damaged containers. Check integrity of containers – regularly.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		C-WM-20	Mark containers adequately specifying the waste types.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-WM-21	Provide secondary containment for hazardous waste liquids.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-WM-22	Do not mix various waste streams.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-WM-23	Hire state authorized contractor for hazardous waste removal and keep agreements with hazardous waste management company's active.	SEMP Waste Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Asbestos	C-WA-26	Works on areas of existing substations which require demolition of existing structures will require a competent surveyor to complete an asbestos survey. If asbestos is present to develop an Asbestos Management Plan. Removal and disposal of asbestos will be in accordance with the management plan. Site will need to be confirmed "clean" before any works on the actual SS will be started	Pollution Prevention Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review and approve plan	Part of general Construction Phase costs (Contractors environmental team)

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
	Siting	C-NV-01	Camp sites shall not be located within 500 meters of residential or other sensitive receptors.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review and approve sites	No cost
Noise and Vibration	General	C-NV-02	Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to help minimize noise emissions.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-NV-03	During construction, work will be undertaken in daytime hours only – in accordance with WBG definitions.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-NV-04	Noise generating construction- related activities will be avoided during evenings, school hours, prayer times, religious or cultural events near the sensitive receptors	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-NV-05	Construction noise in the vicinity of houses must be limited to project standards as defined in the Project IEE	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-NV-06	If these noise levels are exceeded, the contractor will be required to implement additional noise mitigation measures such as adjusting his working methods or placing of temporary noise barriers to ensure the noise standard is met	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-NV-07	Use low noise generating equipment e.g., less than 55dBA sound pressure level at 1m	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		C-NV-08	The use of horns in areas where sensitive receptors are located (houses, schools, clinics, temples, etc.) will be prohibited	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-NV-09	Residents will be forewarned of planned activities that are considered by the Project to be noisy (e.g., excavation / drilling)	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-NV-10	If complaints are received from the local population regarding elevated noise levels, temporary noise screens shall be installed around the work site, shielding the identified receptors from the source of noise	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	I,000 USD per ten meter screen / assume I6 units / I6,000 USD
		C-NV-11	Construction workers exposure to noise should not exceed the levels set out in the General EHS Guidelines on Occupational Health and Safety otherwise the hearing protection is to be provided	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-NV-12	Mobile noise barriers will be provided around the construction zones for towers located within 250m of residential properties for the duration of construction in that location.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to ensure that if any compliants are received noise monitoring is undertaken.	As above
		C-NV-13	Where rock is encountered, the holes for tower footings shall preferably be drilled, but where blasting is to be resorted to as an economy measure, it shall be done with the utmost care to	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			minimize the use of concrete for				
			filling the blasted area				
		C-NV-14	EPC Contractor to avoid soil compaction, piling, blasting and other vibration inducing activities as much as possible; in locations where this is unavoidable Contractor to identify properties within the zone of influence and undertake pre- construction structural surveys to identify level of risk	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs (Contractors environmental team costs)
			If risk of structural damage to properties identified due to	SEMP		PIC and NEGU PMU	Part of general Construction
		C-NV-15	alternative construction method or temporary relocation of occupants during works if at risk	Community Health and Safety Plan	EPC Contractor	specialist) to undertake routine monitoring	Phase costs
		C-NV-16	Consider need to install monitors during construction to monitor structural movement. Structural or cosmetic damage to be repaired by Contractor to at least pre-project condition at their own cost	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	5,000 per monitoring unit
		C-NV-17	Where rock is encountered, the holes for tower footings shall preferably be drilled, but where blasting is to be resorted to as an economy measure, it shall be done with the utmost care to minimize the use of concrete for filling the blasted area	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
Physical Cultural Heritage	Chance Finds	C-PCR-01	In the event of any chance finds during the construction works procedures shall apply that are	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist)	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			governed by GoU legislation and guidelines.	Chance Find Procedure			
		C-PCR-02	A chance finds procedure shall also be developed by the EPC Contractor.	SEMP Chance Find Procedure	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist)	Part of general Construction Phase costs
Utilities and Infrastructure		EDM-IU-01	A record will be made of the condition of access roads, construction camps, laydown areas and rail offloading areas before construction to inform the reinstatement works.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		EDM-IU-02	Existing paved and unpaved roads will be used for the initial transportation of materials and equipment from the staging and storage areas to locations where they will be needed along the transmission line right-of-way	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Access	EDM-IU-03	If any new access roads are required the EPC Contractor shall do what is necessary to make the access suitable for his use and shall take all reasonable precautions to avoid damage, including, if required the erection of temporary fences or gates where permanent fences, hedges or gates have been removed	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-IU-01	Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions at least 72 hours before the disruptions.	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		C-IU-02	Allow for adequate traffic flow around construction areas via diversions or temporary access roads.	SEMP Traffic Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-IU-03	If temporary access roads are to be constructed with a gravel surface, they will be routinely watered by during dry weather to reduce dust impacts.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-IU-04	Provide adequate traffic signs, appropriate lighting, well- designed traffic safety signs, barriers and flag persons for traffic control.	SEMP Traffic Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-IU-05	The authorities will be notified when oversize heavy loads need to be transported and the loads will be escorted by the Project.	SEMP Traffic Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-IU-06	All electricity and gas supply networks in the Project area will be kept operational, particularly during the winter months.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Utilities	C-IU-07	Liaise with the relevant utilities operators to ensure they remain operational.	SEMP	EPC Contractor	N/A	Part of general Construction Phase costs
		C-IU-08	Should utilities need relocating in a different location consult with the relevant utilities and local community to ensure that there is no change in supply as a result of these changes	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
Workers' Rights and OHS	Safety and Training	C-OHS-01	All workmen will be required to attend a safety induction course	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			before they are allowed access to the work site.	Occupational Health and Safety Plan		specialist) to undertake routine monitoring	
		C-OHS-02	Periodic Safety Training Courses: Periodic safety course will be conducted not less than once every two months.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-03	Regular safety meetings will be conducted on a monthly basis.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-04	Regularly inspect, test and maintain all safety equipment (including firefighting equipment), scaffolds, guardrails, working platforms, hoists, ladders and other means of access, lifting, lighting, signing and guarding equipment.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-05	Lights and signs will be kept clear of obstructions and legible to read.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-06	Equipment, which is damaged, dirty, incorrectly positioned or not in working order, will be repaired or replaced immediately.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-07	Workers will be provided (before they commence works) with of appropriate PPE suitable for electrical work such as safety boots, harnesses, helmets,	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			gloves, protective clothes, goggles, and ear protection at no cost to the workers.				
		C-OHS-08	All construction plant and equipment used on or around the Site will be fitted with appropriate safety devices.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-09	Zones with noise level above 80 dBA must be marked with safety signs and appropriate PPE must be worn by workers.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-10	Portable toilet facilities for workers at road work sites will be provided.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	General OHS	C-OHS-11	Fencing on all areas of excavation greater than 2 m deep will be installed along with warning signs.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-12	Ensure sufficient fresh air supply to confined work spaces.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-13	Keep air inlet filters clean and free of dust and microorganisms.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-14	Ensure reversing signals are installed on all construction vehicles.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard	Part of general Construction Phase costs

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				Occupational Health and Safety Plan		specialist) to undertake routine monitoring	
		C-OHS-15	Implement fall prevention and protection measures whenever a worker is exposed to the hazard of falling more than two meters, falling into operating machinery or through an opening in a work surface.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-16	Mark the areas where risk of injuries from falling objects exist with rope or flagging to minimize risks and injuries.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-17	Provide spotters. Employ flag persons to control traffic when construction equipment is entering or leaving the work area.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-18	A suitably staffed and equipped health clinic for all workers is to be provided on site.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-19	First aid kits (compliant with OSHA standard 1910.266 App. A) will be provided at all work sites.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	100 USD per kit / 50 pieces / 5,000 USD
		C-OHS-20	The Contractor shall keep a log of both training records and safety incidents including near misses.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

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		C-OHS-21	Only allow trained and certified workers to install, maintain, or repair electrical equipment.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-22	Deactivate and properly ground live power distribution lines before work is performed on, or in close proximity, to the lines.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-23	Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Live Power Lines	C-OHS-24	 Workers should not approach an exposed energized or conductive part even if properly trained unless: The worker is properly insulated from the energized part with gloves or other approved insulation; or, The energized part is properly insulated from the worker and any other conductive object; or, the worker is properly isolated and insulated from any other conductive object (live-line work). 	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
			Where maintenance and operation are required within minimum setback distances,	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard	Part of general Construction Phase costs
Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
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			specific training, safety measures, personal safety devices, and other precautions should be defined in an OHS safety plan.	Occupational Health and Safety Plan		specialist) to undertake routine monitoring	
		C-OHS-25	Test structures for integrity prior to undertaking work	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-26	Implement a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall- arrested workers, among others.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Working at Height	C-OHS-28	Establishment of criteria for use of 100% fall protection system.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-29	Installation of fixtures on tower components to facilitate the use of fall protection systems.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-30	Provision of an adequate work- positioning device system for workers. Connectors on positioning systems should be compatible with the tower components to which they are attached.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		C-OHS-31	Hoisting equipment should be properly rated and maintained, and hoist operators properly trained.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-32	Safety belts should be of not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-33	When operating power tools at height, workers should use a second (backup) safety strap	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-34	Signs and other obstructions should be removed from poles or structures prior to undertaking work.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-35	An approved tool bag should be used for raising or lowering tools or materials to workers on structures	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Workers'	C-OHS-36	Set targets for local employment based on initial assessment of the labor market for unskilled and semi-skilled work force.	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review targets	No cost
	Nghils	C-OHS-37	For unskilled use a 'ballot' system to ensure that employment is fair and not weighted to connected people for unskilled roles.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			Repatriation of locals through recruitment measures will use online resources.				
		C-OHS-38	Provisions in the EPC Contractors contract are to include as far as practicable items to address the collective bargaining, retrenchment, worker accommodation and non-employee worker gaps, to ensure that ILO and Lender requirements are met.	SEMP Occupational Health and Safety Plan	NEGU	PIC and NEGU PMU (through their safeguard specialist) to review	No cost
		C-OHS-39	All employees will receive at least the minimum wage as defined by Uzbek legislation.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-40	All workers will have contracts describing their job description and conditions of work and will have the contents explained to them.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-41	All Project sub-contractors will be supplied with copies of the SEMP.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Sub- contractors	C-OHS-42	Provisions will be incorporated into all sub-contracts to ensure the compliance with the SEMP at all tiers of the sub-contracting.	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review contracts	No cost
		C-OHS-44	All subcontractors will be required to appoint a safety representative who will be available on the Site throughout the operational period of the respective sub-contract unless	SEMP	EPC Contractor / Sub-contractors	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			the PICs approval to the contrary is given in writing.				
		C-OHS-45	Contractor to conduct their own trainings for their construction management and provide all workers and visitors on site, irrespective of them being formally or informally employed by the contractor, subcontractor or third party with an EHS induction before being allowed on site – induction to cover orientation on EHS requirements	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Training	C-OHS-46	Ensure topics covered by training and induction include, but are not limited to, good housekeeping at all times; environmentally safe and sound waste management practices; hygiene and communicable disease prevention including COVID-19 and HIV/AIDS; gender-based violence and sexual exploitation, abuse and harassment prevention; code of conduct, interaction with local communities and culturally acceptable practices; biodiversity conservation awareness; fire safety prevention; prohibition on trapping, hunting, fishing, or poaching by workers; chance find procedures; H&S including use of PPE; etc	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		C-OHS-47	Suggestion boxes to be provided for construction workers at construction site offices and at employer provided staff accommodation	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-48	Prepare with guidance of labor experts a worker Code of Conduct and information video/brochure/leaflet for distribution to all workers during induction addressing culturally acceptable practices etc.	Code of Conduct	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review and approve document	Part of general Construction Phase costs
		C-OHS-49	Zero tolerance of illegal and unacceptable activities/behavior, including but not limited to engagement in: prostitution; gender-based violence/sexual exploitation, abuse, and harassment; illegal sale or purchase of alcohol; sale, purchase, or consumption of drugs; gambling; fighting	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		С-ОНS-50	Conduct daily toolbox talks on pertinent topics related to the day's work and weekly training on occupational health and safety for all construction workers including refreshers. To include training for subcontractors before commencement of works	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-51	Ensure workers with a specific role have attended specialized health and safety trainings related that role e.g., health and safety stewards, first aiders, fire safety officers, as well as ensuring	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			workers have received task- specific trainings for working at height, demolition, working with electricity, etc				
		C-OHS-52	Only allow suitably trained and qualified workers to work on electrical equipment and at height, these workers must have training record of attending suitable training course on electrical safety and working at height and be provided with and wear the appropriate PPE for their role	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-53	Untrained workers must not be permitted to work with live electricity or to work at height	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	No cost
		C-OHS-54	Conduct monthly training involving all workers on emergency preparedness and response procedures (drills) in case of an occupational or community health and safety incident during construction works including fire, natural disaster, disease outbreak etc. To include training for subcontractors before commencement of works	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-OHS-55	Conduct daily toolbox talks on pertinent topics related to the day's work and weekly training on occupational health and safety for all construction workers	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			including refreshers. To include training for subcontractors before commencement of works				
		C-OHS-56	Ensure workers with a specific role have attended specialized health and safety trainings related that role e.g., health and safety stewards, first aiders, fire safety officers, as well as ensuring workers have received task- specific trainings for working at height, demolition, working with electricity, etc	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Grievances	C-OHS-57	The EPC Contractor shall establish a formal Grievance Mechanism for workers and carry out awareness raising amongst formally and informally employed workers including those of sub-contractors about the GRM at the start of their employment, including details of how to submit a grievance to PMU and/or the EPC Contractor. GRM will be available to all workers for receiving and handling complaints about unfair treatment or unsafe living or working conditions, ensuring no coercion nor reprisal	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to review and approve GRM	Part of general Construction Phase costs
	Fatalities	C-OHS-58	In the event of any fatality occurring during the construction phase at any Project work site, provide ADB with the details of the fatality	SEMP Occupational Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			within one day of the event occurring in a Fatality Report				
	Guard Structures	EDM-CHS- 01	During wire installation, guard structures will be erected over highways, railroads, power lines, structures, and other barriers	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		EDM-CHS- 02	Guard structures may not be required for small roads. In such cases other safety measures such as barriers, flagmen, or other traffic control will be used.	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Grievances	C-CHS-01	Implement the Grievance Procedure to provide opportunity for local residents to raise concerns	SEMP Community Health and Safety Plan	EPC Contractor / NEGU	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
Community Health and Safety	Standards and Safety Codes	C-CHS-02	Ensure that all Project infrastructure are constructed in accordance with national safety codes.	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-CHS-03	Fence and sign immediate working area to prevent public access during construction works	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Hazardous Work Sites	C-CHS-03a	Do not leave hazardous conditions (e.g., unlit open excavations without means of escape) overnight unless no access by public can be ensured	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-CHS-04	All Project infrastructure will be labeled / signposted in accordance with national regulations to inform the public	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			of the specific safety risks of each item	Community Health and Safety Plan			
		C-CHS-05	All work sites will be appropriately signposted and isolated (through fencing or bunting) to prevent encroachment into these areas	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-CHS-06	Consult with local communities every six months, informing them on the status of implementation and results.	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to attend meetings	Part of general Construction Phase costs
		C-CHS-07	Deliver safety awareness training to, local children and their parents and/or their teachers.	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to attend training	Part of general Construction Phase costs
	Community Liaison	C-CHS-08	Tower worksites and any additional temporary workspaces will be surveyed and set out (i.e. marked out and, where necessary, fenced off). The contractor will be required to keep within the designated footprint.	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-CHS-09	Construction traffic warning signs will be positioned at road crossings and other appropriate locations as determined by the Project, for example along access routes before they are used by construction traffic.	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Traffic Accidents	C-CHS-10	A strict Project speed limit of 30km/hr will be enforced for	SEMP	EPC Contractor	PIC and NEGU PMU (through their safeguard	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
			Project vehicles using unmade tracks.	Traffic Management Plan		specialist) to undertake routine monitoring	
		C-CHS-11	Temporary traffic control measures will be employed at road crossings and junctions (flagmen, temporary traffic lights) where a safety risk assessment has identified traffic control measures will reduce the risk of traffic accidents.	SEMP Traffic Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-CHS-12	Random drug and alcohol testing of the workforce will be conducted, recorded and audited regularly.	SEMP Traffic Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-CHS-13	At sensitive locations where traffic will be using local roads, and particularly where schools and markets are close to the road, awareness of safety issues will be raised through village meetings and classroom lessons.	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-CHS-14	Temporary traffic control (e.g. flagmen) and signs will be provided where necessary to improve safety and provide directions	SEMP Traffic Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-CHS-15	Where traffic is diverted around crossings, traffic control or careful selection of the exit from the working areas will be provided with the aim of ensuring vehicles join the road in a safe manner.	SEMP Traffic Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		C-CHS-16	Night-time driving will be by exception only, as approved by the PIC, to minimize driving risk and disturbance to communities.	SEMP Traffic Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-CHS-17	People will be actively discouraged from using Project access roads unless deemed necessary to reach homes or other important sites.	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-CHS-18	Vehicle movements will be restricted to defined access routes and demarcated working areas.	SEMP Traffic Management Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
		C-CHS-19	The Project will implement the 'Voluntary Principles on Security and Human Rights'	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Conflict with Security Personnel	C-CHS-20	During construction, due diligence will be applied to selection of security providers, rules of engagement will be devised, and training provided to all personnel. Performance will be monitored and audited periodically.	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
	Sexually Transmitted Disease	C-CHS-21	A worker education and awareness program regarding the risks and prevention measures associated with STDs including HIV/AIDS and other communicable diseases will be implemented.	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to attend meetings	Part of general Construction Phase costs

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Monitoring Responsibility	Cost
		C-CHS-22	The Project will make information on communicable diseases and STDs available to communities' close to the camps	SEMP Community Health and Safety Plan	EPC Contractor	PIC and NEGU PMU (through their safeguard specialist) to undertake routine monitoring	Part of general Construction Phase costs
Total							56,000

Table 63: Operational Phase EMP

Торіс	Impact / Issue	Mitigation Ref. #	Commitment	Management Plan	Implementation Responsibility	Cost (USD)
Corrective Actions	General environmental, health and safety at substations	CAP-01 to CAP-12, CAP13 to CAP 14 & CAP 16-19	Per the CAP (Table 23)	САР	NEGU	11,500
SF6	Substations CAP 10-17 Substations CAP 10-17 Management and use of SF6 O-AQ-01 New equipment designed and operated so that any leakage will trigger an alarm at the nearest concerned staffed substation requiring O&M staff to rectify the situation immediately		N/A	NEGU	Part of construction costs	
		O-AQ-01	SF_6 in fire extinguishers provided at substations to be avoided	N/A	NEGU	Part of NEGU operational costs
Revegetation	Replanting of trees and revegetation of disturbed areas	O-BIO-01	Continued monitoring of planted trees and revegetated areas. Where any trees are dying or where revegetation has not been successful, plant replant saplings and revegetate exposed slopes.	N/A	NEGU	Part of NEGU operational costs
Soils	Spills and Leaks from	O-SG-01	Prepare a Spill Prevention Control and Countermeasures Plan (SPCC)	SPCC	NEGU / PIC	Part of PIC general costs
20112	substation equipment	O-SG-02	Follow the measures recommend for control and response and disposal per IEEE Guidelines	SPCC	NEGU	Part of NEGU operational costs
Waste Management	General waste management	O-WM-01	Ensure waste management and disposal in line with national waste management regulations	N/A	NEGU	Part of NEGU operational costs

	Substation OHS	O-OHS-01	Provide fully stocked, in-date first aid kit installed in a prominent, signed position, first aid posters and emergency contacts to also be displayed	N/A	NEGU	Part of NEGU operational costs	
		O-OHS-02	Provide eye wash station and water supply to shower located near storage areas for fuel/oil/chemicals	N/A	NEGU	1,000	
		O-OHS-03	Provide sand buckets, full of sand, placed in a prominent, signed location near to fire-risk locations such as transformers and oil storage areas	N/A	NEGU	Part of NEGU operational costs	
Occupational Health and Safety		Subsection	O-OHS-04	Provide fire extinguishers (including for oil and electric fires) in a prominent, signed location near to fire-risk locations such as transformers and oil storage areas with service and expiration dates clearly labelled along with posters on fire safety	N/A	NEGU	Part of NEGU operational costs
		O-OHS-05	All electrical hazards will feature written and visual warning signs that meet the IEEE standards to include the ISO 7010 "Hazard Type: Electrical Symbol" warning of the risk of electrocution	N/A	NEGU	Part of NEGU operational costs	
			O-OHS-06	Design to ensure all lighting is of energy efficient LED type with solar powered LED lighting where practical Use of fluorescent/HPSV lamps will be avoided since they are less energy efficient/classed as hazardous waste for purposes of disposal	N/A	NEGU	Part of NEGU operational costs
		O-OHS-07	Outdoor lighting to be installed must be of low intensity with little or no blue wavelength and operated using passive infrared (PIR) technology movement sensors set at person height so as not to be kept permanently on overnight, it must be directional and shielded, so light does not fall outside substation boundaries	N/A	NEGU	Part of NEGU operational costs	
	EMF	O-OHS-08	Electric utility workers typically have a higher exposure to EMF than the general public due to working in proximity to	EMF Safety Program	NEGU / PIC	Part of PIC general costs	

			electric power lines. Occupational EMF exposure will be prevented or minimized through the preparation and implementation of an EMF safety program based on WBG guideline			
	General OHS	O-OHS-09	All other occupational health and safety will be managed according to national regulations during the operational phase of the Project	N/A	NEGU	Part of NEGU operational costs
	Training	O-OHS-10	Long-term program of OHS training by International OHS specialists.	N/A	NEGU	75,000
Community Health and Safety	General community safety	O-CHS-01	Provide education / public outreach to prevent public contact with potentially dangerous equipment.	N/A	NEGU	Part of NEGU operational costs
Total						77,500

10.3. Environmental Monitoring

- 611. Three types of monitoring are proposed for the Project:
- <u>Observational</u> involving routine site inspections in the field by both the EPC Contractor and the PIC. The Construction Phase EMP sets out the requirements for observational monitoring for each mitigation measures
- <u>Review and Approval</u> This desk-based exercise ensures that all management plans, method statements, permits and designs are reviewed and approved by PIC and PMU before, and during works. The Design Phase and Construction Phase EMPs set out the requirements for this activity.
- <u>Instrumental</u> Requirements for instrumental monitoring, and their costs are provided in Section 8.

10.4. Specific EMP (SEMP)

612. The SEMP is the document that the EPC Contractor will prepare outlining how he intends to implement the EMPs and ensure that all of the mitigation and monitoring is completed according to the implementation arrangements specified in the EMPs and the IEE as a whole.

613. The SEMP will describe the precise location of the required mitigation / monitoring, the persons responsible for the mitigation / monitoring, the schedule and reporting methodology. The SEMP and all of its topic and site-specific plans will be submitted to the PIC and PMU for approval at least 30 days before taking possession of any work site. No access to the site will be allowed until the SEMPs are approved by the PIC and PMU. New topic specific or site specific EMPs may also need to be developed by the EPC Contractor during the construction phase. These new plans will also need to be approved by the PIC and the PMU.

Table 64: SEMP Topic Specific Plans						
	Approv	Approvals				
Plan (EMP Ref. #)	NEGU PMU	PIC				
Pollution Prevention Plan (C-SEMP-02)	Yes	Yes				
Occupational Health and Safety Plan (C-SEMP-06)	Yes	Yes				
Community Health and Safety Plan (C-SEMP-07)	Yes	Yes				
Reinstatement Implementation Plan (C-SEMP-04)	Yes	Yes				
Waste Management Plan (C-SEMP-10)	Yes	Yes				
Traffic Management Plan (C-SEMP-05)	Yes	Yes				

614. The SEMP will include the following topic specific plans:

Table 65: SEMP Site Specific Plans

Plan (EMP Ref. #)	Approvals		
	PMU	PIC	
Construction Camp Management Plan (C-SEMP-09)	Yes	Yes	

615. Guidelines for the preparation of a SEMP is provided in Appendix N.

616. In addition to the plans provided in the SEMP, the EPC Contractor will also be responsible for the following documents:

- Code of Conduct.
- Chance Find Procedure.

10.5. Bid Documents

617. The Bid Documents for the potential EPC Contractors will contain two sections relating to environmental issues, firstly a basic clause indicating that the EPC Contractor will be responsible for following the requirements of the EMPs and that he should prepare his own SEMP for the Project. Secondly, the EMPs will be repeated in its entirety as an Annex to the Bid Documents so as the bidder is aware of his environmental requirements under the Project and help him put environmental costs to his proposal. Environmental cost items will be included in the Bill of Quantities.

10.6. Contract Documents

618. The Contract Documents will follow a broadly similar pattern to the Bid Documents. It is not considered necessary to repeat the mitigation measures verbatim in a list of environmental contract provisions, rather the Contract will specify that the EPC Contractor is responsible for implementation of the EMPs via his SEMP. Again, the EMPs will be included as an Annex to the Contract so the EPC Contractor will be liable for any non-conformance with the EMPs, and thereby this IEE.

10.7. Implementation arrangements

619. The Project Management Unit (PMU) of NEGU will be responsible for ensuring correct implementation of the Environmental Management Plan (EMP) and the EPC Contractors SEMP to comply with ADB's safeguards requirements and environmental national regulations.

620. For this, the PMU will hire national safeguard consultants. The PMU will be assisted by the environmental specialists of the PIC in supervising the implementation of EMP / SEMP.

621. The cost for implementing mitigation measures as outlined in the EMP will be included in the EPC contract, and the cost for environmental instrumental monitoring and supervision will be included in the consulting service of the PIC.

622. If any change in design, unanticipated environmental or social impacts become apparent during project implementation, the PMU will be required to immediately inform ADB and (i) assess the significance of such unanticipated impacts; (ii) evaluate the options available to address them through a Corrective Action Plan (CAP); and (iii) update the IEE and EMP. ADB helps NEGU mobilize the resources required to mitigate any adverse unanticipated impacts or damage.

10.7.1. NEGU

623. NEGU is responsible for

• Preparing PZVOS, ZVOS and ZEP (Uzbekistan EIA) and obtaining approval from Glavgosexpertiza prior to the commencement of the construction.

I0.7.2. NEGU PMU

624. NEGU PMU is responsible for supervising the PIC, EPC Contractor and EMP implementation for overall compliance with ADBs SPS (2009) requirements and project environment-related legal covenants. The PMU's responsibilities include the following, but not limited to:

- Implement and update the EMP developed within the IEE (if required);
- Ensure the bidding documents of PIC and EPC Contractor include all tasks as described in the approved EMP;

- Obtaining all necessary government permits and license, including ecological expertise (EIA), for all civil works;
- Approving SEMPs which will be prepared by the EPC Contractor and endorsed by the PIC;
- Preparing and submitting semi-annual environmental monitoring reports to NEGU and ADB for disclosure on their websites;
- Reporting to ADB of any non-compliance or breaches with ADB safeguard requirements in a timely manner and take corrective actions promptly;
- Updating the IEE in case of technical design changes or unanticipated impacts;
- Establishing a Grievance Redress Mechanism (GRM) after the project effectivity and acting as the GRM secretary to make sure that the GRM is operational to effectively handle environmental and social concerns of project affected persons, and
- Building up and sustaining institutional capacity in environmental management, health and safety, including conducting public awareness programs.

625. A review of the environmental and social capacity of NEGU was undertaken as part of this assessment. The review found that there is limited capacity within the organization to undertake the tasks listed above. There is one existing Safeguard Specialist in the organization who manages donor funded Projects. Accordingly, it is recommended that a training program for the NEGU safeguard specialist is prepared by the PIC.

10.7.3. EPC Contractor

626. The EPC Contractor (or Contractors) will be responsible for the preparation of his SEMP. The SEMP will need to be fully compliant with the EMPs and this IEE and will need to be prepared within 30 days of Contract award and approved 10 days prior to access to the site.

627. To prepare and implement the SEMP (and the operational EMP during the defects liability period) a team of Specialists will be required as illustrated in the following figure and described in detail below.





Environmental and Social Officer

628. During construction, the EPC Contractor must retain the expertise of an Environmental and Social Officer (ESO) to implement and continually update the SEMP and to oversee and report on the operation throughout the contract period. The ESO will be the EPC Contractors main focal point for all environmental, social, health and safety and cultural heritage issues associated with the Project and will lead the other team members listed below.

³⁵ Due to the number of activities under this project there may be several EPC Contractors. Each EPC Contractor shall have their own Environmental, Social, Health and Safety Team.

629. The ESO will be full-time member of staff on the EPC Contractors roster and should be on site at least five days per week. The required qualifications of the ESO are as follows:

- Degree in environmental sciences and related expertise.
- Fluent in Uzbek, Russian and working knowledge of English.
- Experience of at least two construction projects of a similar size and scale.

630. One of the key tasks of the ESO will be to manage the biodiversity aspects of the Project. To do this the ESO should be well trained in (or have access to expertise in) the practical elements of protected species (including handling of species that they may have to move) and the recognition of sensitive habitats; they should also have a working understanding of wider environmental issues and the construction/engineering process. More specifically, the ESO shall be responsible for:

- Identifying any areas of particular ecological sensitivity (e.g. with protected or notable habitats or species) on the route that may need to be avoided.
- Translate mitigation requirements written in the SEMP and its sub-plans into practical measures on the ground.
- Advise in a timely manner as to how best to address changeable and less predictable situations on the ground from an ecological perspective (e.g. should new species be encountered).
- Ensure that all staff are fully aware of the environmental sensitivities of the site and their responsibilities, as outlined in the management plans (e.g. via practical toolbox talks ahead of the construction).
- Take field notes and photographs to demonstrate compliance with the management plans.

631. In addition, the ESO will be responsible for the preparation of weekly environmental checklists and an environmental section of the EPC Contractor's monthly progress reports that shall be submitted to the PIC and PMU for review. The PIC shall provide a template of the checklist to the EPC Contractor.

632. The monthly reports, which will include the weekly environmental checklists, shall contain sections relating to:

- General Progress of the Project.
- Environmental Incidents; e.g. spills of liquids, accidents, etc.
- Progress of any environmental initiatives, e.g. energy savings, recycling, etc.
- Records of any environmental monitoring.
- Conclusions and Recommendations.

633. The ESO shall provide daily toolbox training at the construction camp and also at construction sites. The ESO shall keep a record of all monthly training and toolbox training undertaken.

634. The ESO will also act as the Focal Person at the camp site for receiving and fixing grievances in the Logbook. The ESO shall also manage all social and labor related issues.

Health and Safety Specialists

635. The EPC Contractor shall also hire a qualified Health and Safety Specialist (HSS) for the Project duration. The H&S specialist shall have at least five years on-site experience of similar sized infrastructure Projects. The HSS shall report directly to the ESO. The main responsibilities of the HSS will be:

- Provide H&S training, including daily toolbox training sessions at each work site.
- Approve H&S Plans for specific work activities.

- Conduct routine site inspections and issue internal stop notices if necessary, for unsafe activities.
- Maintain H&S statistics log for near misses, as well as incidents.
- Provide H&S input to EPC Contractor reports.

Staff Costs

636. The following table provides a summary of the anticipated staff costs.

Table 66: EPC Contractor Environmental, Social, Health and Safety Staff Costs (per EPC Contractor)

#	Position	Estimated No. of Months	Month Cost (\$)	Total Cost (\$)
I	Environmental and Social Officer	24	1,500	36,000
2	Health and Safety Specialist	24	1,500	36,000

Control of Records

637. The list of records that must be available by the EPC Contractor for review must include:

- Work program and schedule;
- Environmental permits and licenses;
- List of equipment;
- List of mitigation measures;
- Route/program of construction material transportation;
- Copies of correspondence related to environmental issues;
- Site drainage plan;
- Records of maintenance and cleaning schedules for sediment and oil/grease traps;
- Records of sewage disposal (if relevant);
- Records of quantity of discharged wastewater and concentration of pollutants;
- Waste disposal records;
- Written designation of waste disposal sites and instructions for waste transportation from local authorities;
- Log of material inventories and consumption;
- Chance find records (if any);
- Complaints register;
- Incidence register (environmental limits expedience forms, injuries records, etc.);
- Records on remedial actions taken;
- Equipment control and maintenance log;
- Corrective and preventive action request records;
- Training records.

638. These records shall be kept on-site by the EPC Contractors ESO and available for inspection at any time.

639. The EPC Contractor will also appoint a Focal Person at the camp site as well for receiving and fixing grievances in Logbook. It is recommended that the ESO fulfil this responsibility.

10.7.4. PIC

640. The PIC will ensure the correct implementation of the Project's EMP, and all related documents.

Prior to commencement of the works

641. The PIC shall be responsible for the following:

- Organize a training program for PMU staff (specifically the Safeguard Specialist) on how the environmental aspects of the project will be monitored, giving emphasis on SEMP evaluation; compliance monitoring of construction activities and preparation of corresponding reports; supervision responsibilities and interaction with contractors; and documentation, resolution and reporting of non-compliance issues and complaints;
- Provide guidance to the PMU Safeguard Specialist on the environmental and social aspects of the project with emphasis on compliance monitoring and reporting;
- Preparing Bird Marker Reports and reviewing and approving all EPC Contractor designs relating to bird mitigation and management;
- Assist the PMU with establishing and operating the grievance redress mechanism, including creating a grievance chart which is to be updated on a weekly basis;
- Evaluate the environmental aspects of the EPC Contractors' method statements and working drawings and recommend corrective actions needed, if any, to ensure compliance with the project's environmental and social requirements;
- Review the EPC Contractors' SEMP and all topic specific (such as waste) and site-specific plans; recommend modifications to these documents to be compliant with: (a) the environmental and social requirements of the construction contracts as reflected in the EMP, and (b) the conditions of environmental approvals of the Government, if required;
- Develop the compliance monitoring system to be used during the construction period for monitoring the contractors' performance relative to environmental requirements, including the preparation of: (a) monitoring and corrective action forms and checklists, (b) inspection procedures, and (c) documentation procedures;
- Conduct orientation sessions with the EPC Contractor on the compliance monitoring system to be used, notification of non-compliance, and the process of requiring contractors to implement corrective measures when necessary; and
- Provide guidance to the EPC Contractor on how their respective SEMP will be implemented including the: (a) requirements for each mitigation measure, and (b) implementation schedule of each mitigation measure taking into consideration the general requirement that no specific construction activity will be approved to be commenced if the associated mitigation measures for such activity are not ready before work commences.

During implementation of the works

642. The PIC shall be responsible for the following:

• Supervise the implementation of the SEMPs and its relevant topic and site specific EMPs;

- Evaluate the EPC Contractors' submitted works activities and schedules relative to the requirements of the approved SEMP;
- Undertake monthly inspection, monitoring and reporting of construction sites and all construction-related facilities to assess the EPC Contractors' compliance with the SEMP and the Project EMP.
- Require the EPC Contractors to update their respective SEMP when necessary;
- Monitor the EPC Contractors' compliance with health and safety, and labor requirements of the project as stipulated in the contract documents and their approved health and safety, and labor plans (including the outcome of labor audits), and require the EPC Contractor to provide updated plans when necessary;
- Record non-conformance cases, inform EPC Contractor of improvements needed, respond to EPC Contractors' proposals, prepare corrective action plans for EPC Contractor, and monitor their implementation;
- Assess and approve use of temporary construction areas identified during construction such as camps, laydown areas, access roads, etc.;
- Include environmental and social monitoring in monthly monitoring reports for submission to the PMU; and
- Draft semi-annual environmental safeguard monitoring reports, as required by ADB;

Upon completion of the works

643. The PIC shall prepare a report on the Project's environmental and social compliance performance, including lessons learned that may help PMU in their environmental monitoring of future projects. The report will be an input to the overall project completion report.

644. The PIC should retain the use of a team of environmental, social and health and safety specialists as shown in the figure below to provide oversight of the EPC Contractors environmental performance as outlined above. Terms of reference for the specialists is provided below.





*International in Green, National in Blue

International Environmental (IES)

645. The IES will prepare a detailed action plan including environmental monitoring checklists to be completed by the NES. He/she will work closely with the EPC Contractors ESO and work on general environment focused tasks such as conducting environmental training and briefings to provide

environmental awareness on ADB and the government environmental safeguards policies, requirements and standard operating procedures in conformity with the government's regulations and international practice for project and PMU Safeguards staff; ensure baseline monitoring and reporting of EPC Contractor's compliance with contractual environmental mitigation measures during the construction phase.

646. Qualified with a degree or diploma in environmental sciences or equivalent. Preferably fifteen years' experience in conducting environmental impact assessments and implementation of environment mitigation plans and/or monitoring implementation of environmental mitigation measures and health and safety plans during implementation of projects including electricity transmission projects funded by developing partners, including twelve years' international experience. Working knowledge of Uzbekistan is preferred.

National Environmental Specialist (NES)

647. Three NES will be hired by the PIC (8 months each) to provide monitoring coverage of the project which is spread across the country. He/she will (i) review all documents and reports regarding the integration of environment aspects including EPC Contractor's SEMP, (ii) supervise the EPC Contractors' compliance to EMP, and (iii) prepare monthly compliance reports.

648. Qualified with a degree in environmental sciences or equivalent. Preferably five years' experience in conducting environmental impact assessments and implementation of environment mitigation plans and/or monitoring implementation of environmental mitigation measures during implementation of projects including projects funded by developing partners.

Ornithologist

649. The IES and NES will be supported by a national ornithologist who will be responsible for ensuring that all construction activities follow the bird mitigation and management measures outlined in this report. Specifically, this includes:

- Identifying towers with nests to remain in-situ to continue to provide nesting sites for the Stork.
- Identify all nests on towers to be removed.
- Monitor the nests on towers to be removed for one breeding season to determine if immature storks are "practicing" the construction of nests which they don't use later or if they are "summer nests" used only for resting and sleeping by adult storks.
- Monitor the removal of any nests.
- Ensure designs include nest platforms for the required lines.
- Complete a seasonal survey of all lines and incorporate the findings of the surveys into designs specifically relating to the location of bird diverters on the lines.

650. The ornithologist will be engaged for an 8 month period across the construction phase. The required qualifications are as follows:

- Degree in a biodiversity related subject and related expertise.
- Fluent in Uzbek, Russian and working knowledge of English.

National Occupational Health and Safety Specialist

651. Professionally qualified specialist in all health and safety aspects of major civil works construction, preferably with 5 years of experience with projects similar to the project. The specialist will be responsible to the Team Leader for ensuring that all aspects of the project comply with the health and safety provisions of the project's civil works contracts, and with relevant Uzbek laws and regulations.

Staff Costs

652. The following table provides a summary of the anticipated staff costs.

#	Position	Estimated No. of Months	Month Cost (\$)	Total Cost (\$)			
I	National Environmental Specialist (x3)	24	1,500	36,000			
2	International Environmental Specialist	6	20,000	120,000			
3	National Occupational Health and Safety Specialist	12	1,500	18,000			
4	Ornithologist	8	1,500	12,000			

Table 67: PIC Environmental, Social, Health and Safety Staff Costs

10.8. Reporting and Review of the EMP

653. The following reporting requirements will be followed during the implementation of the Project:

	Responsible Organization	Responsible Person	Destination of the documents	Submission timing		
Documents				Feasibility study period	Construction period	Operation period
PZVOS, ZVOS, ZEP (Uzbekistan EIA)	NEGU	NEGU	SCNP	X (Once)		
ZEP			SCNP		X (Once)	
Semi-annual environmental monitoring reports	PMU	Safeguard Specialist	Regional SCNP, ADB		X (every 6 months)	X (every 6 months)
Compliance reports	PIC	ies, nes	PMU, ADB		X (every month)	
SEMPs (including OHS plan, waste management plan, etc.)	EPC Contractor	ESO	PIC, PMU		X (Once, prior to the start of construction)	
Environmental checklists			PIC		X (every week)	
Monthly progress reports			PIC		X (every month)	
Record of monthly training and daily toolbox training			PIC		X (every month)	
Review result of PZVOS, ZVOS, ZEP	SCNP	Regional officer	NEGU	x	X	

 Table 68: Required documents and submission points

654. The EMP will be reviewed periodically to evaluate environmental controls and procedures to make sure they are still applicable to the activities being carried out. Reviews will be undertaken by the EPC Contractor and PIC as follows:

- The full EMP will be reviewed at least annually;
- Relevant parts of the EMP will be reviewed following a reportable incident;
- In case any issues of failure of mitigation measure to reduce the impact occurs;
- Relevant parts of the EMP will be reviewed following the receipt of an updated site specific or topic specific plan; and
- At the request of stakeholders.

655. The review will include analysis of the data collection and analysis of data, monitoring reports, incident reports, complaints/grievances and feedback from stakeholders.

10.9. EMP Costs

656. Most costs associated with the environmental recommendations of the EMP are a normal part of preparing the bid and contract documents and ensuring that proper environmental provisions are incorporated therein. The installation of septic systems at construction camps, for example, is an environmental necessity, but not generally considered an "environmental cost". Mitigation costs have been provided in the EMP, Monitoring costs in Section 8 and corrective action costs in Section 7. The total project environmental costs are as follows:

#	Item	Cost (USD)	Note
I	Corrective Actions	36,000	Part of NEGU operational
			costs
2	Design Phase Mitigation	763,000	Part of Project loan costs
3	Construction Phase	56,000	Part of Project loan costs
	Mitigation		
4	EPC Staff Costs	108,000 (for each EPC	Part of Project loan costs
		Contractor)	
5	PIC Staff Costs	186,000	Part of Project loan costs
6	Instrumental Monitoring	25,000	Part of Project loan costs
7	Operational Costs	77,500	Part of NEGU operational
			costs
Total		1,251,500 (based on one EPC	
		Contractor)	

Table 69: Estimated Costs

II. Conclusions and Recommendations

II.I. Conclusions

657. This IEE has established that, except for the residual impacts mentioned below, there are no significant environmental issues that cannot be either totally prevented or adequately mitigated to levels acceptable to the national and international standards for Project activities.

658. The key identified residual impacts are as follows:

- Construction Phase Management of Asbestos: Until the asbestos survey and method statements are completed, there remains the possibility of impacts to workers. Residual impacts are of medium significance
- Construction Phase General construction noise Some short-term elevated noise impacts may occur in residential areas during the daytime. The use of temporary mobile noise barriers should reduce the noise levels to acceptable levels during the working day. Residual impacts will be of low significance.
- Operational Phase Bird Electrocution: The proposed mitigation measures should help reduce the potential for bird electrocutions but may not eliminate this issue. Residual impacts will be of low significance.
- Operational Phase Bird Collisions: Like electrocutions, the proposed solutions to limit bird collisions may not eliminate this issue. Residual impacts will be of low significance.
- Operational Phase Accidents involving workers: Mitigation measures proposed should help reduce the potential for accidents to occur. However, based on the experience of the Consultants preparing this Project IEE, accidents cannot be completely ruled out during the lifecycle of the Project. A training program will help NEGU in the longer term. Residual impacts will be of low significance.

11.2. Recommendations

659. The EMP, its mitigation and monitoring programs, contained herewith will be included within the Bidding documents for project works for all Project components. The Bid documents state that the EPC Contractor will be responsible for the implementation of the requirements of the EMP (including specific design phase actions) through his own SEMP which will adopt all of the conditions of the EMP and add site specific elements that are not currently known, such as the EPC Contractors camp locations. This ensures that all potential bidders are aware of the environmental requirements of the Project and its associated environmental costs.

660. The EMP and all its requirements will then be added to the EPC Contractors Contract, thereby making implementation of the EMP a legal requirement according to the Contract. He will then prepare his detailed designs and SEMP which will be approved and monitored by the PIC. Should the PIC note any non-conformance with the SEMP (and the EMP) the EPC Contractor can be held liable for breach of the contractual obligations of the EMP. To ensure compliance with the SEMP the EPC Contractor should employ an Environmental and Social Officer and a team of experts to monitor and report Project activities throughout the Project Construction phase.

661. NEGU are also responsible for completing the required activities outlined in the CAP for the four substations. A timetable for completion of these activities is included in the CAP.

Appendix A – Project Screening



Power Transmission Grid Enhancement Project Screening

TA-9708 UZB: Preparing Sustainable Energy Investment Projects

Part 1

Screening Results

ADB







stage

3





the safety zone issue and 2 house structures directly under the transmission line cable – Low Risk



L-19-23 – Passing directly over a residential property.

Possibility to increase the height of the towers above the property to ensure adequate safety clearance in line with Uzbek regulations





<u>Note:</u> IBA – Important Bird Area – an internationally designated area of importance for special status birds









No affected persons – no social risk.







250



<u>Nate:</u> This 110 kV line shall be reconstructed including relocation of 6.3 km which are on Kazakhstan territory. If this line is relocated to Uzbekistan there is no transboundary <u>risk</u> and the line should be part of the Project








5	Name L-20-D	Region Jizzak	Voltage 220kV	Length 58 out of 116km
Г	Alignm	nent Screening		0
Full L	ine		Contraction of	
x No as	ot a full line – scr sessment	eened out of further	4	
Envir	onmental Aspec	ls	200	A TEN SHOW
ass	t a full line – scre essment	ened out of further		
Socia	Aspects		and the	
0.000	sessment			
.85				



 No potentially affected persons. Desert land - No Risk.









 Approximately 13 potentially affected persons due to the safety buffer zone issue – Low Risk









<u>Nate</u>; Relocation of this line from Kyrgyzstan territory to Uzbekistan would result in about 32 km of line to be constructed on Uzbek territory. According to NEGU the existing line on Uzbek territory is in satisfactory condition. Thus, this line is off, unless the rehabilitation of the lines has been long ago and might need retouch.













safety buffer zone issue - Medium Risk





UZB: Digitize to Decarbonize - Power Transmission Grid Enhancement Project - Initial Environmental Examination



#	Name	Full Line	Env. Risk	Soc. Risk
3	L-19-23	5	Low	Low
5	L-F-CH	×	Medium	Low
9	L-KS-A	~	Negligible	No risk
10	L-19-D	J	Low	Low
12	L-22-23	~	Low	Low
18	L-K-K	J	Low	Low
9	L-32-K	<i></i>	No Risk	No risk
0	L-32-M	<i>v</i>	Negligible	Na risk
4	L-7-F-1	V	Low	Low
6	L-Hamza-1	~	Low	Low
7	L-D-W	2	Low	Low
9	LHK	V.	Low	Medium



Other Lines

#	Name	Full Line	Env. Risk	Soc. Risk
1	L-20-Kc		-	-
2	L-R-D	2	1989	Hitth
4	L-22-H	1	Medium	Medium
6	L-A-S	×	-	
7	L-S-Ku	X .	-	
8	L-A-F	(V)	Medium	Medium
11	L-YU-R	×	Medium	Medium
13	L-17-Buch	~	High	Low
14	L-8-H	×	High	

Other Lines



#	Name	Full Line	Env. Risk	Soc. Risk
15	L-20-D	8. E	-2	-
16	L-M-KB	×	High	Low
17	L-Karshi	×	High	Low
18	L-K-K	4	High	trigh
21	L-25-0	¥.	-	•
22	L-Uz-O	×	-	-
23	L-SI-1	×.	-	-
25	L-P-Uz	*	+ 1	
28	L-Yu-L	J	Medium	Medium





- Through grid simulation considering security of grid operations (N-1), grid stability, improvement of power flow, and facilitating power evacuation from renewable energy power plants a priority list was established.
- <u>Constraints</u> are the safety zone of 8 m from center line for 110 kV lines and 12 m for 220 kV lines as buildings might be located within the safety zone.
- Safe reconstruction of the transmission lines is possible; in case of narrow corridors the lines can be constructed in the same route.
- <u>Benefits:</u> improved supply reliability, reduction of energy losses, reduction of operation and maintenance cost, and increased safety for the public.





Reconstruction of the following substations can be considered for the project scope:

- 220 kV Khamza-1 substation connected to line #26 L-Khamza-1
- 220 kV Fayzabad substation connected to line #8 L-A-F
- 220 kV Katta-Kurgan substation connected to line #29 L-HK
- · 220 kV Akhangarana substation, greenfield substation.



Appendix B – Scope of Work for Biodiversity Survey

An existing high voltage transmission line will be rehabilitated in Bukhara region. The map below shows the location of the line.



The conductors (cables) and towers will all be replaced along the same alignment. Towers are single concrete poles as shown in the photos below



The study area, is 50 meters from the center of the alignment.

Initial screening identified that portions of the alignment maybe in sensitive habitat. We require further investigation of the alignment to determine the potential presence of nationally (red-book species) and internationally special status (IUCN) species of flora & fauna in the study area.

A site walkover survey of the alignment shall be completed by the consultant over a period of two days. Specific focus shall be on the areas where towers are located. The consultant will record all of his findings of the survey and summarise the methodology used during the survey in his report. He will also clearly mark on maps the route of his survey and where any species were identified. The walk-over survey will be complemented by a desk top survey of existing data for the region.

The key output of the report will be:

- Assessment methodology
- Survey findings (with list of species identified and maps). Photos of species shall also be attached to the report (along with their locations).
- Desk top assessment findings (with references)
- Identification of any 'sensitive' areas which should be avoided or where extra care during construction should be taken. This will include identification of habitat that is 'natural' or 'critical' according to IFC definitions.

The consultant will submit a draft report to the client for initial review. Any clarifications from the client will be addressed within 2 working days. Full payment will follow acceptance of the final report.

Appendix C – Audit Form

Environmental Audit XXX Substation				
Area	Question	Answer		
Site Inspection				
	Are the site grounds generally free from obvious staining or discolored soil, concrete or floors?			
	Is the site clear of:			
	· old equipment?			
	• other uncontained debris?			
	Is the site well organized and maintained in good condition?			
	Are drainage channels well maintained without blockages?			
	Are boundaries and areas surroundings fences in appropriate good environmental conditions			
	Describe the surrounding land uses (residential,			
	How close are the pearest houses			
	What is the area of the sanitary protection zone around			
	the site?			
	Are there any properties in the zone?			
	Does the facility extract water (groundwater) for use at			
	the site? If so, does it have a permit for this activity?			
	Does the site require a permit to discharge waste			
Water	water? If so, does it have a permit in place?			
vvalei	How close is the nearest surface water course, river or lake			
	Are there any ground water boreholes or wells within 250 m of the site boundary?			
	Are any hazardous waste kept at site? Oils, etc.			
	If so, how are they stored?			
	Is there a licensed facility to collect the hazardous waste?			
	Do you have copies of waste transfer documentation?			
Waste	Do you have an inventory of all waste generated annually?			
	Are only licensed waste management companies used to			
	dispose of non-hazardous waste?			
	Are all waste containers labelled			
	Are any wastes recycled? If so, what types?			
	Is any SF6 used at the site?			
	Is any SF6 stored at the site? If so, how is it stored and			
	are there procedures to follow relating to its storage?			
SF6	How are leaks of SF6 identified?			
	Do they keep records of the amount of SF6 used at the site?			
	Are there any SF6 containing equipment indoors?			
	Is there any oil / fuel storage at site?			
Hazardous Materials	Are these materials stored in secure bunded areas to			
	prevent leaks contaminating water and soil?			
	Are storage areas well maintained?			

	Are there any spill kits kept at the site?	
	Does the site have an emergency response plan?	
	Do they have an incident reporting system?	
Emergency Planning	Are staff trained to manage emergencies? Including fire	
, , ,	fighting	
	What happens in the event of a major oil spill	
	Who is responsible for environmental management at	
Management	the site?	
	Who is responsible for OHS management at the site?	
	Is there any grievance mechanism for locals to make	
GRM	complaints about the site?	
	Has anyone made a complaint about the site? Noise, etc.	
	Are batteries kept at the site? If so, what type of battery,	
	do they contain lead acid?	
Batteries	How are the batteries stored (take a photo)	
	Is there ventilation in the storage area	
	Are there any signs of leaks from the batteries?	
	Are all transformers located within bunding? Take a	
	photo of the bunding	
	Are large transformer bunds connected to below	
	ground storage reservoirs?	
Transformors	Have there been any major leaks from transformers? If	
Transionners	so, explain what happened	
	Are there any visible signs of contamination around	
	transformers	
	Have any transformers been tested for PCBs? If so, are	
	any contaminated with PCBs?	
	Are there any oil based circuit breakers kept on site?	
Circuit Breakers	Are there any signs of leaks or contamination around	
	the circuit breakers?	
EMF	Is EMF measured at the site? Do they have the results?	
	Is there a first aid kit? Take a photo	
First Aid	Who is responsible for first aid at the site?	
	How often do staff have first aid training?	
Fire safety	Is fire fighting equipment and alarms provided at the site?	
Geo Hazards	Has the site ever been flooded?	
	Has the site ever been affected by landslides / mudslides?	
	Is adequate PPE provided for staff?	
PPE	Have there been any major accidents or fatalities in the	
	last 3 years, if so, describe.	
	Is there a clean and adequate toilet at the site?	
Facilities	Is potable water available?	
	Are there clean facilities for cooking and eating?	

Appendix D - Topographical Data



D-I: Topographical Map of Uzbekistan

https://relief web.int/map/uzbekistan/uzbekistan-reference-map-elevation-map-march-2012

Appendix E – Soils Data



E-1: Soil Map of Uzbekistan

Source: NATIONAL ACTION PLAN THE PREVENTION AND MITIGATION OF THE IMPACT OF SAND AND DUST STORM (SDS) IN THE REPUBLIC OF UZBEKISTAN DIAGNOSTIC ATLAS. 2020



E-2: Soil Salinisation in Uzbekistan

Source: NATIONAL ACTION PLAN THE PREVENTION AND MITIGATION OF THE IMPACT OF SAND AND DUST STORM (SDS) IN THE REPUBLIC OF UZBEKISTAN DIAGNOSTIC ATLAS. 2020

Appendix F – Geohazard Data



F-1: Seismic Risk, Uzbekistan

Source: Soil Dynamics and Earthquake Engineering. Volume 25, Issues 7-10, August-October 2005. Pages 473-486



F-2: Mudflow Zones in Uzbekistan

Mudflow occurrences for the years 2005-2014 in areas with a high probability of mudflow passage in Uzbekistan include the following: Zaravshan basin (blue dots) in the central part of the country; Fergana Valley (red dots) in the east; Chirchik-Akhangaran basin (orange) in the north-east; Surkhandarya (green) and Kashkadarya (violet) river basins in the south of Uzbekistan. The map also represents political administrative divisions and administrative centres/cities of the country. Source: The role of synoptic processes in mudflow formation in the piedmont areas of Uzbekistan. Natural Hazards and Earth System Sciences. November 2018



F-3: Map of River Flooding (areas in blue) at the 200-year return Period Level

Source: Country Risk Profile Uzbekistan. TA-9878 REG: Developing a Disaster Risk Transfer Facility in the Central Asia Regional Economic Cooperation Region. ADB. April 2022



F-4: Landslide Susceptability Index Map

Landslide Susceptibility Index (LSI) map for Kyrgyzstan, Tajikistan and Uzbekistan calculated with respect to slope gradient, slope aspect, profile curvature, geology, distance from faults, and seismic intensity factors. Normalized susceptibility values are shown.

Source: https://www.researchgate.net/figure/Landslide-Susceptibility-Index-LSI-map-for-Kyrgyzstan-Tajikistan-and-Uzbekistan_fig1_281662685

Appendix G – Hydrological Data



G-I: Amu Daryra Basin



Appendix H – Climate Data



H-I: Long Term Average Temperature 1999 - 2019

Source: NATIONAL ACTION PLAN THE PREVENTION AND MITIGATION OF THE IMPACT OF SAND AND DUST STORM (SDS) IN THE REPUBLIC OF UZBEKISTAN DIAGNOSTIC ATLAS. 2020



H-2: Long Term Average Precipitation 1999-2019

Source: NATIONAL ACTION PLAN THE PREVENTION AND MITIGATION OF THE IMPACT OF SAND AND DUST STORM (SDS) IN THE REPUBLIC OF UZBEKISTAN DIAGNOSTIC ATLAS. 2020


H-3: Average Annual Wind Speed and Direction

Source: NATIONAL ACTION PLAN THE PREVENTION AND MITIGATION OF THE IMPACT OF SAND AND DUST STORM (SDS) IN THE REPUBLIC OF UZBEKISTAN DIAGNOSTIC ATLAS. 2020

Appendix I – Nationally Protected Areas



I-I: Protected Areas of Uzbekistan

Source: Protected Planet: https://www.protectedplanet.net/en



I-2: Protected Areas of Uzbekistan (central area)

Source: Protected Planet: https://www.protectedplanet.net/en



I-3: Protected Areas of Uzbekistan (Tashkent area)

Source: Protected Planet: https://www.protectedplanet.net/en



I-4: Protected Areas of Uzbekistan (Ferghana Valley)

Source: Protected Planet: https://www.protectedplanet.net/en

Appendix J: Important Bird Areas / Key Biodiversity Areas



J-1: Important Bird Areas of Uzbekistan



J-2: Important Bird Areas of Uzbekistan (central area)



J-3: Important Bird Areas of Uzbekistan (south central area)



J-4: Important Bird Areas of Uzbekistan (Tashkent area)



J-5: Important Bird Areas of Uzbekistan (Ferghana valley)

Appendix K – Critical Habitat



K-I: Critical Habitat Map of Uzbekistan



K-2: Critical Habitat Map of Uzbekistan (central area)



K-3: Critical Habitat Map of Uzbekistan (eastern area)





Appendix M – Consultation Information

M-I Attendance Signatures and Photos





UZB: Digitize to Decarbonize - Power Transmission Grid Enhancement Project - Initial Environmental Examination

Consultation Attendees

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M-2: Project Information Brochures









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Лойиха хакада маь.лумот: Узбекистов Республикасы Президентининг "Узбекистов Республикасанинг 2022-2026 йилларга мулжалланган невестиция дастурнин тасликлаш хамда консстиция лойихаларини бошкарашнош ниги билануя ва меланизмларини жоркй этиш тугрисида"ги 2021 йил 30 декабрдаги 72-сонли карорига асоеви амалга оширилаёттан "Магистрал электр тархокларины модеринация ва реконструкция колиш" инвестицион лойихасм Осно тараккиёт баных хамкорлигизм амалга оширилиция режатангликасы буландага жание 12 та электр линиосния модеринациях на реконструкция конца иналари амалга оширилади. "Узбекистол МЭТ" А.Ж марилизм аппарати лойихаларны амалга оширина агентлиги хузурядаги лейихаки амалга оширина гурухи томониди амалга оширилади.

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Янги жойга кўчирынган настиконії брдамга мухлож (окпа бошлиги кам тамониланган, окпа бощлиги бокувчиском йукотган, окла бошлиги погиронлар) гурухларнанг турмуш дарамасные оширешга брдам берши.

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Appendix N – Guidelines for SEMP

I. Preparation

The Contractor is responsible for preparing the Specific Environmental Management Plan (SEMP). The SEMP is prepared after the award of the contract and is to meet the conditions of the relevant Contractor bidding documents.

The Contractor can move to the site and commence work only after the SEMP has been approved by the Implementing Agency (IA) Project Management Unit (PMU) and the Project Implementation Consultant (PIC, also referred to as the 'Engineer' or 'Supervision Consultant').

The SEMP is a contractually binding document and applies equally to the main Contractor and to Subcontractors under its control.

The SEMP must be compliant with (i) the SEMP conditions, and (ii) any national legislation. All licenses and permits issued by any outside organization that are required to meet the SEMP conditions are to be attached to the SEMP. An example could be a license to operate a borrow pit.

The PMU / PIC may require the Contractor to assess the SEMP activities. When any inspection by the PMU / PIC is undertaken and the work is found to be unsatisfactory, a non-compliance notice will be issued to the Contractor. The Contractor will implement corrective action to address the issues raised in the notice. When the work is shown to be non-conforming with the SEMP, the Contractor will be responsible for meeting costs of all investigations and associated corrective actions.

After a period, the Contractor may request that the contents of the SEMP be changed, but any requests and alterations to the SEMP can be approved only by the PMU / PIC. Likewise, the PMU / PIC may also request changes be made to the SEMP. In this respect the SEMP can be referred to a live working document.

The Contractor is to keep a daily record of all work done to meet the SEMP requirements. The daily record is to be available to the PMU / PIC. The Contractor is to provide monthly reports to the PMU / PIC regarding compliance with the SEMP.

2. Content

The SEMP needs to be a concise and well-focused document that clearly sets out how the Contractor will meet the requirements of the project EMP. The SEMP shall consist of at least the following sections:

Introduction and Purpose

Identify the project and state the purpose of the SEMP. Identify who prepared the SEMP together with the contacts of the person who prepared the document.

Management Responsibilities

This section must clearly identify those persons within the Contractor's team who will be directly responsible for supervising the SEMP activities. Each person and position is to be identified and contact details provided for their work, after-hours phone numbers for emergency situations, and their email addresses. Details are to be provided as to whether these persons are available on a full-time or part-time basis at the construction site. As a minimum, details are required for the following positions:

• The Contractor's environmental manager.

- The back-up person for the environmental manager whenever the environmental manager is away from the site.
- The Contractor's site engineer, who is responsible for supervising the contract on behalf of the Contractor.
- Any other persons on the Contractor's team who will have management responsibilities as required to meet the activities outlined in the SEMP conditions.

Legal Requirements

This section will outline the various environmental laws, regulations, and standards that the Contractor must comply with during construction. This will include all of the approved Project standards that have been outlined in the Project EIA, for example air quality standards, water discharge limits, etc.

Licenses and Permits

Provide details of licences and permits that the Contractor will require to undertake the works, e.g. licenses to operate a borrow pit, extract groundwater, etc.

Special Environmental or Cultural Issues

Show whether there are any special issues associated with the location of the work area that is, whether it is located inside or close to environmentally or culturally sensitive areas. Advise what approvals will be required and how work will be undertaken in these areas. Locate the boundaries to the areas in the plan of works.

Scope of Works

Define the construction requirements so that these clearly identify all of the work to be undertaken by the Contractor.

Plan of Works

The Contractor is to provide an overall plan of works that shows the location of all of the construction sites and the Contractor's support facilities and access roads. The plan of works should be based on the detailed engineering site plans and should show the following:

- Boundaries of the construction sites showing the extent of the disturbed area;
- Boundaries of any culturally or environmentally sensitive areas;
- Access roads (temporary and permanent);
- Contractor's facilities (show the location of offices, workshops, vehicle and machinery parking areas, material storage areas, fuel stores, etc.);
- Worker camps;
- Areas to be excavated;
- Areas where excavated fill will be dumped both as temporary and permanent dumps;
- Locations of material sources, sand, and stones;
- Waste disposal sites (non-hazardous and hazardous); and

• North, the map scale, contours, and existing drainage lines.

Machinery and Support Equipment Brought to Site

The Contractor is to provide:

- A list of all the machinery, vehicles, and support equipment that will be brought to the project;
- The age of the machinery;
- An assessment of the condition of the machinery ³⁶ as good, average, or poor; where average or poor machinery is listed, describe the defect; ³⁷
- Where vibratory rollers are to be used, indicate the weight of the roller and the safe operating distances where the machine can be operated without causing harm to surrounding buildings or other susceptible infrastructure (the zone of vibration); and
- Any machinery that will create noise above 45 dBA is to be listed.

Example of Table for Machinery that will be Brought to Site

Make and Type	Age (years)	Condition
Excavator	2	Good
Bulldozer	3	Average
7 Ton Truck	1	Good
Mobile Crane	7	Average

Details of Sites Used to Source Raw Materials

This includes borrow pits and quarries. The SEMP is to provide the following details:

- Location of material supply areas;
- Type of activity and material extracted, e.g., borrow pit for sub-base or quarry for aggregate;
- Requirement for any permits or approvals to open the borrow pit of quarry;
- Estimated amounts to be extracted total volume required and daily amounts as numbers of truckloads for how many days/months;
- Names of villages and distances along road (in kilometers) that the haul road may need to traverse before reaching the site;
- Machinery that will be operated at the site; and
- Health and safety issues that will be required to be addressed at the site.

Contractor's Facilities and Worker Camps

³⁶ Condition relates to the age and the maintenance of the machinery or vehicles. Any vehicles or machinery that are leaking oil or fuel and are operated without satisfactory silencing or are deficient in safety equipment must be classified as average or poor.

³⁷ Under the contract, the PSU is able to reject any machinery or vehicles that are unsatisfactory.

Provide details of the facilities that the Contractor will erect on-site for (i) its own use, and (ii) worker camps. The Contractor is to show the location of these facilities on the plan of works and provide the following details:

- For Contractor facilities: show the areas required in square meters for all facilities such as administration offices, stores and workshops, vehicles and machinery parking areas. Show sources of electricity and water supply.
- For worker camps: provide details of (i) number of people occupying the camps; and (ii) areas (m²) and facilities installed for (a) washing and sanitation areas, (b) cooking, (c) sleeping areas, and (d) recreation areas.

For both the Contractor and worker facilities, describe the following:

- Type of construction of facilities (floor, walls, and roof);
- Storm-water drainage, collection systems, flow paths, and disposal areas;
- Source of water and type of treatment required for cooking, washing, and drinking;
- Effluent systems to handle the disposal of washing, sanitation, and kitchen waste water;
- Source of energy to be used for heating and cooking;
- Confirm as "yes" or "no" if the facilities or camps are to be located within or closer than 2 kilometres of a protected or forested area;
- How long the camps will be required to be used; and
- Procedure for closing and dismantling the camps.

Enter details in a table:

Example of Contractor's Facilities to be Used during Construction

	Facility	Area (m [*])	Construction	n		Stormwater	Effluent	
	A Constitution of the second second second	and the second sec	Floor	Wals	Roof	drains to	drains to	
1	Administration offices	300 m ² (30 m x 10 m)	New transpo	nable build	ling	Freshwater tanks	Closed septic system	
2	Workshop and machinery washdown areas	200 m ² (20 m x 10 m)	concrete	concrete c.g.i. c.g.i.		OI & water separator > sediment basin> natural drainage system	Closed septic system	
3	Vehicle and machinery parking area	800 m ² (40 m x 20 m)	Compacted coral aggregate			sediment basin> natural drainage system	n.a.	
4	Storage area – materials	400 m ² (40 m x 10 m)	Coral c.g.i. c.g.i.		Sediment basin> n.a. natural drainage system			
5	Storage area – fuel (5,000 liter) skid tank	15 m² (5 m x 3 m)	Concrete bunded base			Oil and water separator > sediment basin> natural drainage system	n.a	

c.g.i, = corrugated iron; n.a. not applicable.

3. Environmental Works Procedures

The SEMP is to provide a series of procedures that are designed to protect the environment. These are called environmental work procedures (EWP) and outline how work will be arranged to address the various issues that have been outlined in the SEMP.

The SEMP will review and build on the project EMP requirements to develop more detailed procedures for implementation in the construction activity. While the project EMP provides a list of mitigation requirements that will require procedures to be developed for each of them, the Contractor is required to review the adequacy of the requirements and if necessary include additional procedures. Should the Contractor consider that a procedure that is shown in the project EMP is not required, the Contractor will need to justify that decision.

The following is a list of procedures that may be required to be included in the SEMP. The project EMP will confirm which of these procedures or others will be required.

- Site preparation
- Excavation of construction sites
- Removal and disposal of excavated waste
- Erosion and sedimentation
- Storage and handling of construction materials, fuel, and lubricants
- Noise and vibration
- Dust generation
- Public access to site
- Risk to public and worker health and safety
- Use of hazardous materials
- Worker issues (e.g., use of fuel wood, hunting, clearing areas for gardening)
- Disposal of waste material (solid and liquid)
- Archaeological discoveries
- Rehabilitation of construction sites and Contractor facilities
- 4. Monitoring of Work

The SEMP is to provide details of how each activity will be monitored, how frequently the monitoring will be carried out, what criteria will be monitored, and who will undertake the monitoring. A monthly report on monitoring activities is to be included in the monthly SEMP report.

I. Staff and Worker Training

The SEMP is to provide details of staff and worker training and awareness programs that will be required to ensure compliance with the SEMP. Awareness of staff and workers about safety and environmental regulations, the SEMP requirements, and in special circumstances where work will need to be carried out within or adjacent to protected areas or areas of cultural heritage will be particularly important. The program will need to show who will be responsible for implementing the program and where the program will be introduced so as to ensure that all workers are aware of the SEMP requirements before commencing work.

2. Reporting

The Contractor is to provide details in a monthly SEMP report. The report will be prepared by the person who has been identified within the Contractor's team as responsible for overseeing the SEMP procedures. The report will outline progress with regard to the project's physical monitoring targets and implementation of the SEMP for these works. The report should note which tasks have been completed and have been approved for payment by the PMU / PIC. The report is to specify if any notices have been issued by the PMU / PIC to correct work and what has been done by the Contractor to address these issues. Any complaints or issues that have been received from the public are to be listed in the report. Three copies of the report are to be sent to the PMU / PIC. The report will address the following topics:

- Status of work program: work completed, construction under way, and work planned Environmental unit and staff situation for the month
- Staff and worker awareness training carried out
- Waste volumes, types, and disposal (inorganic and organic) Areas revegetated and rehabilitated
- Dust control report
- Discovery of artefacts
- Safety and monthly accident report
- Status of SEMP environmental mitigation measures
- PMU / PIC notices issued and status of all nonconforming work
- Environmental Incidents
- Complaints received
- Other relevant environmental issues

Appendix O – Biodiversity Survey

Report on the field exit to the section of the power line (PTL)"Substation karakul-substation Hamza 2"

Date: 28-29.08.2022

Introduction

The surveyed section of the power line with a length of 33.5 km starts from the Karakul station in the Karakul district of the Bukhara region and goes to the south-east to the Hamza 2 substation in the Olot district of the Bukhara region.

On the days of departure, the site was clear. The average daily air temperature was + 28.5 $^{\circ}$ C. The maximum daily air temperature was + 39.9 $^{\circ}$ C. The average wind speed is 6.8 km/ h. The surveyed landscape is represented by desert and floodplain habitats: areas of clay-gravel and sandy desert, bordering the anthropogenic landscape and agricultural lands.



Northern end of the power transmission line



The boundary of the anthropogenic landscape and the desert

Methods

For the survey of the territory where it is planned to carry out work on the reconstruction and restoration of power lines, 9 points were selected in the direction from north to southof the east. The average distance between the points was 3.9 km. Points 1-5 were examined on 28.08.2022, points 6-9 were examined on 29.08.2022.

- VP 1. 39.524912, 63.868823 Northern tip of the power line, clay-gravel desert, anthropogenic landshaft at the entrance to the city of Karakul
- VP 2. 39.510718, 63.877188 Clay-gravel desert bordering the anthropogenic landscape
- VP 3. 39.497629, 63.881817 Border of angrolandscape and clay-gravel desert
- VP 4. 39.484618, 63.904003 Sand dune type
- VP 5. 39.461599, 63.945909 Sand dune type
- VP 6. 39.417647, 63.954503 Locality, agrolandscape
- VP 7. 39.346975, 64.021208 Shore of the Amu-Bukhara Canal, clay desert
- VP 8. 39.339032, 64.076964 Sandy massif
- VP 9. 39.293814, 64.045764 South-eastern end of the power line. Sandy massif



The total length of the routes on the project site and in its vicinity during the survey days was 165.3 km. The length of the automobile routes was 150.3 km. In the vicinity of each point, hiking circular routes with a total length of 15 km were carried out.

The survey was conducted from 06.00 to 12.45, which made it possible to capture the morning hours of activity of desert species of animals.

On the routes, with the help of Viking 10x binoculars and a Nikon D7500 camera with a Sigma 50-500 telephoto lens, bird species, burrows and traces of mammals and reptiles were recorded, and a visual assessment of the integrity and composition of the vegetation cover was carried out. With the help of the VT-100 anemometer, wind speed and air temperature were measured at each point.

Outcomes

VP 1. 06.00-06.30. Northern end of the power line. The border of the anthropogenic landscape and the clay-gravel desert. Air temperature + 24.6 ° C, the average wind speed is 5.5 km / h. Vegetation is represented by a sparse cover of juzgun. Birds

- I. Magpie Pica pica 2
- 2. Maina Acridotheres tristis 35
- 3. Rook Corvus frugilegus 9

- 4. Blue pigeon Columba livia 25
- 5. Field Sparrow Passer montanus 2

Mammals

1. Yellow ground squirrel Spermophilus fulvus - marked by the presence of burrows (at the time of research is in hibernation)



VP 2. 07.00-07. 40. A heavily littered area of clay-rubble desert, bordering the anthropogenic landscape. Air temperature + 24.4 ° C, average wind speed 5.4 km / h.

Vegetation is represented by a sparse cover of juzgun.

The existing power line is not equipped with bird protection devices (ROMs). Feathers of birds were found under the power lines, which may indicate cases of electric shock to birds in this section of the power line. At the base of the power lines, single residential burrows of red-tailed gerbil were found. Birds

- I. Crested lark Galerida cristata 8
- 2. Green pike Merops persicus 3

Mammals

2. Red-tailed gerbil Meriones libycus - present (residential burrows)



Crested lark Galerida cristata

Burrow of red-tailed gerbil Meriones libycus

VP 3. 07.50-08. 35. The border of the angrolandscape and a heavily littered area of the clay-gravel desert. The air temperature is +2 5.6 $^{\circ}$ C, the average wind speed is 8.6 km / h.

In the vicinity of the point, spontaneous landfills of household waste, food and medical waste were found. The vegetation cover is very sparse and is represented by individual dry bushes of kuzinia.

During the stay on the point, 3 shots were fired from the direction of the city of Karakul, in the vicinity of which, presumably, amateur hunting for pigeons is carried out. Birds

- I. Oenanthe isabellina I
- 2. Rustic swallow Hirundo rustica I
- 3. House owl Athene noctua present (burrows and droppings)

Mammals

- I. Lepus tolai hare I
- 2. Shaggy-footed jerboa Dipus sagitta present (on the tracks)



Oenanthe isabellina

Traces of the Lepus tolai hare

VP 4. 08.40-12. 00. Sand massif of dune type. Vegetation cover of juzgun and camel thorn. A separate section of the salt marsh with thickets of juzgun, saxaul, solyanka and camel thorn. The air temperature is +2 8.3 $^{\circ}$ C, the average wind speed is 9.7 km / h. Reptiles

- 1. Central Asian turtle *Testudo horsfieldii* present (characteristically shaped burrows have been found , some research is in hibernation)
- 2. Sand roundhead Phrynocephalus interscapularis 2

Birds

- I. Rustic swallow Hirundo rustica 2
- 2. Crested lark Galerida cristata 7

Mammals

1. Dressing Vormela peregusna – present (on the trail)





Sand roundhead Phrynocephalus interscapularis

Traces of Vormela peregusna dressing

VP 5. 12.15-12.45. Sand massif of dune type with thickets of saxaul. Air temperature + 39.9 ° C, average wind speed 10.1 km / h.

Reptiles

- I. Sand roundhead Phrynocephalus interscapularis 2
- 2. Sand boa constrictor Eryx miliaris present in 3 places (on the trail)

Birds

I. Rustic swallow Hirundo rustica - 3



Power lines are not equipped with bird protection devices



Traces of the sand boa constrictor Eryx miliaris

VP 6. 06.00-07.00. Settlement, agrolandscape, agricultural land. Air temperature +26.2°C. Birds

- I. Rustic swallow Hirundo rustica 3
- 2. Field sparrow Passer montanus 63
- 3. Magpie Pica pica 4
- 4. Minor turtledove Streptopelia senegalensis 4
- 5. Maina Acridotheres tristis 14
- 6. Blue pigeon Columba livia 88
- 7. Black coinage Saxicola caprata 3
- 8. Black-breasted sparrow Passer hispaniolensis 5
- 9. Mace finch Rhodospiza obsoleta 2



VP 7. 07.30-08. 30. The right bank of the Amu-Bukhara Canal, a clay desert with coastal thickets of juzgun, saxaul and camel thorn. Air temperature + 26.8 ° C, average wind speed 3.6 km / h. Reptiles

I. Long-eared roundhead Phrynocephalus mystaceus – present in 3 places (on footprints in the sand)

Birds

I. White wagtail Motacilla alba - I

- 2. Rustic swallow Hirundo rustica 5
- 3. Marsh Harrier Circus aeruginosus I

Mammals

1. Yellow ground squirrel Spermophilus fulvus – present (6 burrows)





Amu-Bukhara Canal

Marsh Harrier Circus aeruginosus

VP 8. 08.30-09.10. Sandy massif with sparse saxaul cover. Air temperature +2 9.6 $^{\circ}$ C, average wind speed 4.7 km / h.

Reptiles

- I. Sand boa constrictor Eryx miliaris present (in the footsteps)
- 2. Grey monitor Varanus griseus present (on the tracks)

Birds

- I. Rustic swallow Hirundo rustica 2
- 2. Green pike Merops persicus I

Mammals

- 1. Large gerbil Rhombomys opimus present (colonies and traces marked)
- 2. Asian steppe cat Felis silvestris ornata present (on the trail)

VP 9. 09.25-10.00. South-eastern end of the power line. Sandy massif with sparse saxaul cover. Air temperature + 31.1 ° C, average wind speed 6.8 km / h. Birds

- I. Rustic swallow Hirundo rustica 2
- 2. Green pike Merops persicus 23
- 3. Kamenka Oenanthe oenanthe I
- 4. Lake gull Larus canus I
- 5. Marsh Harrier Circus aeruginosus I

Mammals

I. Large gerbil Rhombomys opimus - present (colony detected)



Marsh Harrier Circus aeruginosus



General list of vertebrates noted on and around the site

Reptiles:

- I. Central Asian turtle Testudo horsfieldii present (burrows in 2 places)
- 2. Grey monitor Varanus griseus present (on the tracks)
- 3. Sand boa constrictor *Eryx miliaris* present in 3 places (on the trail)
- 4. Sand roundhead Phrynocephalus interscapularis 4
- 5. Long-eared roundhead Phrynocephalus mystaceus present (on the trail)

Birds:

- I. Lake gull Larus canus I
- 2. House owl Athene noctua present (burrows and droppings)
- 3. Marsh Harrier Circus aeruginosus 2
- 4. Rook Corvus frugilegus 9
- 5. White wagtail Motacilla alba I
- 6. Mace finch Rhodospiza obsoleta -2
- 7. Rustic swallow Hirundo rustica 18
- 8. Green pike Merops persicus 27
- 9. Kamenka Oenanthe oenanthe I
- 10. Oenanthe isabellina 1
- 11. Maina Acridotheres tristis 49
- 12. Minor turtledove Streptopelia senegalensis 4
- 13. Field Sparrow Passer montanus 67
- 14. Black-breasted sparrow Passer hispaniolensis 5
- 15. Blue pigeon Columba livia 113
- 16. Magpie Pica pica 6
- 17. Crested lark Galerida cristata 15
- 18. Black coinage Saxicola caprata 3

Mammals:

- 1. Yellow ground squirrel Spermophilus fulvus present (residential and non-residential burrows)
- 2. Red-tailed gerbil Meriones libycus present (residential burrows)
- 3. Lepus tolai hare I
- 4. Shaggy-footed jerboa Dipus sagitta present (on the tracks)

- 5. Dressing Vormela peregusna present (on the trail)
- 6. Asian steppe cat Felis silvestris ornata present (on the trail)
- 7. Large gerbil Rhombomys opimus present (coloniesand traces found)

Thus, 4 species of animals included in the Red Book of Uzbekistan and the International Red Book (IUCN) were noted at the site:

- Central Asian tortoise (VU): A vulnerable, declining Central Asian endemic species. Listed on the IUCN Red List [VU]. 2 burrows were observed on the 15 km of the hiking route, which allows us to assess the state of the number and this species on the site as extremely low.
- 2. Dressing (VU:D): A vulnerable, dwindling, widely but sporadically distributed, naturally small species. It is listed on the IUCN Red List [VU]. Traces were found on one of the points.
- 3. Grey monitor lizard (VU:D): A vulnerable, shrinking subspecies. Traces of a monitor lizard were noted at the southeastern tip of the power line.
- 4. Sand boa constrictor (NT): A closely vulnerable, mosaic-distributed species. Traces of the boa constrictor were found at least 3 places in the eastern end of the power line, passing through areas of open sand.

Recommendations:

- 1. The timing and duration of the survey do not allow us to estimate the number of rare and vulnerable species of animals noted on the site. To determine the number and threats to species included in the National and International Red Book, a second and longer survey is necessary in the spring.
- 2. Traces of the presence of vulnerable and close to vulnerable species of animals were noted at points 4-9. The natural landscape at points 1-3 is greatly modified as a result of economic activity. Within the boundaries of points 1-3, sports hunting is carried out, the vegetation cover is disturbed. It can be assumed that due to active economic activity, points 1-3 have lost their attractiveness for wild animals.
- 3. Points I-3 of the surveyed site are located in the zone of strong anthropogenic impact: the natural landscape is greatly modified as a result of the formation of spontaneous landfills of food, construction and medical waste when planning and carrying out work on the reconstruction of power lines, it is necessary to move household waste dumps to a safe distance from the project site. It is desirable to think over the mechanism for collecting and disposing of waste generated in the vicinity of nearby villages.
- 4. At the northern end of the power line, there are burrows of red-tailed gerbil at the base of power line pylons. It can be assumed that in the process of increasingthe number and strengthening of the burrowing detail of rodents in this area, subsidence of soil species may occur during the reconstruction of power lines. In this regard, when planning construction work on the reconstruction of power lines, it is necessary to control, and, if necessary, regulate the number of individual species of rodents on the site. by specialized services.
- 5. The inspected sections of the existing power line are not equipped with anti-additive bird protection devices (ROMs). It can be assumed that power transmission towers cause the death of birds as a result of electric shock. In this regard, it is recommended to equip the designed power line with modern ROMs.

Appendix P – Sample Chance Find Procedure

1.1 Objectives of the Procedure

The chance find procedure is a project-specific procedure that outlines actions required if previously unknown heritage resources, particularly archaeological resources, are encountered during project construction or operation. A Chance Find Procedure, as described in IFC Performance Standard 8, is a process that prevents chance finds from being disturbed until an assessment by a competent specialist is made and actions consistent with the requirements are implemented.

1.2 Scope of the chance find procedure

This procedure is applicable to all activities conducted by the personnel, including contractors, that have the potential to uncover a heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during construction activities. Procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority.

1.3 Procedure

If any person discovers a physical cultural resource, such as (but not limited to) archaeological sites, historical sites, remains and objects, or a cemetery and/or individual graves during excavation or construction, the following steps shall be taken:

- 1. Stop all works in the vicinity of the find, until a solution is found for the preservation of these artefacts, or advice from the relevant authorities is obtained;
- 2. Immediately notify a foreman. The foreman will then notify the Construction Manager and the Environment Social Officer (ESO) who will in turn must contact the PIC;
- 3. Record details in Incident Report and take photos of the find;
- 4. Delineate the discovered site or area; secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities take over;
- 5. Preliminary evaluation of the findings by ESO and if necessary, government archaeologists. The ESO must make a rapid assessment of the site or find to determine its importance. Based on this assessment the appropriate strategy can be implemented. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage such as aesthetic, historic, scientific or research, social and economic values of the find;
- 6. Sites of minor significance (such as isolated or unclear features, and isolated finds) should be recorded immediately by the archaeologist, thus causing a minimum disruption to the work schedule of the Contractor. The results of all archaeological work must be reported to the Ministry/Agency, once completed.
- 7. In case of significant find the Agency/Ministry (Agency for Protection of National Heritage or Archaeological Research Centre, hereinafter referred to as Heritage team) should be informed immediately and in writing within 7 days from the find (ref. law on heritage protection).
- 8. The onsite archaeologist provides the Heritage team with photos, other information as relevant for identification and assessment of the significance of heritage items.
- 9. The Ministry must investigate the fact within 2 weeks from the date of notification and provide response in writing.

- 10. Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
- 11. Construction works could resume only after permission is granted from the responsible authorities.
- 12. In case no response received within the 2 weeks period mentioned above, this is considered as authorisation to proceed with suspended construction works.

One of the main requirements of the procedure is record keeping. All finds must be registered. Photolog, copies of communication with decision making authorities, conclusions and recommendations/guidance, implementation reports – kept.

1.4 Induction/Training

All personnel, especially those working on earth movements and excavations, are to be inducted on the identification of potential heritage items/sites and the relevant actions for them with regards to this procedure during the Project induction and regular toolbox talks.

1.5 Additional information

Management options for archaeological site

- <u>Site avoidance</u>. If the boundaries of the site have been delineated attempt must be made to redesign the proposed development to avoid the site. (The fastest and most cost-effective management option)
- <u>Mitigation</u>. If it is not feasible to avoid the site through redesign, it will be necessary to sample it using data collection program prior to its loss. This could include surface collection and/or excavation. (The most expensive and time-consuming management option.)
- <u>Site Protection</u>. It may be possible to protect the site through the installation of barriers during the time of the development and/or possibly for a longer term. This could include the erection of high visibility fencing around the site or covering the site area with a geotextile and then capping it with fill. The exact prescription would be site- specific.

Management of replicable and non-replicable heritage

Different approaches for the finds apply to replicable and non-replicable heritage.

Replicable heritage

Where tangible cultural heritage that is replicable³⁸ and not critical is encountered, mitigation measures will be applied.

The mitigation hierarchy is as follows:

- Avoidance;
- Minimization of adverse impacts and implementation of restoration measures, in situ;
- Restoration of the functionality of the cultural heritage, in a different location;
- Permanent removal of historical and archaeological artefacts and structures;
- Compensation of loss where minimization of adverse impacts and restoration not feasible.

³⁸ Replicable cultural heritage is defined as tangible forms of cultural heritage that can themselves be moved to another location or that can be replaced by a similar structure or natural features to which the cultural values can be transferred by appropriate measures. Archaeological or historical sites may be considered replicable where the particular areas and cultural values they represent are well represented by other sites and/or structures.

Non-replicable heritage

Most cultural heritage is best protected by in situ preservation, since removal is likely to result in irreparable damage or even destruction of the cultural heritage.

Nonreplicable cultural heritage³⁹ must not be removed unless all of the following conditions are met:

- There are no technically or financially feasible alternatives to removal;
- The overall benefits of the project conclusively outweigh the anticipated cultural heritage loss from removal; and

Any removal of cultural heritage must be conducted using the best available technique advised by relevant authority and supervised by archaeologist.

Human Remains Management Options

The handling of human remains believed to be archaeological in nature requires communication according to the same procedure described above.

There are two possible courses of action:

- <u>Avoid</u>. The development project is redesigned to completely avoid the found remains. An assessment should be made as to whether the remains may be affected by residual or accumulative impacts associated with the development, and properly addressed by a comprehensive management plan.
- **Exhumated.** Exhumation of the remains in a manner considered appropriate by decision makers. This will involve the predetermination of a site suitable for the reburial of the remains. Certain ceremonies or procedures may need to be followed before development activities can recommence in the area of the discovery.

³⁹ Nonreplicable cultural heritage may relate to the social, economic, cultural, environmental, and climatic conditions of past peoples, their evolving ecologies, adaptive strategies, and early forms of environmental management, where the (i) cultural heritage is unique or relatively unique for the period it represents, or (ii) cultural heritage is unique or relatively unique for the period it non-replicable cultural heritage may include an ancient city or temple, or a site unique in the period that it represents.

Appendix Q – Rapid Environmental Assessment Checklist

Country/Project Title:								
Sector Division:	Energy Division, C	WRD						
Screening Questions			No	Remarks				
A. PROJECT SITING IS THE PROJECT AREA A WITHIN ANY OF T ENVIRONMENTALLY SE	ADJACENT TO OR HE FOLLOWING NSITIVE AREAS?							
CULTURAL HERITAGE	SITE		X	Initial site investigations have not identified any national or internationally significant cultural heritage sites within close proximity of the project sites. However, there is the possibility that some of the project sites are close to locally important cultural heritage sites, such as mosques or cemeteries. Further investigation will be conducted as part of the initial environmental examination (IEE) study to determine the presence of such sites and if such sites are identified, mitigation measures will be presented accordingly. Further, a chance find procedure will be prepared and applied to excavation works for any new tower footings.				
 PROTECTED AREA 			Х	None of the sites selected as part of this project are located				
WETLAND			Х	within, or adjacent to any of these areas.				
MANGROVE			Х					
ESTUARINE	ESTUARINE		Х					
 BUFFER ZONE OF PRO 	DTECTED AREA		Х					
 SPECIAL AREA FC BIODIVERSITY 	R PROTECTING		Х					
B. POTENTIAL EN IMPACTS WILL THE PROJECT CAU	VIRONMENTAL JSE							
 encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation? 			X	As noted above, there are no known internationally or nationally designated historical cultural sites, but it is possible that locally important physical cultural resources (PCR) could be present which would be identified during site visits as part of the IEE study. A chance find procedure will also be put in place to deal with any finds during construction.				
				Small volumes of waste will be generated during the construction phase, some of which may be hazardous (e.g., from substation upgrading works). The environmental management plan (EMP) will include specific measures for waste management in line with international best practice.				
				The Project sites are generally located in areas of mixed urban / agricultural landscape. No significant landscape impacts are anticipated. However, this will be confirmed in the IEE.				

Screening Questions	Yes	No	Remarks
 encroachment on precious ecosystem (e.g., sensitive or protected areas)? 		X	Sites have been selected to avoid protected areas. It is however possible that some sites may cross areas of natural habitat, and further investigation will be undertaken during the IEE study to determine the presence of any sensitive habitats. Mitigation measures to prevent impacts to areas of natural habitat can include for example, micro alignment changes.
 alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site? 		X	None of the selected sites cross major rivers and works are not anticipated to result in significant alteration of surface water hydrology or waterways. The overhead transmission lines at some sites will cross some small irrigation and drainage canals and good housekeeping practices detailed in the EMP will ensure that impacts to these areas are not significant.
 damage to sensitive coastal/marine habitats by construction of submarine cables? 		×	Not applicable. Project will not involve submarine cables.
 deterioration of surface water quality due to silt runoff, sanitary wastes from worker- based camps and chemicals used in construction? 	X		Contamination risk from stored chemicals, fuel, and oil, including transformer oil used in substations will be minimized through mitigating measures described in the EMP in accordance with international good practice with storage on covered, impermeable bunded (to 110%) surfaces or drip trays with empty drums to be disposed of by suitably licensed waste contractor to suitably licensed facilities. For temporary daytime worker camps or overnight accommodation where no community facilities are available in the area, the contractor will be required to provide adequate sanitary and welfare facilities for workers such as portable self- contained toilet facilities. Open defecation, the use of pit latrines and discharge of untreated sewage to waterways will be prohibited. Solid waste from labor camps will be of low volume and managed by the contractor through development of a Construction Waste Management Plan with environmentally sound storage, transport, and disposal of solid waste off site to suitably engineered and licensed sanitary waste facilities. Biodegradable kitchen scraps may be composted on site if of small volume and environmentally sound facilities are established by the contractor.
 increased local air pollution due to rock crushing, cutting and filling? 	X		Drilling and blasting may be required for excavations (e.g., tower foundations) although this is considered a low probability. If drilling and blasting are required, specific measures relating to safety, noise and vibration will be proposed in the EMP. Some air pollution may occur due to the increased dust and vehicular emissions, but this will be temporary and localized and managed through standard mitigation measures.
 risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation? 	×		Risks exist during both construction and operation. Under the EMP, contractor(s) will be required to undertake a risk assessment and prepare an occupational health and safety (OHS) management plan, including an emergency response plan reflecting international good practice. Particular attention will be paid to communicable disease spread such as COVID-19 for which best practices will be followed including WHO guidelines. Special attention will be paid to OHS risks related to working with electricity as well as at height. No specific chemical or biological risks have been identified. Electromagnetic field issues are discussed below.

Screening Questions	Yes	No	Remarks
 chemical pollution resulting from chemical clearing of vegetation for construction site? 		X	Chemicals will not be used for clearing of vegetation along existing or new ROW. Pesticide use will not be permitted within the framework of this project. Clearance of vegetation will be done manually.
 noise and vibration due to blasting and other civil works? 	x		Noise and vibration may be generated due to drilling and blasting for some excavations (e.g., tower foundations) and construction activities in general, yet this will be short- term and localized. Noise and vibration may also increase on access roads due to the movement of heavy machinery and materials. The EMP defines maximum allowed levels and prescribe measures to ensure the construction and operational noise levels remain within defined limits e.g., through time and activity restrictions.
 dislocation or involuntary resettlement of people? 	X		It is possible that land acquisition may be required and possibly resettlement depending on the findings of further site surveys; a land acquisition and land acquisition and resettlement plan (LARP) will be implemented to manage any this issue. Safety zones will also be checked as part of the IEE to ensure that there are any occupied structures are removed from safety zones and appropriately compensated.
 disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups? 		×	Significant disproportionate impacts on the poor, women and children are not anticipated. However, children are a vulnerable group to be considered with respect to community health and safety risks. Further detailed assessment will be included in the LARP.
 social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads? 	×		Construction works are not expected to cause significant social conflict. Some inconvenience may derive from increased road traffic/congestion and road blockages, yet this should be short-lived and localized. Traffic management plan will be developed and implemented to manage interference with pre-existing roads and facilitate safe access and passage for residents during the works. Overnight accommodation will only be required where no suitable community facilities are available, by accommodating workers in local accommodation and providing economic benefit should help to decrease risks of social tensions. Some inconvenience to living conditions could derive from the humming of the overhead line etc., awareness raising will be carried out, so communities feel more comfortable about their presence.
 hazardous driving conditions where construction interferes with pre-existing roads? 	X		Road traffic/congestion may increase temporarily during construction, especially in work zones in urban areas, yet this should be of short duration and localized. Contractors will be required to devise a traffic management plan. When works are to be carried within the road appropriate signage, flagmen, prior information, and other traffic management controls will be implemented. Safe diversions will be put in place to ensure the safety of pedestrians and drivers with barriers to demark open trenches or excavations. Scaffolding will be used during stringing of transmission lines over running roads.
 creation of temporary breeding habitats for vectors of disease such as mosquitoes and rodents? 	X		Any works will be of short duration. Good housekeeping will be enforced at construction sites to ensure no breeding of vectors of disease.
 dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines? 	X		Project right of ways generally avoid settlements. Nonetheless, some properties will be affected there will be land acquisition; LARP will be implemented.

Screening Questions	Yes	No	Remarks
 environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)? 	X		Subsequent maintenance of the overhead transmission line may require pruning of trees in the RoW. Special attention will be paid to avoiding damage to tree regrowth during maintenance and to limit excessive pruning of trees whilst ensuring the required safety distances are met.
 facilitation of access to protected areas in case corridors traverse protected areas? 		Х	Not applicable
 disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height? 		Х	Not applicable. The use of pesticides is prohibited within the project.
 large population influx during project construction and operation that cause increased burden on social infrastructure and services (such as water supply and sanitation systems)? 		×	Project is not expected to cause a large influx of migrant workers to the project areas as works will be of short duration and small scale. Groups of workers at any site are generally not anticipated to exceed 10 at each work site.
 social conflicts if workers from other regions or countries are hired? 	X		Local hiring will be given priority to avoid social conflict and to minimize provision of temporary construction camps. However, skilled workers are also required who will likely come from outside the project areas; ongoing consultations with local communities will be needed to help avoid conflict. Workers will also be educated on local cultural standards.
 poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations? 	×		Overnight accommodation will only be required where no suitable community facilities are available to accommodate workers. Contractors will be required to provide adequate sanitation and welfare facilities during construction and training on sanitation hygiene and solid waste disposal, including health and safety; special attention will be paid to communicable diseases in the context of the COVID-19 pandemic. All wastes will be segregated and treated accordingly: inert waste (such as soils) will be used for backfilling as much as possible to avoid generation of waste. Any remaining excavated material will have to be disposed of at suitably licensed waste facilities. Solid waste will be collected and disposed of along with municipal waste to suitably engineered and licensed sanitary waste facilities. In particular, workers will be sensitized not to leave drinks/food packages lying around. As much as possible, any materials will be recycled, or sold off for reuse rather than being disposed. Any chemicals or other hazardous substances will be handled appropriately (e.g., fuel, vehicle oil, transformer oil including old oil that may contain PCBs, etc.) and any hazardous waste such as oily rags or old oil drums disposed of to suitably licensed hazardous waste facilities.
 risks to community safety associated with maintenance of lines and related facilities? 	x		Health and safety precautions will be followed by maintenance workers to avoid or minimize all risks. A review of NEGU maintenance procedures will be undertaken as part of the IEE study to ensure that risks to communities are assessed and appropriate mitigation measures applied. Further, audits of substations will be undertaken and where corrective actions are required due to community safety risks, they will be included in the IEE.

Screening Questions	Yes	No	Remarks
 community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization? 	×		The electromagnetic field (EMF) intensity in proximity to the overhead transmission lines decreases rapidly as a function of distance. The Project will comply with all the International Commission on Non-Ionizing Radiation Protection (ICNIRP) EMF exposure limits. Awareness raising activities will be organized to communicate about living safely in proximity to transmission lines. Warning signs on the substation perimeters and transmission towers as well as fences surrounding substation grounds will be put in place to restrict public access. No other community health hazards relating to land subsidence, groundwater or salinization have been identified.
 risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation? 	×		If ever needed, then blasting will only be undertaken by a specialist contractor under strict protocols. Good housekeeping will be required at construction sites. For fuels, oils, and chemicals these will be kept in locked compound on impermeable bunded surfaces or drip trays with empty drums to be disposed of by suitably licensed contractor to suitably licensed disposal facility in accordance with national requirements. Any chemicals stored will in well ventilated areas, protected from weather and heat as well as from cross-contact of various chemicals to avoid reactions. Use of Polychlorinated Biphenyls (PCBs) in transformers, any asbestos containing materials in construction, and herbicides to control vegetation will be prohibited.
community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., high voltage wires, and transmission towers and lines) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	X		National requirements relating to vertical and horizontal clearances between buildings and the transmission line will be complied with. Foundations and structures will be designed so as to be climate resilient and resistant to extreme weather event or geological hazard. Access to construction sites will be restricted with use of warning signs with community awareness at the project onset.

	Risk screening questions	Yes	No	Not sure	Remarks
١.	Will project preparation be affected by the inability of experts/consultants, to visit the project site because of the pandemic?		x		Uzbekistan is allowing travel to and within the country and no change of this policy is currently in sight.
2.	Is the project likely to face challenges in achieving meaningful consultations because of the pandemic? If yes, please clarify the types of consultations to be affected and at what stages of environmental safeguards planning and implementation.		×		Public consultation has been held in September 2022.
	Examples: Project consultants are unable to travel to the project site and meet with project stakeholders. Face to face consultations with project affected people cannot be organized due to travel restrictions or social distancing requirements.		^		
3.	Is the project likely to face challenges in preparing safeguards assessments/planning instruments and/or implementing environmental safeguards plans because of the pandemic? Please be as specific as you can in the remarks section.		x		Safeguards documents are currently being prepared without any delay. No challenges foreseen in
	Example: Collection of environmental baseline data is not possible as consultants are unable to travel and conduct field studies.				preparing necessary due diligence reports and in implementing the EMP.

Project COVID-19 Risk Screening for Environmental Safeguards Assessments

Note.

- If the answer is "no" to all three questions, project teams may continue preparing the project following standard methods of due diligence.
- If the answer is "yes" or "not sure" to any of the questions above, the project teams must follow Figure 2 of the <u>Guidance Note on Safeguards Compliance during the COVID-19 Pandemic</u> during further steps of project preparation.
- For further detailed guidance, please refer to the <u>Guidance Note on Safeguards Compliance during the</u> <u>COVID-19 Pandemic</u>

Additional comments from the Project Team (if any)

<u>None</u>

SDSS Comments

(Name and Signature, SDSS Environment Safeguards Specialist, Date)

Endorsed by:

(Name and Signature, Director, SDSS, Date)

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: Uzbekistan / Preparing Sustainable Energy Investment Projects

Sector: Energy

Subsector: Power Transmission

Division/Department: Energy Division / CWRD

	Screening Questions	Sco	R emarks ⁴⁰
		re	
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1	Extreme weather events such as high winds and flooding could potentially affect lines and
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?		towers.
Materials and Maintenance	Would weather, current, and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1	Alternative materials in substations and conductors may be required due to future temperature changes.
	Would weather, current, and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	
Performance	Would weather/climate conditions, and related extreme events	Ι	Changes in temperature could
of project	likely affect the performance (e.g. annual power production) of		affect the performance of
outputs	project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?		substations and carrying capacity of lines

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered <u>low risk</u> project. If adding all responses will result to a score of 1–4 and that no score of 2 was given to any single response, the project will be assigned a <u>medium risk</u> category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as <u>high-risk</u> project.

Result of Initial Screening (Low, Medium, High): Medium

Other Comments: Project will need to undertake further climate assessment and integrate relevant climate proofing measures in the project design.

Prepared by: Malte Maass, Climate Change Specialist (11.08.2022)

⁴⁰ If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.
Appendix R – Incident Reporting Forms

	INCIDENT	NOTIFICAT	ION FORM	
-				

Project:		Incider Date:	nt		
Location:		Incider Time:	nt		
Equipment Involved:		Operat	ion in ss:		
Weather: Clear Dark Rain Sno Visibility: Artificial Light Dark Dan		now 🗆 High Winds 🗆 Other (describe): awn 🗆 Daylight 💷 Dusk			
Reporting Level of	Incident:				
Fatality Lost Time Restricted Work Medical Aid Fire/Explosion		Business Interruption Security/Trespass/Theft Mobile Equipment Vehicle Security/Pelease		Government Reportable Non-reportable Contravention Public Complaint	
Contractor Inciden	t: 🗆 Yes 🗆 No Contra	ctor name	4		<u>(1)</u>
Report Prepared by	r.	Supervi	isor's Nam	16:	
Signature:	Date:	Tel. No.			Date:
DESCRIPTION OF I Attach photos if appli	NCIDENT (Describe what, wh cable.)	en, why, wh	to and how	. Use sep	aarate pages if required.
DESCRIPTION OF I	NCIDENT (Describe what, wh cable.)	en, why, wh	to and how	. Use sep	arate pages if required.
DESCRIPTION OF I Attach photos if appli	NCIDENT (Describe what, wh cable.) de separate witness reports	en, why, wh	to and how	. Use sep	parate pages if required.
DESCRIPTION OF I Attach photos if appl WITNESSES- Provi	NCIDENT (Describe what, wh cable.) de separate witness reports	en, why, wh	to and how	. Use sep	arate pages if required.
DESCRIPTION OF I Attach photos if appl WITNESSES- Provi Name	NCIDENT (Describe what, wh cable.) de separate witness reports	en, why, wh	to and how	. Use sep	arate pages if required.
DESCRIPTION OF I Attach photos if appl WITNESSES- Provi Name	NCIDENT (Describe what, wh cable.) de separate witness reports	Position	Contact In	. Use sep formatio	ave been made?
VITNESSES- Provi Name	NCIDENT (Describe what, wh cable.) de separate witness reports stions have been made?	Position	contect In	. Use sep formatio	arate pages if required.

Was injured person(s) taken to hospital? (if yes, provide name and location of the hospital)	Yes 🗆	No 🗆	
Indicate the area of injury, if applicable, on the injury in the space below:	diagram	to the right, and describe the	
VEHICLE INFORMATION (if applicable)			A.S.
Driver's Name:	Dr	iver's License No.:	
Year, Make & Model:	Dr	iver's Phone Number:	
License Plate or Serial Number:	In	surer and Policy No.:	
Was seat belt done up? 🗆 Yes 🛛 No	W	ss a cell phone being used? 🗆 Ye	es 🗆 No
Were police notified? Yes 🗆 No 🗆	Na	me of police officer:	
Road conditions: Dry Gravel Wet Icy	Ot	her Info/Attachments:	
Spill/Release Information (if applicable)			
Product: Volume:		Quantity Recovered:	
Initial Causal Analysis of Incident:			
Direct Cause: (what / how)			
Root Cause: (why)			
Corrective Actions to Prevent Recurrence:			

Note: Refer to the "Root Cause Investigation & Corrective Action Form" for further detail.

INCIDENT ROOT CAUSE INVESTIGATION AND CORRECTIVE ACTION FORM

 _	
 - 14	

Project:		Incident Date:	
Location:		Incident Time:	
Incident Title:			
Has the Incident Not	ification Form been compl	eted? 🗆 Yes 🗆 No	
If not, complete the incident notification form before		Completing this form.	
Lost Time Restricted Work Medical Aid	Near Miss Equipment Damage Property Damage Eco/Exploring	Security/Trespass/Theft Mobile Equipment Vehicle	Government Reportable Non-reportable Contravention Rublic Complaint
First Aid Report Prepared by:	Стичехрозоп	Spill/Release Supervisor's Name:	Ci Fabile Companie
report riepareo by.		aupervisor a riente.	
Signature:	Date:	Signature:	Date:
A cause is a condition A contributing factor contributing factor is el such as being less seve DESCRIPTION OF IN	that produces an effect. If a is a condition that influences iminated, the effect is not ne re, less likely, proceeding mo CIDENT (Use separate pages	cause is eliminated, the effect the effect but does not cause cessarily eliminated but may t are slowly, or other similar effe i if required. Attach photos if	is eliminated, the effect. If the be influenced in other ways, ects. applicable.)
A cause is a condition A contributing factor contributing factor is el such as being less seve DESCRIPTION OF IN	that produces an effect. If a is a condition that influences iminated, the effect is not ne re, less likely, proceeding mo CIDENT (Use separate pages	cause is eliminated, the effect the effect but does not cause cessarily eliminated but may t are slowly, or other similar effe i if required. Attach photos if	is eliminated, the effect. If the be influenced in other ways, acts. applicable.)
A cause is a condition A contributing factor contributing factor is el such as being less seve DESCRIPTION OF IN Root Cause and Co	that produces an effect. If a is a condition that influences iminated, the effect is not ne re, less likely, proceeding mo CIDENT (Use separate pages CIDENT (Use separate pages ntributing Factor Analys	cause is eliminated, the effect the effect but does not cause cessarily eliminated but may t se slowly, or other similar effe if required. Attach photos if sis (add more pages if nec	is eliminated, the effect. If the be influenced in other ways, ects. applicable.) essary for any section)
A cause is a condition A contributing factor contributing factor is el such as being less seve DESCRIPTION OF IN DESCRIPTION OF IN DESCRIP	that produces an effect. If a clisic second	cause is eliminated, the effect the effect but does not cause cessarily eliminated but may to a slowly, or other similar effect if required. Attach photos if sis (add more pages if nect s leading up to the incident the r whether changes from norma- to Chapter 6 of the ADB OCI	is eliminated, the effect. If the be influenced in other ways, ects. applicable.) essary for any section) at were different to a al sequences of events were HS Guide for detail)

Were relevant legislation and standards being followed by the workers in the events leading up to the incident? If not, why not?

INCIDENT ROOT CAUSE INVESTIGATION AND CORRECTIVE ACTION FORM

Were there any mechanical failures or defects that led to the incident? If yes, describe below:

Were the proper safety devices in place and being used? Were workers using proper personal protective equipment (PPE)? If not, why not?

Did the actions or lack of actions of anyone at the worksite contribute to the incident? If yes, describe below:

Were there any unusual conditions that contributed to the incident, such as (but not limited to) weather, other activities in the area, or anything else that was not typical for the task?

Did the workers present at the incident respond in a safe and appropriate way? Describe below:

INCIDENT ROOT CAUSE INVESTIGATION AND CORRECTIVE ACTION FORM

ction Analysis	
ed to prevent a similar incident from complete and who is responsible for	occurring
Person Responsible	Status?
	-
	-
	ction Analysis d to prevent a similar incident from complete and who is responsible for Person Responsible

INCIDENT	ROOT CAL	JSE INVEST	IGATION AND
CORRECTI	VE ACTION	N FORM	

1

Were the workers adequately trained to respon	nd to the incident? If not, what training would have
helped to lead to a better outcome?	
Are there adequate procedures in place to resp need to be developed?	ond to similar incidents? If not, what procedures
Check any causes and contributing factors from causes and contributing factors.	n the following list. If necessary, add additional
Operating equipment without training	Inadequate site security
Operating equipment without proper care	Inadequate worker protection from toxic substances
Operating equipment without safety devices in place or with inoperable safety devices	Inadequate PPE
Inadequate warning to workers of a safety issue	□ Inadequate lighting
Inadequate barriers or barricades	Inadequate ventilation
Using defective tools or equipment	Inadequate supervision
Proper equipment unavailable	Inadequate training
Improper loading	Fatigue
D Poor nousekeeping practices	Worker(s) under the influence of substances such a single of substances such a
Repetitive accorningury Soor maintenance of tools/equipment	
Hazardous conditions (gas, dust, fumes)	ä
- iters and a second and a second second	
	0
List the contributing factors and their involvem	ent as a cause of the incident.

ï

Appendix S – PCB Tests

Tests completed using rapid test kits:

https://www.dexsil.com/products/clor-n-oil#documents

PCBs rapid testing at transformer substations (January 24 - 26, 2023)

Day 1

Substation Faizabod

Transformer 1 (1 training test and 1 for verification) - below 50 ppm





1

Transformer 2 - below 50 ppm



Substation Zafar

Transformer 1 - below 50 ppm



Transformer 2 - below 50 ppm

Day 2

Substation Obi Kaet

Transformer 1 - below 50 ppm







Day 3

Substation Zarafshon

Transformer 1 - below 50 ppm





Transformer 2 - below 50 ppm