Initial Environmental Examination

Project Number: 51308-008
September 2023

India: Uttarakhand Climate Resilient Power System Development Project

Appendices Part 8

Prepared by Power Transmission Corporation of Uttarakhand Limited and Uttarakhand Power Corporation Limited for the Asian Development Bank.

Appendix Q – PTCUL Environmental Mitigation Plan

Table N-1: PTCUL Design Phase EMP					
Topic	*Impact / Issue*	*Commitment*	*Applicable Project Standards / Best Practice*	*Implementation Responsibility*	*Monitoring Responsibility*
New SS or connections at locations within existing SS	Corrective action	*Applicable to New SS within Existing SS* • Lands for new SS at Dhaulkhera, Selaqui and Araghar are owned by UPCL and will need to be cleared of all debris/waste prior to handover, PTCUL to work with UPCL to ensure that in clearing the site all applicable EMP requirements are followed. In particular, PTCUL to ensure all debris/waste is removed by UPCL to their stores or disposed of using appropriately licensed waste management company with all storage, transport, and disposal as per national waste regulations and records kept. • PISC will conduct an environmental audit to confirm all debris/waste has been removed from site such that it is "clean" for construction and if there are any legacy issues/impacts or risks for the contractor to address prior to taking over the land. *Applicable to Pithoragarh SS Connection* • PTCUL (PISC) will conduct an environmental audit of the existing SS to confirm if there are any legacy issues/impacts or risks for the contractor to address prior to installing the connection.	• ADB SPS (2009)	PTCUL PTCUL counterpart cost	PTCUL PIU / PISC
		Applicable to New SS or Connections within Existing SS of PTCUL • Contractors at request of PTCUL to address any short-term or long-term corrective actions (e.g., cleanup of oil spills) as part of their scope of works in construction of new SS at locations which are also supporting existing substations of UPCL (Dhaulkhera, Selaqui and Araghar) and in the termination of second circuit stringing within the Pithoragarh substation of PGCIL.		EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	
Siting and design of Project infrastructure	Finalization of new substation design and layout, finalization of OHL and UG cable route alignments	*Applicable to all Components:* • Comply with all applicable national and state environment, health, and safety (EHS) regulatory requirements in addition to the mitigation measures set out in the EMP – if there is any conflict between national requirements and measures set out in the EMP the most stringent provisions will take precedence	• ADB SPS (2009) • IFC EHS General Guidelines • IFC EHS Electric Power T&D Guidelines	EPC Contractor Include in EPC contract cost	PTCUL PIU / PISC

Table N-1: PTCUL Design Phase EMP					
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		• Designs to reflect the requirements of the EMP and international engineering best practice/good EHS practices • Preference shall be given to locating above ground equipment on modified habitat. • Identify presence of any unstable land/steep slopes and avoid these during the detailed design. • Where SS sites and OHL towers are not on flat land conduct geotechnical/slope stability analysis with slopes to be graded with drainage installed to minimize landslide risk. Ensure resulting slope design/topography does not exacerbate surface erosion and/or trigger a landslide; all disturbed areas are to be revegetated. Bioengineering methods can be considered for providing slope protection. • Stability of slopes over 30% shall be checked and approved by the PISC prior to selection of tower location/substation layout and related foundation to be used. • Cut and fill requirements shall be minimized by design to reduce changes in topography and the extent of earthworks and thus dust generation during construction. Contractor shall quantify the extent of earthworks required and locations for disposal of excavated spoil such as through landscaping within SS site. • Identify presence of floodplain or depressions that get waterlogged in the rainy season and avoid these during detailed design. • Conduct flood and drainage risk assessment and incorporate effective drainage design (allowing for climate change) to prevent possible flooding or waterlogging of SS equipment/towers during the wet season, whilst ensuring that surface runoff from the project site is no more than the greenfield runoff rate. *Applicable only to Applicable to HV Power Lines (OHL and UG)* • Carefully select the route/siting of towers to minimize impacts on existing structures (e.g., buildings) etc.	• EBRD[22] • ILO Worker Housing[23]	Before design approval for further implementation during construction phase	

[22] https://www.ebrd.com/downloads/about/sustainability/Workers_accomodation.pdf

[23] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwipxs7J1eP3AhWbdHAKHU25CRMQFnoECAQQAQ&url=http%3A%2F%2Fwww.ilo.org%2Fwcmsp5%2Fgroups%2Fpublic%2F%40ed_emp%2F%40emp_ent%2F%40multi%2Fdocuments%2Fpublication%2Fwcms_116344.pdf&usg=AOvVaw2-ApSPNhOLrUokrZPmdcL3

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		• UG cables shall generally follow the existing RoW of the road whilst avoiding impacts on trees, properties, public utility services, street furniture etc. • Any temporary disturbance compensated for in accordance with the LARP. • Minimize visual impact and clutter in locating above ground equipment. • For all UG works crossing rivers they must be in conduit attached to a bridge or buried beneath the river using HDD method. *Applicable only to Substations* • Substation transformers to be mounted on impermeable surface extending beyond the transformer footprint, bunded to 110% capacity and not connected to the surface water drainage system to collect oil spill, leaks, and overflows; transformers to be sited in a separately fenced area that can be kept locked. • Substation designs will follow the Draft Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2021, including Soak Pit and Oil collecting pit. An oil soak pit shall be designed and provided below each oil filled transformer / reactor to accommodate at least 150% of total quantity of oil contained in the transformer / reactor with minimum 300 mm thick layer of gravels / pebbles of approximately 40 mm size (spread over a steel iron grating / trans rack) providing free space below the grating. Alternatively, an oil soak pit shall be provided below each transformer or reactor, to accommodate one third of total quantity of oil contained in the transformer / reactor with minimum 300 mm thick layer of gravels/ pebbles of approximately 40 mm size (spread over a steel iron grating/ trans rack) providing free space below the grating provided a common remote oil collecting pit of capacity at least equal to oil quantity in the largest size transformer or reactor is provided for a group of transformers or reactors and bottom of the soak pit below the transformer or reactor shall be connected to the common remote oil collecting pit with drain pipe of minimum 150 mm diameter with a slope not less than 1/96 for fast draining of oil or water through gravity from soak pit to the common remote oil collecting pit. Every soak pit			

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		below a transformer or reactor shall be designed to contain oil dropping from any part of the transformer or reactor. The common remote oil collecting pit and soak pit (when remote oil collecting pit is not provided) shall be provided with automatic pumping facility, to always keep the pit empty and available for an emergency. • Provision of oil-water separator on all surface water drainage. • Separation or fire barrier walls will be provided between the transformers or between transformer and nearby buildings as per Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations. • Ensure maximum sound power level of equipment at 1 m is 85 dBA through use of sound attenuation, in areas where these noise levels will be exceeded OHS noise warning signage identifying that ear protection to be worn must be installed as part of design. • Provide well designed, covered, segregated materials and waste storage area of sufficient size to accommodate all anticipated storage requirements, ensure storage areas can be locked, are well-ventilated and will not reach extreme temperatures. Ensure space also provided in the storage area for solid and hazardous waste garbage bins to be stored. Fuel/oil/chemical/waste storage areas must have an impervious floor and be bunded so that the capacity of each bund is sufficient to contain at least 110% of the maximum design storage capacity within storage area, not connected to the surface water drainage system. • Provide spill prevention kits (sorbent pads, loose sorbent material, etc.) at storage areas and other at-risk locations within clearly labelled containers. • Locate new transformers; storage areas; and septic tanks/soak away at least 50m from waterbodies and borewells to reduce pollution risk, if closer proximity is required due to site layout further assessment to be carried out to demonstrate using a source-pathway-receptor model there will be no adverse impact on aquatic ecology or human health. • Layout substations so transformers are the furthest distance possible from the adjacent receptors to minimize corona noise/transformer hum experienced. Where possible the quietest available equipment with manufacturer-supplied noise mitigation will be installed. Contractors to ensure that			

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		the design enables operation to always comply with 1-hour LAeq 70 dB(A) at the site boundary, 55dB(A) outside the fence line if located within a commercial zone, 45 dB(A) at the nearest residential properties including located those in commercial zones, and 40dB(A) at 100m distance from silent zones. • Given transformers are generally in the range 60-80 dBA at 1m they are to be located at least 5 m inside the substation site boundary but this distance will need to be increase to between 20m – 100m depending on the land use adjacent to the substation for noise limits to be met without additional attenuation. Diesel generator sets will similarly need to be located away from the SS boundaries. • If residential properties or other sensitive receptors are near the substation boundary, then measurements must be carried out during detailed design and baseline noise calculations (modelling) considering low frequencies associated with transformer hum will be undertaken by the Contractor to demonstrate that the noise standards/guidelines can be met. If background noise levels already exceed the standards/guidelines the design must ensure that noise levels result in a <3dBA increase in background. • If the noise levels at the site boundary or receptors cannot be met through siting alone, then an acoustically designed enclosures or fences will be installed around either the noise source and/or substation boundary to enable the required noise level to be met as a permanent installation as part of the design. • Ensure that ICNRP occupational and community EMF exposure levels (reference and peak values) will be achieved within the substation and outside of the fence line respectively. • 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 • Include a secure boundary fence or wall that is sufficiently high it cannot be climbed over, provide a gated, surfaced vehicular access for entry/exit off public highway having adequate sight lines for all drivers and warning signs of entranceway for road users.			

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		• 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. Detailed design is to include rainwater harvesting and enable PTCUL to readily fit solar panels on building rooftop once operational. • Control building design will provide for sanitation and welfare facilities as per national regulations and international GIIP including indoor toilets (separate for men and women) with hand washing facilities (minimum of 1 unit to 6 males and 1 unit for 6 females shall be provided) and a dedicated cooking area / clean eating area / rest area for staff on-site etc. • Provide access to a safe, secure, hygienic facility for female workers' children below five years of age; any room provided for this purpose must be segregated from the operational elements of the substation. • Dedicated shelter to be provided at the site entrance for use by security guards, shielding them from rain, wind, and extreme (hot / cold) temperatures. • All wastewater 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. • Potable water will be supplied that meets national ISO 10500 drinking water standards (full suite). If this is unavailable, ensure regular supply of bottled water to the site during construction and operational phases. • Design of control building to include emergency exits with emergency exit signage • Provide automatic fire alarm and fire suppression system in control building. • Provide fully stocked, in-date first aid kit installed in a prominent, signed position, first aid posters and emergency contacts to also be displayed			

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		• Provide eye wash station and water supply to shower located near storage areas for fuel/oil/chemicals • Provide sand buckets, full of sand, placed in a prominent, signed location near to fire-risk locations such as transformers and oil storage areas • 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 • 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. • 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.			
	General Conditions for HV Power Lines (OHL)	*Applicable to Applicable to HV Power Lines (OHL)* Based on the requirements of the Draft Standard Technical Specification for Steel Pole Structure. GoI. Ministry of Power. Central Electricity Authority. April 2021, the Contractor shall ensure that: • Route to have minimum crossings of major rivers, railway lines, National/State highways, overhead EHV power lines, and communication lines. • Number of angle points to be kept to a minimum. • Distance between the terminal points specified to be kept shortest possible, consistent with the terrain that is encountered (*but considering environmental and social constraints to be identified within the IEE*). • Marshy and low-lying areas, riverbeds and earth slip zones to be avoided to minimize risk to the foundations. • Areas subjected to flooding such as nalah shall be avoided. • All alignment should be easily accessible both in dry and rainy seasons to enable maintenance throughout the year. • It would be preferable to utilize level ground for the alignment.	• Draft Standard Technical Specification for Steel Pole Structure. GoI. Ministry of Power. Central Electricity Authority. April 2021	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC

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		• The areas requiring special foundations and those prone to flooding to be avoided. • Crossing of power lines to be kept to a minimum. Alignment of a transmission line with respect to existing line will be kept considering ROW and tower falling distance. • Crossing of communication lines to be minimized and it shall be preferably at right angle. Proximity and parallelism with telecom lines to be eliminated to avoid danger of induction to them. • Certain areas such as quarry sites, tea, tobacco and saffron fields and rich plantations, gardens and nurseries which will present PTCUL problems in acquisition of right of way and way leave clearance during construction and maintenance to be avoided. • Angle points during survey should be selected such that shifting of the point within 100 m radius is possible at the time of construction of the line (*subject to updating of the IEE for ADB clearance*). • Routing of a transmission line to avoid large habitations, densely populated areas, protected / reserved forest / National Parks / Wild Life and Bird Sanctuaries, the habitant zones of Great Indian Bustard and other protected species, civil / military airfields and aircraft landing approaches, reserve coal belt areas, mining area, oil pipeline/underground inflammable pipelines etc. to the extent possible.			
	Exposure to safety risk	*Applicable to Applicable to HV Power Lines (OHL)* • Ensure all relevant safety clearances and right of way are applied to HV power lines per national standards, see Appendix O. • During route survey identify presence of all buildings/properties within the ROWs with particular attention to mapping school compounds and playgrounds; minimum distances to center line to be inventoried. • Installation of HV power lines above or adjacent (within the horizontal clearance) to residential properties or other locations intended for highly frequent human occupancy (e.g., schools or offices) to be avoided. No school compounds or playgrounds will fall within the horizontal safety clearance. • Barbed wire type anti-climbing device shall be provided and installed by the Contractor for all tower structures. The height of the anticlimbing device shall be approximately 3 m above	• ADB SPS (2009) • The Electricity Act (1910) and its Amendments (2004) & (2007); • The Electricity Rule (1956) & its Amendments (2000); • The Indian Telegraphic Act (1885) & its Amendments (2003); • Central Electricity Authority (CEA) (Installation and Operation of Meters)	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC

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		ground level. The barbed wire shall conform to IS: 278 (size designation A1). The barbed wires shall be given chromating dip as per procedure laid down in IS:1340. • Each tower shall be fitted with a number plate, danger plate and a set of phase plates per circuit. The arrangement for fixing these accessories shall not be more than 4.5 m above ground level. • Ensure that ICNRP community EMF exposure levels (reference and peak values) will be achieved • All transmission towers 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	Regulations, 2006 – Notified on 17.3.2006; • CEA (Grid Standards for Operation & Maintenance of Transmission lines) Regulations, 2010- notified on 26.06.2010; • CEA (amendment to the regulations on "Installation & Operation of meters") regulations, 2010- notified on 26.06.2010; • CEA (Measures relating to safety & Electric Supply) Regulations, 2010- notified on 24-09-2010; CEA (Technical Standards for Construction of Electric Plants and Electric Lines) regulations, 2010-notifed on 20-08-2010; • CEA (Safety Requirements for Construction, Operation and Maintenance of Electrical Plant and Electrical Lines) Regulations, 2011-notifed on 14-02.2011; • CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) – Regulations 2010; and • CEA (Technical Standards for		

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			connectivity to the Grid) (Amendment) Regulations, 2010. • The Draft Standard Technical Specification for Steel Pole Structure. GoI. Ministry of Power. CEA. April 2021		
	Visual impact of HV power lines	*Applicable to Applicable to HV Power Lines (OHL)* • For the micro-siting of HV power lines, the towers and lines to be located as far away as practical from residential dwellings. • Include visibility of the towers among the factors considered during final tower positioning, including determining the proper balance between heights of towers and the number of towers.	• ADB SPS (2009) • IFC EHS Guidelines. Electrical Power Transmission and Distribution (2007)	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC
	Damage to socially/culturally sensitive and historical sites	*Applicable to All Components:* • Permanent or temporary facilities will strictly avoid protected ASI and GoUK monuments including the 300m regulated area associated with protected ASI and GoUK monuments. *Applicable to HV Power Lines (OHL and UG)* • Contractors to conduct an inventory of physical cultural resources in and adjacent to the RoW prior to the start of any works including distances to the center line. • Careful selection of route alignments to avoid encroachment on socially, culturally, and archaeological sensitive areas (e.g., sacred groves, graveyards, religious worship place, monuments etc.)	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC
	Impacts to designated sites	*Applicable to all Components* • No OHL works will be permitted in ESZ or draft notified ESZ. • SS sites and OHL route alignments plus any temporary facilities that are potential pollution sources (including from noise) will be located at least 500m from the core / buffer zones of national parks, wildlife sanctuaries, conservation/tiger reserves, and other internationally and nationally recognized biodiversity sites such as Ramsar Sites, Key Biodiversity Areas, Important Bird Areas, elephant	• ADB SPS (2009) • IFC EHS Guidelines. Electrical Power Transmission and Distribution (2007) • The Environment (Protection) Act 1986 and Environment	EPC Contractor Include in EPC contract cost Before design approval for further implementation	PTCUL PIU / PISC

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		corridors, tiger corridors etc. SS sites and OHL route alignments will be located at least 100m from reserve forests and other notified forest areas. • Temporary laydown and storage areas that are not potential pollution sources may be located a minimum of 50m distant of notified forest areas/forest habitat. • Only exception to OHL works allowed within 500m of tiger corridors and KBA is the LILO of 132 KV Khatima - Sitarganj line where at least 100m to the tree line must be maintained from the SS site and route alignment. • Only those SS sites and UG cables as set out in the IEE will be permitted in the ESA and draft notified ESZ covering Dehradun. UG cables routed within 100m of notified forest areas/forest habitat must be installed within the existing road alignment. • Only exception to works allowed in notified forest areas/forest habitat will be second stringing of the OHL as set out in the IEE. No temporary facilities for second stringing of the OHL will be allowed within notified forest areas/forest habitat. The written permission of the Forest/Wildlife Department has been secured by PTCUL and their requirements will be followed (e.g., no new forest land will be utilized, no new towers will be constructed other than the originally approved, stringing of the second circuit will be done on the double circuit towers already erected, and no tree felling will be done) along with applicable requirements of the original forest clearance for diversion of land. • For those works within the ESA and within 10km of protected areas where the ESZ is not yet gazetted written permission (as applicable) will be obtained from the Forest/Wildlife Department, Mussoorie Dehradun Development Authority (for works in Dehradun-Mussoorie) the Uttarakhand Pollution Control Board. • Except for laydown and storage areas that are not potential pollution sources temporary facilities (e.g., centralized concrete batching plant, hot mix plant, refueling areas, maintenance yards, storage areas for loose materials or fuel/oil/chemical, temporary worker camps) will not be sited in a notified or draft notified ESZ. However, they will be permitted in the ESA and within 10km of protected areas where the ESZ is not yet gazetted if written permission is requested from and	(Protection) Rules 1986 & its Amendments • Wild Life (Protection) Act, 1972 (amended 2003	during construction phase	

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		provided to the contractor by the Forest/Wildlife Department, Uttarakhand Pollution Control Board, Mussoorie Dehradun Development Authority (for works in Dehradun-Mussoorie)			
	Land Acquisition and Compensation, resettlement and temporary disruption	*Applicable to HV Power Lines (OHL and UG)* • During route survey identify presence of all buildings/properties within the ROWs with particular attention to mapping school compounds and playgrounds; minimum distances to center line to be inventoried. • Where properties cannot be avoided in the design and where they are present within national safety clearances the properties will be expropriated by PTCUL following the procedures outlined in the Project LARP. The LARP will be updated by PTCUL during the design phase to include any such properties • Underground cables will be bored and laid using trenchless method through Horizontal Directional Drilling (HDD) machine as the preferred option. • Open trenching will only be used with the permission of PTCUL where sufficient open space is available away from narrow and congested roads, there will be no disturbance to vegetation/trees, and no social safeguard constraints present, and the trench will be open and backfilled within a single day. • UG cable alignment to be designed to be within road/sidewalk reserves as far as is practical, having minimal impact on private land holdings and any informal settlement, street vendors etc.	• ADB SPS (2009) • Project LARP • Ministry of Power, Government of India, Guidelines for payment of compensation towards damages in regard to Right of Way for transmission lines dated 15th October 2015 • Ministry of Power, Government of India, Guidelines for payment of compensation in regard to Right of Way (RoW) for transmission lines in urban areas, dated 16th July, 2020. • Govt of Uttarakhand Order dated 5th Aug 2020 for POWERGRID/PTCUL Projects.	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC
	Damage to private property, crops and water supplies etc.	*Applicable to SS:* Drains bisecting the SS sites will be maintained with bridge/culvert to cross over sufficient to allow passage of flood water. *Applicable to HV Power Lines (OHL and UG)* • Alignment to avoid or minimize crop disturbance where lines cross private land by crossing uncultivated land (not natural habitat) as much as possible. • During route survey identify and inventory presence of any surface waterbodies including rivers/ponds and groundwater sources including springs/wells/pumps within the ROW and confirm if any are used by local communities for drinking water or other purposes documenting distance to the center line. • Alignment to avoid impacting on rivers/ponds and groundwater sources especially water sources including springs/wells/pumps used by local communities.		EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC

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		• Alignment to avoid impacting on men and women's access to common land for uses such as fuelwood and fodder and water resources; use of common land and water resources to be identified through consultation			
	Access roads	*Applicable to all Components* • No new permanent access roads will be constructed except to SS sites if needed; for HV power lines existing access roads will be used in the first instance along with manual construction to minimize soil compaction from vehicle movements. • Designs for access roads in steep terrain will be submitted for approval, no access roads will be cut into a hillside. • Access roads will be graded and sloped with drainage either side to prevent unnecessary flow of water across the road and to minimize soil erosion. • If new access roads are required the Contractor will make the access suitable for 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.		EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC
	Drainage	*Applicable to all Components* • Final surface level of substation and tower foundations will be at least 0.5 m above the existing ground level or highest flood level including an allowance for climate change based on the findings of the climate change assessment prepared for the Project (whichever is higher) • Foundations to be constructed in such a way as to be adequately drained to prevent washouts and flooding impacts to adjacent land. • Junctions between new access roads and existing roads will not impede or damage the latter nor any associated drainage channels, irrigation infrastructure, etc.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC
Biodiversity	Habitat Loss, Tree Cutting	*Applicable to all Components* • Contractor to employ field ecologists to undertake ROW walkover, map habitats beneath towers and ROW confirming if modified or natural habitat present, and listing species encountered. During ecological surveys field ecologists will enumerate the number and species of trees requiring to be cut and lopped. In forest habitat the quality of forest cover lost will be confirmed. Submit ecological survey report alongside design.	• ADB SPS (2009) • CEA (Safety Requirements for Construction, Operation and Maintenance of Electrical Plant and Electrical Lines) Regulations, 2011-notifed on 14.02.2011	EPC Contractor Include in EPC contract cost Before design approval for further implementation	PTCUL PIU / PISC

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		• Presence or absence of sensitive receptors and critical habitat species identified in IEE to be confirmed by field ecologists during route surveys including detailed species surveys as required by the IEE. Adaptive management measures to be applied according to the findings of the surveys, e.g., realignment of cable routing to avoid tree roots, etc. • Carefully select route alignments and substation layouts to avoid or at least minimize the need to cut/trim trees by avoiding areas with a high concentration of trees. • Cutting or trimming of trees will only be planned when required to meet safety clearance requirements per CEA requirements. • Entry/exit pits for UG cables to be placed to avoid the area beneath tree crowns (zone for root protection) and other vegetation. UG cable alignment placed to avoid the tree crowns especially mature trees.		during construction phase	
	Primates/Elephants	*Applicable to HV Power Lines (OHL)* • Detailed design to include retrofitting of transmission towers in forest area/habitat and within 500m with anti-climbing devises designed specifically for primates (barbed wire is less effective). • Ensure that the minimum height of lowest sag of HV power line conductors is at least 6m over and above the minimum clearance stipulated by CEA, for the safe passage of the terrestrial fauna.	• ADB SPS (2009) • CEA (Measures relating to safety & Electricity Supply) Regulations, 2010	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC
	Bird Electrocution and Collision	*Applicable to all HV Power Lines (OHL)* • Design of all OHL to minimize the risk of bird electrocution and collision following international best practice for phase-to-phase and phase-to-ground clearances for large birds at risk, as identified in the IEE. • Maintain at least a 1.5 meter (60-inch) spacing between all energized components and grounded hardware or, where this spacing is not feasible, covering all energized parts and hardware to avoid electrocution. • Bird diverters, wherever required as per MoEF&CC or WII guidelines or where birds are at risk of collision per the findings of the IEE (Appendix C), shall be provided and installed by the contractor immediately following stringing and	• ADB SPS (2009) • IFC EHS Guidelines. Electrical Power Transmission and Distribution (2007) • *Suggested Practices for Avian Protection on Power Lines (2006)* • The Draft Standard Technical Specification for Steel Pole Structure. GoI. Ministry of Power. Central Electricity Authority. April 2021	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC

Table N-1: PTCUL Design Phase EMP					
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		before commissioning/energizing of the HV power line. Specific lines are: ○ Manglaur – Nara LILO (6 locations for diverters) ○ Kashipur – Mahuakheraganj LILO (5 locations for diverters) ○ Mahuakheraganj - Jaspur LILO (8 sections for divertors) • Design of second circuit OHL stringing to include for the procurement and installation of bird divertors on sections of the HV power line specified within the IEE (Appendix C) – this will include marking of lines crossing forest land (3.03km) to comply with the original Forest Clearance, the Kali River Valley between angle points (about 2km) and any other sections identified as a risk by the forest officer and/or IEE – including forest areas. • Exact stretches for bird diverter marking are to be confirmed by field ecologists during route surveys and agreed with PTCUL. • Technical specifications for bird diverter available at Central Electricity Authority website (www.cea.nic.in) shall be followed. They must also be an internationally accepted robust design, rotates, of contrasting color, reflects UV light, glows in the dark, and is guaranteed. At minimum the bird divertors to be placed at 10m spacing along the earth wire. • Design of second circuit OHL will ensure that the conductors are installed in the same horizontal plane as the existing conductors (to avoid additional barrier being created to bird flight paths). • To prevent birds perching immediately above the suspension insulator strings (I-Type / V-Type) and fouling the same with droppings as well as to help prevent electrocution, suitable bird guards shall be provided at crossarm tips of all suspension towers. The bird guard arrangement shall be such that it shall either prevent bird from perching in position where they are liable to cause damages or ensure that if birds do perch, droppings will fall clear of the insulator string and they will not be at risk of electrocution. Suitable provision of cleat / plate to be provided on all suspension towers facilitating installation of bird guard after stringing. At minimum saw type bird guard conforming to IS: 5613 shall be provided.			

Table N-1: PTCUL Design Phase EMP					
Topic	*Impact / Issue*	*Commitment*	*Applicable Project Standards / Best Practice*	*Implementation Responsibility*	*Monitoring Responsibility*
Equipment specifications and design parameters	Polychlorinated Biphenyls (PCB)	*Applicable to all SS* • PCBs will not be permitted for use in any transformers at substations or in any other project facilities or equipment. • Provide PTCUL with material data sheets for the insulating oil used in transformers. • Processes, equipment, and systems not to use chlorofluorocarbons (CFCs) including halon.	• ADB SPS (2009) • Stockholm Convention	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC
	Exposure to electromagnetic interference	*Applicable to all Components* • Designs to comply with the reference levels of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) for EMF exposure. Contractor to provide EMF calculations to the PISC for review and approval. *Applicable to all SS* • Use of shielding equipment/materials to decrease electromagnetic field exposure included at any substation where calculations identify levels above ICNIRP reference levels at properties close to the substation.	• ADB SPS (2009) • Guidelines of Central Electricity Authority	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC
	Exposure to noise	*Applicable to all SS* • Design substations so operational noise complies with 1-hour LAeq 70 dB(A) at the site boundary, 55dB(A) outside the fence line if located within a commercial zone, 45 dB(A) at the nearest residential properties including located those in commercial zones, and 40dB(A) at 100m distance from silent zones. • Given transformers are generally in the range 60-80 dBA at 1m they are to be located at least 5 m inside the substation site boundary but this distance will need to be increase to between 20m – 100m depending on the land use adjacent to the substation for noise limits to be met without additional attenuation. Diesel generator sets will similarly need to be located away from the SS boundaries. • If residential properties or other sensitive receptors are near the substation boundary, then measurements must be carried out during detailed design and baseline noise calculations	• ADB SPS (2009) • IFC EHS Guidelines – Noise Management (2007) • Noise Pollution (Regulation and Control) Rules, 2000 and the Noise Pollution (Regulation and Control) (Amendment) Rules, 2010	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC

Table N-1: PTCUL Design Phase EMP					
Topic	*Impact / Issue*	*Commitment*	*Applicable Project Standards / Best Practice*	*Implementation Responsibility*	*Monitoring Responsibility*

		(modelling) considering low frequencies associated with transformer hum will be undertaken by the Contractor to demonstrate that the noise standards/guidelines can be met. If background noise levels already exceed the standards/guidelines the design must ensure that noise levels result in a <3dBA increase in background.
		• Due to presence of receptors within 50m an acoustically designed enclosure or wall will be installed around the transformers at the following substations to enable noise levels to be met during operation:
		  • Araghar SS
		  • Khatima-II SS			

	Hazardous Materials	*Applicable to all Components* • No asbestos containing materials of any type will be used in the design and construction of project facilities. *Applicable to all SS* • Batteries will be to national standards; use lithium-ion in preference to lead acid or cadmium nickel to minimize use of heavy metals. • Separate room for substation batteries will be provided with ventilation and exhaust fan for taking out fume gases in case of leaks and provision of monitoring of substation batteries (remote if not staffed substation) and exhaust fan will be made.	• ADB SPS (2009) • Model Factories Rules 120 (MFR 120) under Section 87 regarding Handling and processing of Asbestos, manufacture of any article of Asbestos and any other process of manufacture or otherwise in which Asbestos is used in any form.	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC
	Oil Management	*Applicable to all SS* • Secure oil storage areas bunded to 110% of capacity with an impervious floor of sufficient size to accommodate all anticipated oil storage requirements will be provided. Ensure these storage areas covered, can be locked, are well-ventilated, will not reach extreme temperatures and are not connected to the surface water drainage system. • Substation transformers to be mounted on impermeable surface extending beyond the transformer footprint, bunded to 110% capacity and not connected to the surface water drainage system to collect oil spill, leaks, and overflows; transformers to be sited in a separately fenced area that can be kept locked. • To manage leaks from oil containing equipment SS designs will follow the Draft Central Electricity Authority (Technical	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC

Table N-1: PTCUL Design Phase EMP					
Topic	*Impact / Issue*	*Commitment*	*Applicable Project Standards / Best Practice*	*Implementation Responsibility*	*Monitoring Responsibility*
		Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2021, including Soak Pit and Oil collecting pit.			
	SF6	*Applicable to all SS* • Use of alternative insulation medium (such as Hydrophobic Cycloaliphatic Epoxy) to be considered as the preferred option. • If no alternative the use of SF6 in gas insulated equipment must be minimized as part of design requirements. • Design of any gas insulated equipment will comply with international norms and standards for handling, storage, and management of SF6. • 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. • Installation 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. • Provide SF6 leakage detector at each substation • SF6 in fire extinguishers provided at substations to be avoided.	• ADB SPS (2009) • Reducing SF6 Emissions in Electric Power Systems: Best Industry Practices – USEPA	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC
	Geohazards	*Applicable to all Components* • All designs shall incorporate specific measures, as required by Indian Standards for Earthquake Resistant Design of Structures and other regulations and in coherence with the MoP, GoI Disaster Management Plan for Power Sector to mitigate the risk of damage from seismic events, and other natural hazards including flooding, forest fires and landslides. All structural designs are to be checked for seismic safety by design team and an independent expert, separate to design team, to confirm national and international good practice standards are met.	• ADB SPS (2009) • CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) – Regulations 2010	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC
	Water body / river crossings	*Applicable to all HV Power Lines (OHL and UG)* • During route survey identify and inventory presence of any surface waterbodies including rivers/streams/ponds within 500m of OHL RoWs and 50m of UG cables and confirm if any are used by local communities for drinking water or other purposes.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before design approval for further	PTCUL PIU / PISC

Table N-1: PTCUL Design Phase EMP					
Topic	*Impact / Issue*	*Commitment*	*Applicable Project Standards / Best Practice*	*Implementation Responsibility*	*Monitoring Responsibility*
		• Carefully select route alignments to avoid bisecting lakes, ponds and wetland areas. Alignment to avoid impacting on rivers/ponds and groundwater sources especially water sources including springs/wells/pumps used by local communities. • All OHL river/stream crossings required will be single span. • Any river crossing associated with UG LILO of 220 KV Khodri-Jhajra must be in conduit attached to bridge or HDD beneath the river.		implementation during construction phase	
	Climate hazards	<u>*Applicable to all Components*</u> • All designs shall incorporate climate change adaptation measures per the climate risk assessment (2023) including: <u>*Examples of Climate Adaptation Measures Applicable to SS*</u> Designs shall incorporate climate change adaptation measures per the climate risk assessment, including: • Locate or relocate substations away from areas highly susceptible to flooding/landslides when selecting substation sites. • Conducting geotechnical investigations at substation sites. • Designing strong foundations with higher elevation and safety factors for substation equipment including power transformers. • Building parapet walls, drainage systems, embankments as required at substation sites. • Building fire walls between power transformers at substations. • Providing lightning protection measures including station class surge arresters, equipment earthing, earth mesh etc. to minimize risks due to lightening. • Implementing GIS substations at required locations to save space and minimize climate and disaster risks. • Using power transformers with higher efficiency ratings at substations.	• ADB CRA (2023)	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC

Table N-1: PTCUL Design Phase EMP					
Topic	*Impact / Issue*	*Commitment*	*Applicable Project Standards / Best Practice*	*Implementation Responsibility*	*Monitoring Responsibility*

	Slope Stability	*Applicable to all Components*
		• Project components on slopes must incorporate slope stability measures such as bioengineering methods and retaining walls with adequate drainage to avoid exacerbating surface erosion and/or triggering a landslide. All designs for works in steep topography to be checked by design team and an independent geotechnical engineer, separate to design team, to confirm national and international good practice standards are met. Steep topography is present at,
		  • Lohaghat SS
		  • Champawat second circuit stringing OHL
			• ADB SPS (2009)	EPC Contractor
				
				Include in EPC contract cost
				
				Before design approval for further implementation during construction phase
					PTCUL PIU / PISC

Hazards to Life	OHS	*Applicable to all Components* • For all construction works undertake facilitated H&S risk assessment through a workshop during the design (and at other key stages) so it can inform both design and pre-construction preparations, considering both occupational and community H&S risks resulting from subsequent stages of the project. Facilitated workshop will involve the design and construction team of the contractors and PTCUL operational staff.	• ADB SPS (2009) • IFC EHS General Guidelines/Occupational and Community Health and Safety	EPC Contractor Include in EPC contract cost Before design approval	PTCUL PIU / PISC
	Explosions / Fire	*Applicable to all Components* • All substations and other project facilities will be designed and constructed according to national fire safety standards. *Applicable to all HV Power Lines (OHL)* • Ensure detailed design of OHL HV power lines incorporates lightening protection to minimize forest fire risks. *Applicable to all SS* • All substations will follow any national requirements for emergency response planning and response in compliance with Ministry of Power, GoI Disaster Management Plan for Power Sector- 2021 • Ensure designs of substations in vicinity of forest habitat where dry pine needles accumulate account for potential forest fires e.g., at Lohaghat SS.	• ADB SPS (2009) • CEA (Measures relating to safety & Electric Supply) Regulations, 2010- notified on 24-09-2010; CEA (Technical Standards for Construction of Electric Plants and Electric Lines) regulations, 2010-notifed on 20-08-2010		
	Electrical	*Applicable to all HV Power Lines (OHL and UG)* • Ensure HV power line designs are in accordance with all national safety standards for OHL and UG cabling. • To prevent cable break incident of new UG cables, cable markings will be installed above the cable to inform those who may be excavating in future.			

Table N-1: PTCUL Design Phase EMP					
Topic	*Impact / Issue*	*Commitment*	*Applicable Project Standards / Best Practice*	*Implementation Responsibility*	*Monitoring Responsibility*
		• In case the armor is broken by a third party and the core damaged, protection relays to which the UG cables connect will be designed to detect this and stop sending electricity immediately by automatically opening switchgear to prevent a live shock to the person.			
	Access	*Applicable to all Components* • Designs will ensure that there can be no illegal access to substations. • Include in the design of all towers anti-climb features together with posting of written and visual warning signs to include the ISO 7010 "Hazard Type: Electrical Symbol" warning of the risk of electrocution.	• ADB SPS (2009)	EPC Contractor	PTCUL PIU / PISC
	Building and tower safety	*Applicable to all SS* • All buildings will be designed in accordance with national building safety codes and Indian Standards for Earthquake Resistant Design of Structure • All structural designs to be checked for building and seismic safety by design team and an independent expert, separate to design team, to confirm national and international good practice standards are met.	• ADB SPS (2009) • The Uttarakhand Building Construction and Development Bye Laws / Regulations, 2011	EPC Contractor	PTCUL PIU / PISC
Soils	Contaminated Land	*Applicable to all SS* • New substations making use of existing substations will be surveyed by a contaminated land professional employed by the contactor during the design phase to assess the potential for soil contamination to be present in the area proposed for works (Phase 1 Site Investigation). • If signs of potential 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 proposed work area to determine the level of soil contamination. • The findings and recommendations of the survey will be submitted to PTCUL for approval. • If soil contamination is noted in the work area, a method statement for the management and/or removal and disposal of the contaminated soil as hazardous waste following international good EHS practices will be prepared and submitted to PTCUL for approval. • This is specifically applicable to the following substations as well as any others supporting existing land use other than agriculture:	• Solid Waste Management rules, 2016 • The Hazardous Waste (Management, Handling and Trans-boundary Movements) rules, 2009 • Construction and Demolition Waste Management rules, 2016 • IFC EHS Guidelines: Contaminated Land (2007) • IFC EHS Guidelines: Hazardous Materials and Waste Management • Stockholm Convention	EPC Contractor Include in EPC contract cost Before design approval	PTCUL PIU / PISC

Table N-1: PTCUL Design Phase EMP					
Topic	*Impact / Issue*	*Commitment*	*Applicable Project Standards / Best Practice*	*Implementation Responsibility*	*Monitoring Responsibility*
		• 220/33 KV (2x50 MVA) GIS Substation, Selaqui, Dehradun • 132/33 KV, (2X40 MVA), GIS Substation, Araghar (heavy metals identified during baseline soil sampling) • 132/33 KV (2x40 MVA) GIS Substation, Dhaulakhera, Nainital			
Asbestos	Removal of asbestos at existing substations	*Applicable to all SS* • If demolition of existing buildings or structures is required, then they will be surveyed by a competent asbestos surveyor employed by the contractor during the design phase to confirm the risk of asbestos being present. The findings and recommendations of the survey will be submitted to PTCUL for approval. • If asbestos is found a method statement (Asbestos Management Plan) for its management and/or safe removal and disposal of asbestos as hazardous waste following international good EHS practices will be prepared and submitted to PTCUL for approval. • Removal and disposal of asbestos will be in accordance with the asbestos management plan. Site will need to be confirmed "clean" by a competent asbestos surveyor before any works on the new SS will be started.	• ADB SPS (2009) • Model Factories Rules 120 (MFR 120) under Section 87 regarding handling and processing of asbestos, manufacture of any article of asbestos and any other process of manufacture or otherwise in which asbestos is used in any form. • ADB Good Practice Guidance for the Management and Control of Asbestos: Protecting Workplaces and Communities from Asbestos Exposure Risks	EPC Contractor Include in EPC contract cost Before design approval	PTCUL PIU / PISC
Final Designs	Community Consultations	*Applicable to all Components* • Contractors to undertake and document meaningful consultations with potentially affected persons and local communities within 500m of the substations and OHL RoWs and 50m of UG RoWs, ensuring representation of at least 30% women, as well as other stakeholders including local authorities and public utilities during design in order that any concerns raised can be reflected in the choice of SS site layout, route alignment and construction method. • Every individual on whose land the OHL towers will be installed will also be consulted one-on-one by the Contractor prior to finalization of the position of the tower footings.	• ADB SPS (2009) •	EPC Contractor	PTCUL PIU / Engineer

Table N-1: PTCUL Design Phase EMP					
Topic	*Impact / Issue*	*Commitment*	*Applicable Project Standards / Best Practice*	*Implementation Responsibility*	*Monitoring Responsibility*
	Review of documentation, update of the IEE	*Applicable to all Components* • Detailed designs will be reviewed by the contractor and PTCUL to confirm all measures required by the IEE/EMP have been adequately incorporated and that they reflect international engineering best practice/good EHS practice before they are approved. • Prior to PTCUL approval of the designs and commencement of construction, ensure that PTCUL have updated the IEE as required to reflect the final scope of SS works/design/route alignment, seeking ADB clearance of any updated IEE before works start by contractor.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before design approval	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
Management Planning	Unanticipated impacts and corrective actions	• Comply with the definite version of the EMP which is the version disclosed on ADB's website. This includes any measures in an updated IEE following design or any updates in response to unanticipated impacts. • Comply with any corrective action plan required by PTCUL, contractor to cover the costs where corrective action is required due to non-compliance on behalf of the contractor, its subcontractors or third parties. • Ensure all subcontractors and third parties, irrespective of being formally or informally employed also comply with the EMP and any updates to it, as well as the CSEMP and that this responsibility is cascaded down any chain involved. • Do not engage in any activities described on the ADB Prohibited Investment Activities List in Appendix 5 of ADB's SPS (2009) • Put in place appropriate incentives and/or penalties for (non-) compliance by workers related to use of PPE, and any violations of the Contractors Code of Conduct. • Comply with all applicable national and state environment, health, and safety (EHS) regulatory requirements in addition to the mitigation measures set out in the EMP – if there is any conflict between national requirements and measures set out in the EMP the most stringent provisions will take precedence	ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before the start of start any related works including construction site establishment then ongoing through project implementation	PTCUL PIU / PISC
	CSEMP	Preparation for PTCUL approval and implementation of the CSEMP and its associated management sub-plans reflecting the EMP requirements and international engineering best practice/good EHS practices- CSEMP shall include:	• ADB SPS (2009) • IFC EHS General Guidelines/Electric Power T&D Guidelines • ILO code of practice[24]	EPC Contractor Include in EPC contract cost Before the start of any works including	PTCUL PIU / PISC

[24] https://www.ilo.org/sector/Resources/codes-of-practice-and-guidelines/WCMS_861584/lang--en/index.htm

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		Construction Method Statement Identifying all construction activities, schedule, access routes, anticipated traffic volumes, and construction methods to be used as well as temporary construction facilities needed and their location e.g., laydown areas, stores, worker rest areas, toilets/washrooms, worker overnight accommodation etc. **Waste Management Plan** Dealing with all solid and hazardous waste as well as wastewater generated in an environmentally sound and safe manner. Where possible it will ensure surplus materials will be reused or recycled, disposal will be the last resort. **Pollution Prevention Plan & Emergency Response Plan(s)** Covering dust and emissions to air management, noise management, the protection of water resources and environmentally sound and safe storage, use, and disposal of all fuels, chemicals and oils used on site and an emergency preparedness and response plan in the event of any leaks or spills (e.g., of oil, etc.) or an incident such as flood. Including emergency response plan to be prepared for construction to deal with event of an accidental spill leak, including leakage of SF6 as a greenhouse gas. **Occupational Health and Safety Plan & Emergency Response Plan(s)** See Appendix K. H&S plan to include emergency preparedness and response plan including flow chart and contact details to deal with situation should any construction worker or community member be diagnosed with COVID-19 during the works. **Community Health and Safety Plan** Outlining all of the relevant measures in this EMP relating to community health and safety. Community Health and Safety Plan shall include flow chart and contact details to deal with situation should any community member be diagnosed with COVID-19 during the works.		construction site establishment for PTCUL approval then implement throughout construction phase	

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		Labor Management Plan Addressing employment of migrant workers, sanitation and welfare, gender-based violence/sexual exploitation, abuse, and harassment prevention etc. LMP shall include a Code of Conduct. **Traffic Management Plan** Considering both the safety of pedestrians and vehicles and need to avoid traffic congestion; it is to be developed in consultation with relevant local authorities to ensure proper execution of traffic controls including where temporary blockage of one lane of the road or footpath is needed for installation **Biodiversity and Physical Cultural Resources Plan** Including (i) prohibitions on fishing, hunting, poaching, protected areas etc. (ii) a wildlife incident reporting procedure and emergency fauna rescue and handling procedure, including contacts of forest and protected area management, nearest veterinary etc. (iii) measures to avoid the spread of invasive species including the installation of washing stations for the pressure washing of vehicles at the site entrance, and (iv) a Chance Find Procedure for physical cultural resources **Communication Plan** **Training Plan** • CSEMP and its associated management sub-plans will be living documents, to be updated as required and re-approved by PTCUL as construction proceeds, if construction methods or site conditions change, in response to an accident, incident, near miss etc. • CSEMP will identify all temporary construction facilities needed e.g., laydown and storage areas, temporary workers facilities etc.			
Regulations, permits etc.	Permits and Licenses	• Contractor is required to follow local statutory provisions, stipulations of CEA Regulations & Electricity Act 2003 as amended from time to time and other local rules and regulations referred in these specifications. Other internationally accepted standards which ensure equivalent or	• ADB SPS (2009) • CEA Regulations & Electricity Act 2003	EPC Contractor Include in EPC contract cost Before the start of any works including	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		better performance than those specified shall also be accepted.		construction site establishment for PTCUL approval then implement throughout construction phase	
		• Acquire all requisite environment, health, safety and labor permits and licenses for construction activities as required by national laws and regulations, prior to the commencement of works. • Statutory H&S and labor requirements including permits, licenses, and insurances for all workers to be obtained and maintained. • Contractors are to obtain Consent to Establish for all construction plant including DG sets and all other applicable national EHS permissions or requirements prior to construction. • Construction plant must not be operated by contractors until their Consent to Operate is obtained. • Medical insurance will be provided for all workers with sick leave allowance to ensure symptomatic workers do not attend site due to no work-no pay policies. Given the specialist nature of responding to COVID-19 public health officials/experts to be consulted in undertaking the risk assessment and management planning for COVID-19. • Insurance to include a community liability clause for payment of compensation in case of any accidents because of construction.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before the start of any works including construction site establishment for PTCUL approval then implement throughout construction phase	PTCUL PIU / PISC
		• No new HV power lines will be permitted to traverse forest area/forest habitat, second stringing of the existing HV power line is permitted. • For the second stringing OHL, all pre-construction conditions will be complied with prior to the start of related works. These works will comply with MoEF&CC guidelines for laying HV power lines in forest areas, the original forest clearance and the forest department permission for second stringing copies of which are provided at Appendix W.	• ADB SPS (2009) • Tree Felling Permission Under Uttarakhand Enterprises Single Window Facilitation And Clearance Act, 2012 will be followed in case of trees in Non Forest Area • In case of Forest Area provisions of Forest Conservation Act (FCA),	EPC Contractor	PTCUL PIU / Engineer

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• PTCUL has provided funding for but the Forest Department has not yet implemented a scheme for the creation and maintenance of dwarf species (preferably medicinal plants) in the RoW of the second stringing OHL, PTCUL to ensure the tree planting is completed by Forest Department on completion of the second stringing followed by maintenance. • Where government/public tree cutting cannot be avoided required clearances to be obtained from Department of Forests and all pre-construction conditions of clearances complied with prior to the start of related works.	1980 and guidelines for laying transmission lines through forest areas issued by Ministry vide letter no. 7-25/2012-FC dated 05/05/2014 & 19/11/2014 etc. • The Environment (Protection) Act 1986 and Environment (Protection) Rules 1986 & its Amendments • Wild Life (Protection) Act, 1972 (amended 2003		
		• Coordinate with relevant authorities where the RoW crosses irrigation canals, roads, rail, other power and communications lines to obtain no objection, required vertical clearances to be maintained.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before the start of any works including construction site establishment then ongoing throughout project implementation	PTCUL PIU / PISC
Temporary facility	Selection of temporary construction facilities	• Local communities within 500m to be consulted when selecting sites for temporary project facilities prior to finalization, consultations to involve at least 30% women. • Provide a central covered warehouse for storage of construction materials etc. Only volumes of material required for the day's work will be stored on-site • Contractor to seek to locate all temporary construction facilities required including laydown and storage areas within the boundaries of PTCUL land (substations) except for overnight accommodation that could be provided in existing properties off-site.	ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• If other public or private land is required for temporary construction facilities noisy and dusty facilities or those that may generate sediment laden runoff or wastewater (e.g., centralized concrete batching plant, hot mix plant, refueling areas, maintenance yards, storage areas, temporary worker camps) must be sited 500m from residential property and other sensitive receptors (houses, schools, clinics, temples, etc.). Laydown and storage areas that are not potential pollution sources may be located 50m distant but must not block accesses or road use. • No temporary facilities will be established in forest area/forest habitat. • No public or private land requiring clearance of vegetation or supporting forest habitat or having waterbodies is to be used. No cutting of trees or mature vegetation clearance will be allowed for temporary facilities. • Land use to be negotiated with private landowner, submit land ownership papers and copy of agreement for temporary land use with a photographic record of pre-project condition. • A photographic record will be made of the pre-construction condition of land used for temporary facilities before construction to inform the reinstatement works. • After completion of the construction work the temporary structures shall be completely removed and the land will be restored to its earlier condition.			
	Temporary access routes	• For HV power lines in steep terrain the construction of new access track is not allowed. No temporary access tracks will not be cut into a hillside, especially immediately below a tower. • For second stringing in forest area/habitat the construction of new access track is not allowed. • In steep terrain and forest area/habitat use will be made of existing access roads and tracks for transporting tower materials and machinery. In locations where access is restricted use of manual			

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		labor to transport, install and string the towers and lines. • Plans for access in steep terrain and forest area/habitat will be submitted for approval by PTCUL. • Where possible, use existing paved and unpaved roads for the initial transportation of materials and equipment from the staging and storage areas to locations where they will be needed along the HV power line ROW. • If new access tracks on flat terrain are required the Contractor will make the access suitable for use and 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. • Temporary earth access tracks on flat terrain shall be suitably compacted, they will be graded and sloped to prevent the unnecessary flow of water across tower sites and to minimize any soil erosion. • 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. • A photographic record will be made of the pre-construction condition of access roads and land which is used for any temporary access tracks before construction to inform the reinstatement works. • After completion of the construction work temporarily access roads/tracks shall be restored to their original condition.			
	Land Acquisition and Compensation	• Temporary impacts (e.g., land rentals) that are not within the assessed corridor of impact are to be compensated by the Contractor in line with the LARP entitlement matrix.	• ADB SPS (2009) • Project LARP • The Electricity Act, 2003, Section 68 (6)	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
Staffing	Inadequate staff to provide supervision and oversight	• Appoint a suitably qualified and experienced, dedicated Environment and Social Officer and dedicated Health and Safety Officer for each contract package/lot to be based on site full-time. • Each active construction site is to have adequate health and safety supervision to ensure the health and safety of all workers and local communities to include a suitably qualified and experienced Senior Engineer having NEBOSH/IOSH certification or similar qualification who is based on-site full-time and nominated to the role of EHS Supervisor with responsibility for ensuring EMP implementation, acting on the advice of, and reporting to their safeguards team. Each Senior Engineer will be supported by full-time on-site Health and Safety steward(s) with at least one steward to each 50 persons. • Do not discriminate and proactively encourage the employment of (i) suitably skilled women, and (ii) local and women's employment for unskilled roles whilst ensuring suitably qualified and experienced workers for skilled roles; noting that all workers must be appropriately skilled given the hazardous nature of works. • No child will be employed, and no under 18s will be engaged on construction site (hazardous work). • Provide medical/accident insurance for all workers (formal and informal, men and women) for the duration of their contracts as well as at least 10 days of sick leave for all construction workers.	ADB SPS (2009)	EPC Contractor Include in EPC contract cost with BOQ line for staff Staff in place prior to the start of construction and ongoing through project Implementation	PTCUL PIU / PISC
	Induction and Orientation	• Ensure all members of contractor's safeguards team, design team, and construction management team attend PTCUL EMP trainings. • Contractor to conduct their own trainings for their construction management and provide all workers (men and women) 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	ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before the start of any works including construction site establishment then on an ongoing basis	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		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, protected areas, forest land, interaction with wildlife etc. • 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; forest fire risk; prohibition on firewood and NTFP collection by workers; prohibition on trapping, hunting, fishing, or poaching by workers; chance find procedures; H&S including use of PPE; etc. • 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. • Prepare with guidance of health experts HIV/AIDS/COVID-19 information video/brochures/leaflets for distribution to all workers during induction, covering factual health issues as well as behavior change issues (e.g., social distancing for COVID-19) around the transmission and infection of HIV/AIDS/COVID-19 and other communicable diseases. • Prepare with guidance of labor experts a worker Code of Conduct and information video/brochure/leaflet for distribution to all			

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		workers during induction addressing culturally acceptable practices etc. 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 ○ Zero tolerance of illegal and unacceptable activities/behavior, including but not limited to sexual harassment in the workplace, 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 ○ Alcohol and drugs policy and testing regime ○ Role of workers in good housekeeping ○ Role of workers in maintaining good hygiene including COVID-19 measures e.g., social distancing ○ Respect of wildlife and the environment ○ Description of disciplinary measures for infringement of the code of conduct and other employer rules (e.g., immediate removal from site, fine etc.)			
Communications	Advance Notice	• No works will start until PTCUL has locally disclosed the IEE and any update to it with executive summary translated into Hindi via the PTCUL website, PTCUL offices, existing substations, and other construction site offices. • Brochures and posters on the main findings of the IEE and where the full version can be accessed, as well as a translation of the executive summary of the IEE, will be printed in Hindi and made	• ADB SPS (2009) • The Electricity Act 2003 (Provisions as to opening up of Streets, Railways, etc.)	EPC Contractor Include in EPC contract cost Before the start of any works including construction site establishment then ongoing throughout	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		available/displayed for public scrutiny at places easily accessible to affected persons. • Directly liaise one-on-one with receptors in the RoW for OHL or in the vicinity of entry/exit pits for underground cables including informal settlers/street vendors and specifically notify them about the commencement of work etc. • Local communities as well as individual property owners within 500m are to be consulted when selecting sites for temporary construction facilities outside of substations prior to finalization of their location.		project implementation	
	GRM	• PTCUL with support of contractor to inform all potentially affected persons and local communities within 500m of substations and OHL and 50m of UG cables of the existence of the GRM as well as the GRM process and means of submitting project grievance to. Inform all residents and businesses of the GRM in advance of works (at least one month). • Community awareness raising of the GRM will be undertaken verbally, through community meetings including at least 30% women, one-on-one consultations with landowners; through the distribution of notices/pamphlets/posters; and through other media outlets. • Provide notice boards at all substations, construction site offices and active work sites including details of the GRM including the name, designation, contact numbers including phone/SMS/What's App, address of both the PTCUL and contractor's GRM focal persons plus the timeline and process of redressal together with a suggestion box that will be regularly checked for any grievances received.	• ADB SPS (2009) • Project GRM	EPC Contractor Include in EPC contract cost Before the start of any works including construction site establishment then ongoing throughout project implementation	PTCUL PIU / PISC
Hydrology	Water Users	• Any drilling or excavation works within 50m of boreholes and wells used as a drinking water source by local communities will require pre-construction and post construction water quality monitoring against GoI drinking water standards to ensure there is no contamination of the supply.	• ADB SPS (2009) • BIS for Drinking Water 10500:2012	EPC Contractor Include in EPC contract cost	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• Construction water to be sourced from an existing licensed commercial supplier (preferred option especially for potable water supplies) where available or rainwater harvesting. • If using an existing surface water or an existing borewell for construction water, permissions to be obtained from authorities together with the agreement of local communities. • Prior agreement is required from local community users to use any existing surface water/borewell or local piped water either temporarily during construction or permanently for substations; in cases where use of local water source is not agreed contractor to import tanked water to the project area. • No groundwater will be used in districts without additional groundwater capacity – in other districts groundwater will not be used only after it has been confirmed through assessment there will be no additional stress on groundwater resources as a result. • Permissions for any new borewell installation (for construction or permanent supply to substation) shall be obtained including NOC from CGWB together with agreement of local communities before abstraction, include water meter on the borewell for monitoring of water abstracted.		Before construction commences	
	Water Pollution	• If any surface waterbodies or groundwater sources are within 500m, undertake a baseline water quality sampling as per the EMoP to confirm their current water quality status at least one week prior to the commencement of any actively onsite. • Plan for designated impermeable fuel/oil/chemical hazardous materials/waste storage areas located at least 50m from surface water. • Diesel storage tanks will be sited 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	• ADB SPS (2009) • IFC EHS Guidelines: wastewater and ambient water quality • ADB SPS (2009) • BIS for Drinking Water 10500:2012	EPC Contractor Include in EPC contract cost Before construction commences	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		connections will be located over secondary containment. • Refueling procedure will be developed, which will include a restriction on refueling within 50m of any watercourse.			
Hazardous Materials	Release of chemicals and gases in receptors (Air, water, land)	• Contractor to undertake air quality monitoring per the EMoP to confirm current background levels in the project area at least one week prior to the commencement of any actively on-site. • 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.	• ADB SPS (2009) • Stockholm Convention	EPC Contractor Include in EPC contract cost Before construction commences	PTCUL PIU / PISC
Utilities and Infrastructure	Outages	• Check with relevant local authorities (electric, water, telecoms) whether there are known pipes, cables, or other utility lines and carry out a scan using cable avoidance tool to identify any unknown underground utilities prior to excavation. • Obtain necessary clearances consistent with the regulatory requirements from other utilities that could be affected by the Project (municipality for street furniture, electric, water, sewerage, telecommunications, road, rail etc.) • Contractors to identify in consultation with service providers appropriate measures to minimize period of disruption to utilities and reduce health and safety risks during installation. If services must be disrupted contractors (via service providers if appropriate) to notify affected communities well in advance of any power outage etc. • 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 because of these changes. • All electricity and gas supply networks in the Project area will be kept operational, particularly during the winter months. Liaise with the relevant utilities operators to ensure they remain operational.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before the start of any works including construction site establishment for PTCUL approval then implement throughout construction phase	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• In relation to cumulative impact liaise with other utilities regarding the timing and extent of other construction works in the same location/ROW and ensure plans for construction works are coordinated so emissions/disruption/ disturbance are minimized. • For private property or public utilities/street furniture that may be damaged during construction, including from potential breaking/drilling vibration damage (buildings, roads, drains etc.) photographic and/or structural pre-condition surveys are to be completed and agreed with PTCUL prior to any works, including site establishment. To be documented in a pre-project condition report, which will serve as baseline in case any inadvertent damage or vibration impact to property occurs. If risk of structural damage to adjacent properties from vibration identified due to current condition, consider alternative construction methods or temporary relocation of occupants during works if at risk.			

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
Occupational Health and Safety	General	• Strictly implement all the OHS measures outlined in Appendix L and all the measures outlined below. • Informed by risk assessment prepare H&S plan for approval by UPCL in accordance with the IFC EHS General Guidelines on OHS, considering occupational and community H&S and including adherence to electrical safety standards and emergency preparedness and response plan with communication systems and protocols to report an emergency. • For all pre-construction and construction works comply with Government of India rules and regulations for the protection of workers. • During construction works, ensure qualified first aider and trained fire marshal is always available on-site with an appropriately equipped first aid kit and appropriate fire extinguisher and other firefighting equipment immediately available for use. • Provide an ambulance for more serious cases to transport the patient to the hospital for treatment • Contractors will set up an accident reporting system for any health and safety incidents (near miss, minor, lost time, fatal) involving workers or community to be reported to UPCL within 24 hours of occurrence with a response plan detailing the incident and how its reoccurrence will be avoided. Record of all incidents and response taken should include date, time, details of incident, treatment given and outcome, and lessons learnt for the future. Contractors will ensure all workers are covered by insurance to pay out in the event of a disability or fatality. • Emergency contact number and details for medical, fire, etc. are to be displayed in all construction sites.	• ADB SPS (2009) • IFC EHS Guidelines: Electrical Power and Distribution (2007) • IFC General EHS Guidelines: Occupational Health and Safety • IFC General EHS Guidelines: Community Health and Safety • Occupational Safety, Health And Working Conditions Code, 2020 • Workmen's Compensation Act, 1923 and subsequent amendments • Interstate Migrant Workers Act, 1979	EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	PTCUL PIU / PISC
	COVID-19	• Prior to any pre-construction field work being undertaken develop procedures to ensure that		EPC Contractor Include in EPC contract cost	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		national COVID-19 requirements[25] and WHO workplace[26] and hand hygiene[27] guidelines are followed, including providing awareness raising activities for surveyors, minimizing travel requirements, undertaking screening health checks to confirm those going in the field are not symptomatic, providing surveyors with adequate supplies of personal hand sanitizer and masks, ensuring social distancing of at least 1m, that masks are worn at all times during consultations, and that a register of all contacts is maintained etc. In undertaking H&S risk assessment for construction and preparing H&S Plan adequate attention will be given to the risks associated with COVID-19 pandemic and other communicable viral diseases. National restrictions for containing the spread of COVID-19 must be complied with and ADB guidance to be followed, as well as the control measures set out in Appendix M. Given the specialist nature of responding to COVID-19 public health officials/experts to be consulted in undertaking the risk assessment and management planning for COVID-19. • COVID-19 vaccination program to be completed for all workers before works commencement and kept up to date with booster vaccinations on schedule as recommended by national requirements. • Construction workers to be given medical checkup per statutory requirements and including checks for COVID-19 symptoms before being allowed on site; medical records are to be maintained on-site.		Before commencement of works and then ongoing through project implementation	
	Working at altitude	• Complete a health and safety risk assessment of all sites at high altitudes and include specific measures to address any risks identified as part of the OHS Plan.		EPC Contractor Include in EPC contract cost	PTCUL PIU / PISC

[25] https://www.mygov.in/covid-19 and https://www.mohfw.gov.in/
[26] https://www.who.int/docs/default-source/coronaviruse/advice-for-workplace-clean-19-03-2020.pdf
[27] https://www.who.int/infection-prevention/campaigns/clean-hands/WHO_HH-Community-Campaign_finalv3.pdf?ua=1

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
				Throughout project implementation	
	Labour and accommodation	• Design of temporary worker camps/overnight accommodation (including separate accommodation for men and women, as necessary) to conform to national requirements and international good practice. Contractors to provide all basic requirements (beds and beddings, mosquito nets, artificial lights, natural light, windows and ventilation, fans, emergency exits, firefighting equipment, kitchen and dining halls, mobile charging points, toilets (separate for men and women) and washing facilities, potable drinking water, recreational space etc. The contractor shall ensure the camps established for providing accommodation to laborers engaged in construction activities meet the requirements which are set out in Appendix N. • No temporary worker camps/overnight accommodation will be established in forest area/habitat. • Shaded rest area that is immediately accessible and can accommodate the number of workers on site • Source water from an existing licensed commercial supplier (preferred option) where available • Provision of separate toilet facilities for men and women on site • Provision of access to childcare facilities separate from but in the immediate vicinity of the construction site; provide access to a safe, secure, hygienic facility for female workers' children below five years of age		EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
	Sub-contractors	• All Project sub-contractors will be supplied with copies of the EMP and CSEMP. • Provisions will be incorporated into all sub-contracts to ensure the compliance with the CSEMP at all tiers of the sub-contracting. • All subcontractors will be required to appoint an OHS representative who will be available on each work site.		EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	PTCUL PIU / PISC
	Grievance	• Establish a formal Grievance Mechanism for workers including those related to sexual harassment at work. • 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 PIU/PMC and/or to the Contractor.		EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	PTCUL PIU / PISC
Community Health and Safety	Delays	• Undertake face-to-face with all communities/residents and schools, health centres, places of worship and community centres within 500m of the substations and ROW of OHL HV power lines and 50m of ROW of UG cables to keep them fully informed of the nature of works and latest construction schedule, notifying them individually at least one month prior to the commencement of works of the intended start date and schedule. • Provide information to the public about the scope and schedule of construction activities and expected disruptions and access restrictions at least 72 hours before any disruptions. • The authorities will be notified when oversize heavy loads need to be transported and the loads will be escorted by the Project.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before the start of any works including construction site establishment for PTCUL approval then implement throughout construction phase	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
	Noise and vibration	• Contractor will be required to measure and confirm the distance from their construction works to sensitive receptors to confirm if the noise standards can be met based on their construction methods or if temporary acoustic barriers are required. • Contractor to avoid soil compaction, piling, blasting and other vibration inducing activities as much as possible • If piling, blasting or other vibration inducing activities are to be undertaken for construction a detailed construction noise/vibration assessment is to be undertaken by the contractor to demonstrate how construction noise and vibration levels/guidelines can be achieved at the site boundary and nearest receptors and a piling/blasting management plan is to be prepared for approval. • 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. 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. 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. • Contractor to undertake pre-construction noise monitoring per EMoP to confirm current background noise levels in the project area at least one week prior to the commencement of any actively on-site.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before the start of any works including construction site establishment for PTCUL approval then implement throughout construction phase	PTCUL PIU / PISC
	Safety Awareness	• In conjunction with the local municipality (Nagar Palika/Nagar Palika Parishad) or village/tribal head in rural areas plus the media organize health and safety campaigns including the distribution of posters, leaflets, and safety booklets to all households in local language with strong use of	• ADB SPS (2009) • Project GRM • IFC EHS Guidelines: Community Health and Safety (2007)	EPC Contractor Include in EPC contract cost	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		graphics for construction and electrical safety community awareness raising activities in local communities and schools within 500 m of the new substations and OHL at least 50m of the UG cables prior to construction and then again prior to commissioning of substations/energizing the HV power lines about how to avoid electrical incidents having greater emphasis on operational hazard and risks, etc. Materials will be written in non-technical language and will provide illustrations where practical. • Deliver face-to-face electrical safety awareness training to local children including their parents and/or their teachers at all educational facilities within at least 500m. • Provide construction work site safety awareness sessions at all educational facilities within at least 50m of any work zone. • Provide EMF awareness sessions at villages within 500m of OHL and substations. The awareness sessions should provide information regarding the findings of the IEE on EMF and specifically discuss best practice reference limits for EMF and how they have been applied to the Project. • Develop and distribute leaflets/pamphlets/posters to the local community especially those living close to construction camps covering (i) health awareness including HIV/AIDS/STDs/Covid-19 and other communicable diseases, and (ii) the conduct of construction workers that can be expected. Materials will be written in non-technical language and will provide illustrations where practical. • Keep a record of the number of leaflets distributed and their locations.		Before commencement of works and then ongoing through project implementation	
Physical Cultural Resources	Pre-work surveys	• Demarcation of physical cultural resources such as trees or shrines to be avoided and retained.	• ADB SPS (2009) • The Ancient Monuments and Archaeological Sites and Remains Act of 1958	EPC Contractor Include in EPC contract cost	PTCUL PIU / PISC
	Chance Finds	• A chance find procedure will be developed for implementation in the event physical cultural			

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		resources are found, to include the following procedures: ○ If suspected physical cultural resources are encountered, all works at the find site should be immediately halted; ○ The find should be assessed by a competent local official managing cultural issues, and procedures to avoid, minimize or mitigate impacts to such physical cultural objects should be agreed in writing with them. ○ Work should not begin until the procedures to avoid, minimize or mitigate impacts to the physical cultural resources have been agreed and implemented in full. ○ If avoidance is not feasible, and no alternatives to removal exist, and the Project benefits outweigh the anticipated cultural heritage loss from removal which is unlikely unless in case of resource of local value, following clearance of ADB the physical cultural resources should be removed and preserved using the best available technique in accordance with relevant provisions of national heritage protection laws and decrees. ○ Records should be maintained of all finds, including chain of custody instructions for movable finds. • All construction workers to be made aware of the chance-find procedure and types of finds to be reported.	• Indian Treasure Trove Act, 1878 (as modified up to September 1949) • The Antiquities and Art Treasures Act, 1972	Before commencement of works and then ongoing through project implementation	
Biodiversity	Tree cutting / removal	• Ensure all the requisite forest department approvals or approvals from other applicable departments for any public and private tree cutting are in place pre-construction. • Permission is required for tree cutting of public trees located outside of protected or notified forest areas with compensatory afforestation completed	• ADB SPS (2009) • The Environment (Protection) Act 1986 and Environment (Protection) Rules 1986 & its Amendments	EPC Contractor Include in EPC contract cost Before construction commences	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		on at least a 10:1 basis (species to be region specific). • Public trees will be compensated by compensatory afforestation (planting at least 10 trees for each tree cut) as per forest department requirements and the requisite forest department approvals for any tree cutting will be sought pre-construction. PTCUL will provide funds to the forest department based on the number of public trees counted by the EPC Contractor to be cut and monitor the progress of the compensatory plantation process that it has funded to ensure that planting takes place such that no net loss of biodiversity is obtained. • Compensation for the loss of any private trees in the RoW would be based on their replacement cost, as defined in the LARP.	• Wild Life (Protection) Act, 1972 (amended 2003		
	Project Footprint	• Demarcation of the working area and avoid encroachment outside the agreed corridor of impact. • Follow design drawings and implement careful construction practices to avoid damage to trees. • Sensitive habitats that need to be avoided during construction (e.g., specific trees that are to be retained) will be marked for protection by the contractor's environmental specialist who shall with support of field ecologists make a pre-work survey of the work sites to identify and conduct an inventory of trees to be cut prior to the start of works with the PISC. • Demarcation of mature trees to be avoided and retained. Only the marked trees within the ROW are to be felled after joint verification and approval of tree list.			
	Designated sites	• Where biodiversity sites are present within 10km and there may be a risk of workers accidentally straying into these areas then worker trainings and the code of conduct will cover measures to ensure that wildlife will be protected.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
				Comply throughout project implementation	
Procurement	Material Sourcing	• Considering relevant technical and commercial considerations, the Project will seek to purchase goods and services from within India. • Environmental considerations will be included in the Project procurement process. • Contractors will use locally sourced materials as far as practical to reduce transportation, but all raw materials will be sourced only from existing licensed sources e.g., aggregates from quarries which hold Prior Environmental Clearance and valid crusher operating documents from SPCB. Records to be kept of all the materials used and source with copies of licenses etc. • Only already existing state licensed borrow pits for land raising will be allowed for use. Provide copies of the borrow pit operator's license and permit before any materials from the borrow pit are delivered to site. • Procedures will be established to determine the acceptability of material storage conditions and to promote the minimization of storage volumes on-site.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Comply throughout project implementation	PTCUL PIU / PISC
Economy Employment and Livelihoods	Employment	• Targets for local recruitment from the local communities will be agreed with PTCUL based on initial assessment of the labor market for unskilled and semi-skilled work force. • Seek to manage employment expectations by explaining the number and type of opportunities in advance to local communities. • Applications for employment will only be considered if submitted via the official application procedure. • Recruitment procedures will be transparent, public, and non-discriminatory and open with respect to ethnicity, religion, sexuality, disability or gender.	• ADB SPS (2009) • Ministry of Labour & Employment Safe Workplace Guidelines For Industry & Establishment	EPC Contractor Include in EPC contract cost Comply throughout project implementation	PTCUL PIU / PISC

Table N-2: PTCUL Pre-construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• Clear job descriptions will be provided in advance of recruitment and will explain the skills required for each post. • Job vacancies will be advertised in the local communities through appropriate and accessible media. • For unskilled 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.			
	Workers' Rights	• Contractor to allow collective bargaining and ensure that ILO core labor standards to which India is a signatory are upheld. • All employees will receive at least the minimum wage as defined by national legislation. • All workers will have contracts describing their job description and conditions of work and will have the contents explained to them.			
	Staff Conditions and Community Relations	• Employee Code of Conduct will prohibit the workforce from participating in illegal activities, including use of illegal drugs, sexual harassment, bribery and corruption or requesting or receiving gifts from communities. • Policy limiting alcohol consumption in construction camps will be applied • Workforce training will include a briefing on camp rules and awareness of local social issues and sensitivities. • No unauthorized access to, or use of, any camp facilities will be allowed. • 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.			

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
Training	Pollution Prevention	• 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. • Information will also 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. Site induction training will be supplemented by regular toolbox talks with relevant personnel if inspections or audits highlight failings in waste management.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Bi-monthly throughout project implementation	PTCUL PIU / PISC
	OHS	• 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. • 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. • 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. • Untrained workers must not be permitted to work with live electricity or to work at height.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Emergency Response	• 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 hazard, disease outbreak etc. To include training for subcontractors before commencement of works. • Emergency preparedness and response training for construction management will include modules on first aid	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Monthly and throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		and fire safety including include training on how to use first aid and firefighting equipment provided on-site, and scenario of potential or confirmed COVID-19 infection.			
	Driver Training	• Driver training, monthly, to include advice on behaviors to reduce the potential for disturbance, including use of horn, loud radios with windows open, switching engines off when not in use, strictly observing speed limits and not accelerating or braking aggressively.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Monthly and throughout project implementation	PTCUL PIU / PISC
Communications	GRM	• Contractor's safeguards team will act as site GRM Focal and keep affected persons and local communities informed of the status of work and be readily available onsite to receive, document and deal with grievances at site level. • Encourage use of the GRM and clarify that this does not prevent affected persons from pursuing any legal action, if they feel it is needed, and inform communities about the ADB Accountability Mechanism and their possibility to resort to it if any grievance is not resolved by the project level GRM.	• ADB SPS (2009) • Project GRM	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Worker GRM	• GRM will be available to all workers for receiving and handling complaints about unfair treatment or unsafe living or working conditions, sexual harassment, ensuring no coercion nor reprisal. • Construction workers will be given access to register any grievances with the contractors or direct access to the PTCUL GRM Focal			
Air Quality	Release of Exhaust Gases and Fugitive Emissions	• Emission sources (vehicles such as excavators) shall be positioned as far as is practical from sensitive receptors. • Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to maximize fuel efficiency and help minimize emissions. • Use diesel fuel that has a low sulfur content, less than 0.1% • Construction equipment and vehicles will meet national emissions standards. • Hold valid PUC emission certificates of all construction vehicles • Belching of black smoke is prohibited. • Limit engine idling to maximum 5 minutes.	• ADB SPS (2009) • IFC EHS Guidelines: Air Emissions and Ambient Air Quality (2007)	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• The open burning of wastes generated by project-related activities is strictly prohibited. • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery-powered equipment where practicable. • Stack emissions of temporary diesel generator set or hot mix to comply with national emission standards with the stack height designed according to both national requirements and IFC EHS General Guidelines.			
	Siting of Equipment	• Stationary emission sources (e.g., portable diesel generators, compressors, etc.) shall be positioned as far as is practical from sensitive receptors.			
	Dust	• Ensure an adequate supply of bowsers and carry out watering for dust control at least twice a day within 50m of work sites: in dry weather with temperatures of over 25°C, or in windy weather. Dust control measures will also be implemented on all access roads within 50m of residential / sensitive receptors. Avoid overwatering as this may make the surrounding muddy. • If temporary access tracks are constructed with a gravel surface, they will be routinely watered by during dry weather to reduce dust impacts. • For UG cables entry/exit pits will be refilled with temporary repaving of the excavated area done manually immediately once cable installation is completed. • Soil scattered on pavements and roads shall be immediately swept up to avoid windblown dust. • Vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency). • A strict Project speed limit of at most 30km/hr will be enforced for Project vehicles using unmade tracks. • 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. • Keep stockpiles of soil, aggregate and waste materials covered with canvas or tarpaulin when spoil heaps are not active to avoid suspension or dispersal of fine soil particles			

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		during windy days and to prevent disturbance by stray animals. • Earthwork operation will be suspended when the wind speed exceeds 20 km/h in areas within 500 m of any community. • Vehicles carrying fine aggregate materials will be sheeted with canvas or tarpaulin to help prevent dust blow and spillages. • 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. • Concrete batching (if required) will be sited at least 500m away from sensitive receptors • For SS a solid temporary fencing shall be installed around the boundary/works area to minimize the dispersion of dust, it will also function as a temporary acoustic noise fence to minimize the noise and visual impact. • Undertake weekly dust soiling checks of surfaces of adjacent properties during earthworks and help with cleaning of external surfaces of property if dust is evident. • If there is an increase in existing background air pollution or complaints are received contractor will be required to implement additional dust or noise mitigation e.g., barricading/isolating sources of dust, use of wheel wash etc. • Provide workers with N95 dust masks to be worn when ambient conditions are dusty or when dust generating activities take place.			
Hydrology	Water resources	• Construction activities must not limit the availability of or restrict access to water sources (e.g., wells) used by local communities. • Natural flow of waterbodies must not be obstructed or diverted to another direction.	• ADB SPS (2009) • BIS For Drinking Water 10500:2012	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Water pollution	• Follow liquid management and storage requirements listed below under 'soils' • No untreated wastewater will be discharged direct to surface waterbodies or groundwater. • All wastewater to be connected to existing sewerage system or septic tank with soak away, septic tank/soakaway effluent	• ADB SPS (2009) • IFC EHS Guidelines: Hazardous Materials	EPC Contractor Include in EPC contract cost	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		to meet national general wastewater standards or IFC wastewater discharge limits, whatever is the most stringent. • Self-enclosed portable toilets may be used where the wastewater generated is enclosed in a container and will later be taken offsite to a municipal STP for wastewater treatment and disposal. • Use of pit latrines is prohibited as is open defecation and urination and uncivil use of roads or private premises by construction workers. • 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. • Treated wastewater will be used for damping down earthworks and road surfaces to mitigate dust generation. • Construction camps will be located at least 50m from water courses. • Locate mobile generators and site construction equipment at least 50m from groundwater resources and surface waters.	Management (2007) • IFC EHS Guidelines: Wastewater and ambient water quality • BIS For Drinking Water 10500:2012	Throughout project implementation	
Soils	Soil Compaction	• To avoid compaction impacts outside the cleared areas, i.e., tower foundations vehicle movements will be restricted to defined access routes and working areas (unless in the event of an emergency).	• ADB SPS (2009) • IFC EHS Guidelines: Contaminated Land (2007)	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
	Topsoil and excavated materials	• Minimize removal of existing vegetation and topsoil. Topsoil disturbed will be separately stored and used to restore the surface of the excavated area. • On completion of works, stockpiled topsoil will be spread over the surface of disturbed areas (if not under hard surfaces) and used in the restoration of temporary construction facilities. 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. Revegetation of the soils will follow using native seed mixes to Uttarakhand. • Soil exposed to oil leakage from transformer equipment that MLV power lines are connecting to is to be removed from site for disposal as a hazardous waste. • Records of excavated soil, generated waste, and transfer records will be kept. • 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. • Stored subsoil and topsoil will be segregated in a manner that avoids mixing. • Topsoil stacks will be free draining. Topsoil will be stored outside the running track used by construction plant, equipment and vehicles. • Soil storage areas will be protected from vehicle movements to avoid soil compaction. • Excavation will be limited to within the agreed corridor of impact. • Infertile and rocky material will where possible be reused as fill material around 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. • Upon completion of subsoil and topsoil reinstatement, disturbed areas will be inspected jointly for signs of erosion, slope instability, topographic diversity, surface water drainage capacity and function, and compaction with the contractor implementing remedial measures where required.	• Solid Waste Management rules, 2016 • The Hazardous Waste (Management, Handling and Trans-boundary Movements) rules, 2009 • Construction and Demolition Waste Management rules, 2016 • Stockholm Convention	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
	Soil erosion	• Schedule works during the dry season where practical to minimize any exposed areas subject to erosion by surface water runoff. • 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 wet season before full reinstatement of the site has been completed. • Rehabilitate any disturbed areas beyond footprint of the alignments and substation infrastructure footprint to at least original condition through revegetation using native species. • Slope stability measures to be implemented during construction to minimize landslide risk. • In steep terrain natural flows will be diverted around the tower site and the foundation protected by grading of excavated slopes, placing riprap or retaining wall, or other erosion control measures. • Temporary access tracks will not be cut into a hillside immediately below a tower. • Temporary access tracks will be graded and sloped to prevent unnecessary flow of water across them and to minimize soil erosion.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

	Contaminated Land and asbestos	• Any soils within work sites that appear to be contaminated by leaked oil or fuel shall be removed and disposed of as hazardous waste per the Contaminated Land Management Plan, similarly asbestos will be managed per the Asbestos Management Plan. This is specifically applicable to the following substations as well as any others supporting existing land use other than agriculture:
		  • 220/33 KV (2x50 MVA) GIS Substation, Selaqui, Dehradun
		  • 132/33 KV, (2X40 MVA), GIS Substation, Araghar
		  • 132/33 KV (2x40 MVA) GIS Substation, Dhaulakhera, Nainital
				EPC Contractor
				
				Include in EPC contract cost
				
				Throughout project implementation
					PTCUL PIU / PISC

	Drilling fluid	• HDD equipment will use water as a drilling fluid to reduce noise level. Do not allow the use of oil or bentonite clay as a drilling fluid. Where water is used any excess must be disposed of to open ground for percolation, or if no open ground to waiting tanker		EPC Contractor Include in EPC contract cost	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		trucks for proper disposal, it must not be disposed of to surface water.		Throughout project implementation	
	Soil Pollution	• Fuel, oil, and chemicals used to be kept under lock and key and stored in labelled, sealed containers on drip trays to provide secondary containment. They will be located on an impermeable surface and be under cover. This will be located at least 50m from any surface water course or seasonal water channel. • Mount plant containing oil and diesel on drip trays to catch leaks. • Refueling operations, equipment servicing and washdown to take place on an impermeable surface at least 50m from watercourses, springs and wells, with drainage directed through oil and grease interceptors before being discharged into a settling pond prior to discharge offsite. • Regular inspections and maintenance will be carried out of secondary containment areas to confirm that they are functioning effectively. • Provide sufficient absorbent materials (e.g., sorbents, dry sand, sandbags) on-site for soaking up fuel, oil or chemical leaks/spills. • Spill response equipment (absorbents etc.) will be available in hazardous materials storage areas. • All material safety data sheets (MSDS) are kept on site with the relevant materials. • Materials that can potentially react with each other will be segregated during storage. • Hazardous chemicals will be securely stored on site in a designated storage area. • Relevant personnel will be trained in safe use and handling of hazardous materials. • Relevant construction personnel will be trained in use of spill kits and disposal practices. • Vehicles delivering fuel or hazardous liquids will carry appropriate spill kits to allow an initial response to any spill to be deployed. • All mobile plant (excluding vehicles) will be integrally bunded or will be equipped with a bund or drip tray which will be		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		regularly inspected and emptied to prevent rainwater accumulating.			
	Contaminated Land	• Any soils within work sites that appear to be contaminated by leaked oil and fuels including areas of oil leaks beneath equipment shall be removed and disposed of as hazardous materials. This is specifically applicable to the following substations as well as any others supporting existing land use other than agriculture and spills/leaks that occur during works: • 220/33 KV (2x50 MVA) GIS Substation, Selaqui, Dehradun • 132/33 KV, (2X40 MVA), GIS Substation, Araghar • 132/33 KV (2x40 MVA) GIS Substation, Dhaulakhera, Nainital		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
Biodiversity	Project footprint	• Minimize removal of existing vegetation and topsoil to that which is necessary. • Implement careful construction practices to avoid damage to trees. • In preference to being cut, trees in ROW that can survive it will be pruned in preference to being cut, such that they might re-establish quicker following works. • For second stringing felling trees in gullies and valleys is to be avoided. • Demarcation of all working areas and avoid encroachment outside the agreed corridor of impact. • Vehicle movements will be restricted to demarcated working areas (unless in the event of an emergency) to reduce unnecessary impacts to habitat. • In wet conditions, minimize use of heavy machinery and consider temporary installation of removable steel plates to protect soil and its vegetation cover. • For second stringing no works will be allowed outside of the RoW in forest areas/habitat. Unnecessary use of machinery to be avoided in the forest area/habitat to minimize disturbance to fauna, in forest area/habitat construction will be manual. • Contractor will not allow any works to be undertaken from 1 hour before sunset to 1 hour after sunrise to avoid disturbance to the fauna in (i) forest areas/habitat, and (ii)	• ADB SPS (2009) • IFC EHS Guidelines: Electrical Power and Distribution (2007) • Procedure For Grant of Tree Felling Permission for Establishment of an Industry Under Uttarakhand Enterprises Single Window Facilitation and Clearance Act, 2012 will be followed in case of tree cutting in forest area • In case of Forest Area being traversed provisions of Forest	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		rural areas outside of settlements within the ESZ or within 10km of a protected area for which an ESZ has not been notified. • No lighting is to be used within any forest area/habitat or within rural areas outside of settlements within the ESZ or within 10km of a protected area for which an ESZ has not been notified. • Prior to excavation, area will be checked by ecologist for any signs of burrows etc. If determined to be occupied, only manual digging under the supervision of ecologist will be permitted. • Excavated pits will be robustly fenced or covered to prevent fauna accidentally falling in, further an escape ramp will be provided to allow their escape – particularly in forest area/habitat. • Keep written record, supported by photographs, of any animal casualties, including a cause of death if known. • Strict prohibition on construction workers to enter forest area/habitat outside of their working hours. Strict prohibition on purchase, sale, and use of firewood, timber and NTFPs, hunting and poaching of fauna by workers. • Provide good standard of worker accommodation with heating and all meals to help discourage breaches of prohibition by the workers. • Strict prohibition of fuelwood or timber being cut by the construction workers. Contractor and construction workers will be prevented from the use of firewood for cooking their food and heating etc. • Contractor to provide alternative fuel source (e.g., kerosene/LPG, which will be stored in safe conditions) to communal kitchen and for heating of worker accommodation. • Contractor to undertake regular, compulsory awareness raising activities for all workers related to prohibitions including toolbox talks and posting of information and warning signs at site offices, worker camps, and at all work sites in forest area/habitat, patrols by security guards employed by the Contractor, regular inspections of the worker camps, and disciplinary procedures for any contravention by the workers.	Conservation Act (FCA), 1980		

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• Fuel will be stored outside of and refueling will take place outside of forest area/habitat to minimize the risk of forest fire. • Contractor to provide fire-fighting equipment at work site with compulsory basic fire training for all workers and training drills undertaken in preparation for forest fire. In case of forest fire, Contractor to act swiftly to minimize impacts on the environment and human life. • Record all trees removed during construction, compensation paid, and replacements planted (including location, species, size, and economic value) and monitor their current health and survival status, for up to two years following plantation. • Cut/trimmed trees and other vegetation trimmings will be removed off-site as soon as line is completed. Unless sold for reuse, to be disposed of to a suitably licensed waste management facility with all waste transfer records retained. • Temporarily store cut/trimmed trees and other vegetation trimmings away from the roadside. No blocking of accesses or roads with cut vegetation. • Any vegetation material not handed over to the landowner will be immediately removed from site for disposal by a licensed waste management contractor once cutting works are completed. No dumping of cut vegetation on agricultural fields. • Temporary works areas will be reinstated to original condition. Prompt revegetation of disturbed areas on the completion of works with plant species native to Uttarakhand. • Routine inspection of re-planted trees to ensure the correct numbers of trees are re-planted according to the compensation payments made to Forest Department. • Trees shall not be removed during the nesting season. • Land clearing activities at Landhora SS undertaken outside the nesting season to avoid impacts to birds (generally April to June, but to be confirmed by ecologist after field surveys).			
	Second stringing	• No trees will be felled. If trees are to be selectively lopped following granting of permission by the Forest Department, they are to be identified, species and location confirmed, counted, marked, and lopped manually (i.e., with hand-held equipment) using appropriate forestry techniques to minimize impacts on adjacent vegetation.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

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Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• Important tree species to retain will be marked separately and protected during the construction.			
	Pesticides	• Use of herbicides or burning to clear vegetation is strictly prohibited.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Invasive Species	• Removal and disposal of identified invasive plant species in an ecologically sound manner.			
	Nest Management	• Before cutting/trimming trees ecologist to check for presence of nesting birds or roosting bats.			
	Private Crops / Trees	• Where the Project results in loss of loss of fruit-bearing trees that have economic value compensate in accordance with the entitlement matrix in the Project LARP; the contractor will pay any subsequent compensation for loss or damage to private trees due to the fault of the contractor's work. • Schedule works to avoid or minimize crop disturbance where lines cross private land, such as undertaking works in between crops.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
Land Use	Damage to Property or cause detriment or inconvenience	• Construction work will make effort to cause as little damage to property or cause detriment and inconvenience. If caused, PTCUL shall make full compensation. • All unanticipated damage to existing public and private property shall be restored to pre-project condition and/or compensated at the cost of the contractor in line with the LARP entitlement matrix. • If any borewells, water pumps or water supply networks are damaged during works the contractor must provide the affected users with an adequate, alternative drinking water supply meeting national standards whilst immediately repairing the damage caused.	• ADB SPS (2009) • Project LARP • The Electricity Act, 2003, Section 67 (3)	EPC Contractor Include in EPC contract cost Throughout project implementation	PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
	Damage to trees and crops	• Route alignment to avoid or minimize tree cutting and crop disturbance where lines cross private land. For all trees which exist prior to placing of the overhead line, the person interested in the tree/crop shall be provided reasonable compensation. • EPC contractor will schedule works to avoid or minimize crop disturbance where lines cross private land, such as undertaking works in between crops • The loss of trees and crops are to be compensated at the rate estimated by (i) Forest Department for timber trees, (ii) State Agriculture Extension Department for crops, and (iii) Horticulture Department for fruit/flower trees.	• ADB SPS (2009) • Project LARP • The Electricity Act, 2003, Section 68 (6)	EPC Contractor Include in EPC contract cost Throughout project implementation	
	Avoidance of impacts to crops / agricultural land	• Use existing access roads and tracks traversing uncultivated, fallow land (not natural habitat) as much as possible to avoid additional crop damage. • Repair any temporary damage caused to agricultural fields after construction is completed. • Saving the top-soil and restoration of land will be done by the Contractor to previous use and farmers will be allowed to continue their cultivation post the construction. • Allow men and women to have continued, safe access to common land for uses such as fuelwood and fodder and water resources • Ensure continuous consultation with affected households and residents.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
Waste Management	General impacts	• Provide adequate facilities for handling and storage of construction materials to reduce the amount of waste that is caused by damage or exposure to the elements and a system for the collection/storage of wastes generated. • Any plant or equipment that is rejected during the installation and commissioning due to damage or failure to immediately be removed from the site and returned to the supplier. • Ensure that the waste hierarchy is followed including prevention, minimization, reuse and recycling -- maximum reuse and recycling of waste and timely removal of unusable waste according to national waste management regulations. • Restrict use of plastics and polyethene and use recyclable/biodegradable materials during construction to the extent possible.	• ADB SPS (2009) • Construction and Demolition Waste Management Rules, 2016 • IFC EHS Guidelines: Waste Management (2007) • IFC EHS Guidelines: Contaminated Land (2007)	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• In locations where waste is dumped (existing site conditions) the contractor will clean the site and collect the waste for onward disposal before they commence their works. • Ensure sufficiently sized facilities are provided for the environmentally safe and sound collection, segregation and storage of waste (including from overnight accommodation) on-site, maximum reuse and recycling of waste by reputable, legitimate, licensed third parties and timely removal and safe transportation of unusable waste to a suitably licensed and engineered waste management facility with all waste transfer records retained. Keep copies of the waste management company's licenses on file. Document all volumes and types of wastes generated and removed off site (inert, solid, hazardous) using transfer • Leaving or disposing of construction wastes by burying them on-site or disposing of them at unlicensed waste management facilities is strictly prohibited. • Unsanitary open dumps are not to be used by the contractor or their third parties. • Municipal waste collection systems must not be used as this is likely to mean that the waste is open dumped, arrangements should be made for direct disposal to a suitably licensed and engineered waste management facility with all waste transfer records retained. • Burning of waste on-site is also strictly prohibited. • No construction material or waste to be poured or thrown into drains • Provide regular training of staff in waste management issues.			
	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.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Domestic and Inert Waste	• No domestic waste shall be left at work sites.		EPC Contractor Include in EPC contract cost	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
				Throughout project implementation	
		• Ensure that wastes are not haphazardly dumped within the work sites and adjacent areas		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Hazardous Waste	• Use containers suitable for each type of waste. • Mark containers adequately specifying the waste types. • Do not mix various waste streams. • Remove waste at the completion of the work day and return it for storage at the appropriate Contractor facility before final disposal via a state licensed contractor for hazardous waste removal and keep agreements with hazardous waste management company's active.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Excavation Waste	• Any spoil material from trenches and substation foundations will be removed from the site and sent to an appropriate state licensed waste management facility.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Waste Tracking	• Keep copies of waste manifests on site. • Keep a record of waste on-site and waste removed.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
Noise and Vibration	Elevated noise levels	• Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to help minimize noise emissions. • Contractor to use suitably designed mufflers or sound reduction equipment on breakers/drills and ensure all leaks in the air line are sealed on them. • Work will be undertaken in daytime hours only – in accordance with IFC EHS definitions (7am – 10pm). • Noisy construction activity at substations (especially earthworks) only between the hours of 8 am - 6 pm. • For UG cables only daytime working is permitted unless in commercial zones with dense urban areas for reasons of road safety and avoiding traffic congestion it is otherwise agreed in writing with the municipal authorities and following consultation with all adjacent residents/occupants of buildings to avoid noise nuisance. • Noise generating construction-related activities will be avoided during evenings, school hours, exam periods, prayer times, religious or cultural events near the sensitive receptors. • No works on Sundays, holidays or festival days. • Sensitive receptors to be consulted with any other special days when they would wish noise levels to be minimized. • Loud construction noise, breaking and drilling activities, must be limited to very short periods of activity adjacent to receptors to minimize disturbance. • Construction noise in the vicinity of houses must be limited to 55dB(A) as 1hour LAeq – if nighttime work is permitted it must be limited to 45dB(A) as 1hour LAeq • In silent zones it must be limited to 50dB(A) as 1hour LAeq – if nighttime work is permitted it must be limited to 40dB(A) as 1hour LAeq • In commercial zones it must be limited to 65dB(A) as 1hour LAeq – if nighttime work is permitted it must be limited to 55dB(A) as 1hourLAeq (if residential property is found in the commercial zone then the above limits apply for works in the vicinity of houses) • On the boundary of the substation construction noise will be limited to 1- hour LAeq 70 dB(A).	• ADB SPS (2009) • IFC EHS Guidelines – Noise Management (2007) • IFC EHS Guidelines: Electrical Power and Distribution (2007) • Noise Pollution (Regulation & Control) Rules, 2000 • Occupational Safety, Health And Working Conditions Code, 2020	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• If these noise levels are exceeded, or background levels >3dBA where already exceeded at the nearest monitored substation, 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. • No piling or blasting is to be undertaken for construction unless a piling/blasting management plan has been agreed. Any rock removal will be undertaken using pneumatic hammer (handheld or excavator mounted). • Use low noise generating equipment e.g., less than 55dBA sound pressure level at 1m. • The use of horns in areas where sensitive receptors are located (houses, schools, clinics, temples, etc.) will be prohibited. • Residents within 500m of substations and ROW of OHL and within 50m of the ROW of UG cables will be forewarned of planned activities that are considered by the Project to be noisy (e.g., trench excavation / drilling). • 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. • 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 e.g., 85 dB(A) during continuation of 8 working hours without wearing PPE.			
	Vibration	• No piling or blasting is to be undertaken for construction unless a piling/blasting management plan has been agreed. • Where rock is encountered, the excavations 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.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
Physical Cultural Heritage	Chance Finds	• Implement the Chance find procedure, if required.	• ADB SPS (2009)	EPC Contractor	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
			• Indian Treasure Trove Act, 1878 as amended in 1949	Include in EPC contract cost Throughout project implementation	
Utilities and Infrastructure	Outages, damage to utilities and private property	• On completion restore or rehabilitate any shut off or damaged utilities/street furniture to at least their original condition in conjunction with the relevant utilities to minimize the public inconvenience. • All unanticipated damage to existing public utilities shall be restored immediately to pre-project condition and/or compensated at the cost of the contractor. • If existing structures (e.g., buildings) and roads, tracks, crops, or, canals, or drains are damaged by works, the Contractor will be required to rehabilitate them to at least their condition prior to construction works to the satisfaction of the property owner having reference to pre-condition surveys. • Through a request via a Project high-level committee which will be established to coordinate the Project, Uttarakhand Public Works Department (PWD) must appoint a dedicated contractor for the PTCUL and UPCL resurfacing work in Dehradun to ensure timely reinstatement. • The high-level committee must also be requested to cooperate with PTCUL and UPCL to enable them to meet their environmental safeguard obligations including prompt reinstatement of damaged utilities etc. • High-level committee coordination and agreements on the timely reinstatement of roads with the Public Works Department are required to ensure there is no more than a 15-day period after construction works are completed to complete final rehabilitation. PWD must also ensure that all public spaces are restored to their original condition within 15 days of works completion.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
Occupational Health and Safety	General	• For all construction works comply with Government of India rules and regulations for the protection of workers. • Strictly implement all the measures outlined in Appendix L and all the measures outlined below. • Emergency contact number and details for medical, fire, etc. are to be displayed in all construction sites.	• ADB SPS (2009) • IFC EHS Guidelines: Electrical Power Transmission and Distribution (2007) • ILO code of practice • Inter-state Migrant Workmen Act 1979 • Occupational Safety, Health And Working Conditions Code, 2020	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Fatalities	• In the event of any fatality occurring during the construction phase at any Project work site, provide UPCL with the details of the fatality within one day of the event occurring in a Fatality Report (for onward reporting to ADB within 48 hours).		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Work sites	• Contractor is responsible for ensuring H&S of everyone on construction site including visitors and sub-contractor workers regardless they have been formally or informally employed. • Ensure adequate health and safety supervision is always on site (if staff temporarily off sick or on short term leave of less than a fortnight contractor to provide a named alternate in advance; if safeguard staff are on longer term leave, are posted elsewhere, or resign, contractor to ensure replacement CV is submitted to UPCL in seven days of the contractor becoming aware with the staff joining the site within one month). • Construction plant and equipment used will be modern and fitted with appropriate safety devices. • Temporary safety fences shall be erected around each work site. • Require workers to confirm they have seen and understood the requirements of the OHS plan before proceeding with the work. • Warning signs will be displayed around work sites to warn workers and members of the local community of potential		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		risks in Hindi and other languages of the workers found on site. • MSDS are to be readily available to any exposed workers and the first-aid personnel. • All crews shall have a competent person responsible for first aid. • Only allow suitably trained and qualified workers to be allowed 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 have a recent medical checkup to confirm they are fit for work. • Require other workers to observe the minimum approach distances for excavations, tools, vehicles, pruning, and other activities when working around power lines. • Provide personal protective equipment (PPEs) for workers in accordance with national OHS regulations OHS with additional PPE provided as needed for COVID-19 risks. • Handwashing facilities with clean running water supply and soap as well as hand sanitizers and closed bins for disposal of hygiene-related wastes to be provided on-site during works. Display posters to promote handwashing and respiratory hygiene etc. • Sanitation and welfare facilities (with separate facilities provided for men and women) used by construction workers to be regularly cleaned and disinfected by the contractor. • Enforce disciplinary system (e.g., immediate removal from site) for non-compliance with PPE requirements. • Ensure proper grounding and deactivation of live power lines during construction/decommissioning work or before any work near the lines and this will be checked and certified by Health and Safety Officer in advance. • Require workers to observe IFC EHS Guideline on T&D requirements for working at height. • Require workers to test the structural integrity of towers prior to proceeding with the work. • Use fall protection measures when working on poles, i.e., mobile elevated working platform, all workers are required to wear body harness.			

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• During construction works ensure qualified first aider and trained fire marshal is always available on-site with an appropriately equipped first aid kit and appropriate fire extinguisher and other firefighting equipment immediately available for use. • Every crew shall have a first aid box at the worksite. First-Aid Box are compliant to Schedule-III of the BOCW Rules 1998. • Arrange with nearest Health Center and/or Hospital for emergency cares of workers. • Provide workers with access to an existing functional toilet facility (toilets and hand washing area) or provide a self-contained portable toilet with hand washing facilities (open defecation and use of pit latrines to be prohibited) generated wastewater to be disposed of to wastewater treatment plant. • Toilet facilities to be provided with adequate supplies of hot and cold running water, soap, and hand drying device. • Sufficient toilet facilities should be provided for the number of workers, and there should be an indication of whether the toilet facility is “in use” or “vacant” if not segregated.			
	EMF	• Measure exposure levels to electromagnetic fields (EMF) and provide workers working in zones where EMF levels are above reference levels with personal EMF monitoring device to be attached onto their PPE.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Food and drink	• Provide workers with access to clean eating area with supply of drinking water. • Adequate supplies of potable drinking water meeting national standards should be provided to workers.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
	COVID-19	• Ensure employees can take time off sick without being penalized, including any self-isolation for COVID-19 that is required. • Medical insurance to be provided for all workers with sick leave allowance to ensure symptomatic workers do not attend site due to no work-no pay policies.	• Ministry of Labour & Employment Safe Workplace Guidelines For Industry & Establishment • Ministry of Health & Family Welfare, GoI guidelines	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Forced and Child Labour	• No forced or child labor to be employed in construction with the minimum age for employment on construction site to be 18 given hazardous nature of works involved. • Verifiable proof of age documentation is maintained for every worker. • Workers operate within the legal working hours and additional work hours are adequately compensated. • All overtime hours are voluntary; coercion, threats or penalties not used to pressure the workers into overtime. • Wages being paid to workers confirms to the minimum wage rated specified under applicable laws. • All wages including overtime are paid within legally defined time limits. • Pay statements shows earned wages, regular and overtime pay, bonuses and all relevant deductions • No unreasonable restraints on the workers freedom of movement. • Terms of employment outlined at the time of recruitment do not differ from the terms offered during the course of employment.	• ADB SPS (2009) • ILO Convention - Minimum Age Convention (1973) • ILO Convention - Worst Forms of Child Labour Convention (1999) • ILO Convention – Forced Labour • Child Labour (Prohibition and Regulation) Act, 1986 amended in 2016 • The Bonded Labour System (Abolition) Act 1976	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Labour and Accommodation Camps	• Ensure the camps established for providing accommodation to labors engaged in construction activities (including separate accommodation for men and women, as necessary) meet the requirements specified in the IFC and EBRD Workers Accommodation: Processes and Standards document, the ILO code of practice for construction sites and the requirements of Appendix N.	• ADB SPS (2009) • World Bank Guidance Note on Managing Labor Influx, 2016 • The Buildings and Other Construction Workers Act 1996, Section 34	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
			• Inter-state Migrant Workmen Act 1979 • IFC and EBRD Workers Accommodation: Processes and Standards, 2009 • ILO code of practice		
Community Health and Safety	Grievances	• Implement the Grievance Procedure to provide opportunity for residents to raise concerns, including those on sexual harassment.	• ADB SPS (2009) • Project GRM • IFC EHS Guidelines: Community Health and Safety (2007) • Voluntary Principles on Security and Human Rights[28]	EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Hazardous Work Sites	• Robustly fence and sign immediate working area including stores/stockpiles with security presence to prevent public access during construction works. • Do not allow children to play in or adjacent to the construction site • Do not leave hazardous conditions (e.g., unlit open excavations without means of escape) overnight unless no access by public can be ensured. • Prevent standing water as it may become a breeding habitat for mosquitoes etc. • All Project infrastructure will be labeled / signposted in accordance with national regulations to inform the public of the specific safety risks of each item. • All work sites will be appropriately signposted and isolated (through fencing or bunting) to prevent encroachment into these areas. Where there are open excavations then solid fencing barrier must be used.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC

[28] https://www.voluntaryprinciples.org

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
	Guard Structures	• For stringing scaffolds and safety nets will be used to protect pedestrians and vehicles (and the conductor itself) from potential injury/damage – this will be used wherever stringing crosses over roads and securing a road closure is not possible, presenting a possible risk to traffic, waterbodies, or is in settlement presenting a possible risk to local communities where access cannot be completely prevented, especially in the vicinity of schools. 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.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Outages	• Provide 72 hours advance notice of any works (not including emergency works) to the local community.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Record Keeping	• Keep a specific record of any community accidents that occur during the construction phase. Report the numbers to PTCUL monthly.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
	Conflict with Security Personnel	• The Project will implement the 'Voluntary Principles on Security and Human Rights' • 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.		EPC Contractor Include in EPC contract cost Throughout project implementation	PTCUL PIU / PISC
Traffic Management	Traffic and Pedestrian Safety	• Implement agreed traffic management plan. Safe access to property and roads should be maintained and alternative routes and access provided where there are temporary diversions or blockages. Diversion works to be immediately	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost	PTCUL PIU / PISC

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		dismantled on completion of works and the footpath and roads restored to their original condition. • Transport equipment only during non-rush hours i.e., avoid the hours of 9am to 11 am and 4pm to 6 pm to minimize traffic congestion. • In dense urban areas or on busy roads installation works affecting footpaths and roads to avoid rush hours i.e., avoid the hours of 9am to 11 am and 4pm to 6 pm. • Stockpiling of spoil and any new equipment (conductor reels, etc.) shall be away from properties and only in designated areas where no access or road use will be blocked. • Allow for adequate traffic flow around construction areas via diversions or temporary access roads. • Provide adequate traffic signs, appropriate lighting, well-designed traffic safety signs, barriers, and flag persons for traffic control. • Ensure that safe access ways to public and private amenities (including schools) are maintained, safe alternative routes provided and clearly signed where there are temporary diversions or blockages. • Safety guides should be provided where works are on footpaths or in locations of pedestrian crossings to help guide pedestrians, especially vulnerable persons, safely around the working area. • Traffic management will need to be done in consultation with the affected communities to ensure they are aware of likely disruption. • Implement traffic management controls during construction works with advance warning signs or flag persons to ensure health and safety of construction workers and road users. • 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. • Road safety and warning signs must be posted at 500m, 100m, and immediately in advance of the works at least two days prior to the works commencing to inform the public of the temporary blockage of one lane of the road. • For congested and narrow roads flagmen should be utilized to warn road users of the situation.		Throughout project implementation	

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
		• For stringing scaffolds and safety nets will be used to protect pedestrians and vehicles (and the conductor itself) from potential injury/damage – this will be used wherever stringing crosses over roads and securing a road closure is not possible, presenting a possible risk to traffic, waterbodies, or is in settlement presenting a possible risk to local communities where access cannot be completely prevented, especially in the vicinity of schools. • Where the execution of the works requires single-lane operation on/beside public road the contractor will provide and maintain all necessary barriers, warning signs and traffic control signals to the satisfaction of the local authority. Wherever traffic diversions, warning signs, traffic control signals, barriers and the like are required, the PISC prior to commencing the work, in that area. • Upon completion of the works for which the temporary traffic arrangements or diversions have been made, the contractor shall remove all temporary installations and signs and reinstate all affected roads/sections and other structures or installations to the conditions that existed before the work started, as directed by the PISC. • No more than a 15-day period after construction works are completed to complete final rehabilitation. • All public spaces are restored to their original condition within 15 days of works completion.			
Training	Pollution Prevention	• Conduct bi-monthly training of workers on pollution prevent 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.	• ADB SPS (2009)	EPC Contractor	PTCUL PIU / Engineer
	OHS	• Conduct weekly training on occupational health and safety for all construction workers including refreshers. To include training for subcontractors before commencement of works.	• ADB SPS (2009)	EPC Contractor	PTCUL PIU / Engineer
	Emergency Response	• Conduct monthly training of workers on emergency preparedness and response procedures in case of an occupational or community health and safety incident during construction works. To include training for subcontractors before commencement of works.	• ADB SPS (2009)	EPC Contractor	PTCUL PIU / Engineer

Table N-3: PTCUL Construction Phase EMP					
Topic	Impact / Issue	Commitment	Applicable Project Standards / Best Practice	Implementation Responsibility	Monitoring Responsibility
	Driver Training	• Driver training, monthly, to include advice on behaviors to reduce the potential for disturbance, including use of horn, loud radios with windows open, switching engines off when not in use, strictly observing speed limits and not accelerating or braking aggressively.	• ADB SPS (2009)	EPC Contractor	PTCUL PIU / Engineer
GRM	GRM Communication and Implementation	• Disseminate GRM contact details and arrangements to the community through the distribution of pamphlets, prominently posted notices at work sites, community centers etc. • Ensure that throughout construction highly visible signage providing their and GRM Focals names and contact details are prominently displayed at all construction sites, storage areas, temporary worker camps, subproject site offices, road crossing points etc	• ADB SPS (2009) • Project GRM	EPC Contractor	PTCUL PIU / Engineer
		• Encourage affected persons to make use of the GRM yet clarify that this does not prevent them from pursuing legal action, if they feel that it is needed		EPC Contractor / PTCUL PIU	-
		• Keep a record of all grievances received and their resolution and to report on them.		EPC Contractor	PTCUL PIU / Engineer

Table R-4: PTCUL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
General	General impacts of O&M on environment, health, and safety and disturbance to local community	*Applicable to all Components* Develop SOP for environmental, health and safety management of SS and power lines operation and maintenance including inspections schedules etc. SOP to cover pollution control, solid and hazardous waste management, health and safety risk assessments and management plans addressing both occupational and community risks and including permit to work system of critical activities such as electrical or work at height and emergency preparedness and response provisions. Implementation of SOP environment, health and safety measures, provision of regular EHS trainings to O&M workers on SOP implementation and good housekeeping practices including how to clean up oil/fuel spills and dispose of contaminated sorbent material which would be treated as hazardous waste etc. Continually improve compliance with national requirements and good international practice for EHS including health and safety and solid and hazardous materials and waste management in particular: • undertake regular visual and technical inspection of condition of substations and power lines and carry out maintenance as required, if encroachment into safety clearances of OHL, SF6 or an oil leak encountered these are to be immediately addressed. • During maintenance works provide signage detailing PTCUL contacts in case of grievance. • Provide at least one-month advance notice to local community through the about the schedule of, location plan, and details of planned major maintenance works. • Mitigation measures applicable to the construction stage are also applicable to the O&M activities and workers. During O&M, internal audits will be undertaken by the PTCUL ESSO and HSO.	• ADB SPS (2009) • Project GRM • WBG EHS Guidelines: Community Health and Safety (2007) • WBG EHS Guidelines: Electrical Power and Distribution (2007) • Occupational Safety, Health And Working Conditions Code, 2020 • Workmen's Compensation Act, 1923 and subsequent amendments • Interstate Migrant Workers Act, 1979	PTCUL with support PISC for development of SOP	N/A
Climate change and pollution prevention	Climate change from fugitive emission of SF6, transformer oil spill and leakage, and forest fire risk at SS due to dry pine needles.	*Applicable to all SS* • Inventory to be maintained of all SF6 containing equipment at SS, their make and model, volume of SF6 contained, details of repair works undertaken, dates of SF6 replenishment, leakage incidents etc. Inventory to be used to monitor SF6 leakage from SS. If trend of lowering gas pressure is observed investigate the cause and rectify any leak per the manufacturer's instruction. • SF_6 in fire extinguishers provided at substations to be avoided.	• ADB SPS (2009) • IFC EHS Guidelines: Waste Management (2007)	PTCUL	N/A

Table R-4: PTCUL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• During operation, regular visual and technical inspections will be undertaken, SF_6 leakage detection kits will be provided at each substation, and remote gas pressure alarms are to be installed where daily inspection is not an option, such that any leaks can be immediately addressed. • PTCUL do not currently have procedures for safe disposal of SF_6. Therefore, SOP must detail and on disposal at end-of-life PTCUL must ensure SF_6 is first removed in accordance with International Electrotechnical Commission (IEC) standard 61634 to a very low pressure so losses of SF6 are less than 0.5% at end of life and then reused, recycled, or destroyed in a high-temperature incinerator. • Training of all project and O&M staff on the climate change impact of SF6, alternatives, H&S risks during O&M due to presence of toxic byproducts, leakage minimization, and environmentally sound and safe disposal • Maintain inventory of transformers on site, make, model, risk of PCBs and other details including transformer test report, details any maintenance works undertaken, dates oil changes, leakage incidents etc. • Maintain transformers and other noise generating equipment to meet operational noise standards. • Carry out regular inspections and periodic preventive maintenance to minimize oil leakages; ensure values, nuts and bolts are fully functional and tightly secured, ensure rubber seals of radiators are intact • Maintenance of and handling of transformer oil to be carried out only by trained workers using appropriate PPE. • The acceptance of mineral oil at substation to be accompanied with Material Safety Data Sheet and certification that it is PCB free. • Unless transformers have been certified PCB free workers interacting with them must wear suitable chemical and/or oil resistant gloves, goggles, and protective clothing whilst taking samples and/or working with transformers. • Material Safety Data Sheets for all fuel/oil/chemical kept on site to be posted • Keep spill prevention equipment available on site at all times. • Collect and segregate all O&M wastes including scrap metal, oil, and solid waste; ensure all workers are familiar with this segregation. Store	• IFC EHS Guidelines: Contaminated Land (2007) • Solid Waste Management rules, 2016 • The Hazardous Waste (Management, Handling and Trans-boundary Movements) rules, 2009 • Construction and Demolition Waste Management rules, 2016		

Table R-4: PTCUL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		all the wastes produced in an environmentally sound manner in designated, labelled area with separate waste containers (drums, bins, skips) for each type of waste with solid waste in enclosed bins to contain leachate and avoid vermin. • Encourage recovery of recyclable wastes that could be reused or sold to recyclers, rather than disposing of it. • Document all wastes removed off site using transfer notes, to be taken by licensed waste contractors who should reuse/recycle or dispose of the waste to a suitably engineered and licensed solid waste management facility. • Hazardous wastes (asbestos, old wooden poles treated with preservatives, oily rags, etc.) must be disposed of. using appropriately licensed waste management company with all storage, transport, and disposal as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 • Records volumes of waste generated and keep transfer records at the substation with copies of the waste management company's licenses on file. • Maintain spill management materials (sorbent pads, loose sorbent material, sand, etc.) next to storage areas for immediately soaking up any leaks or spills that do accidentally occur • Ensure pine needles are regularly cleared from substations and the areas immediately around them.			
Health and Safety	Impacts on occupational health and safety due to exposure to live power and risks of accidents (electrocution, fire, etc.) Impacts to community health and safety such as electrocution and fire, etc.	*Applicable to all Components* • Maintain warning / advisory signs in good and visible condition. • For all maintenance works undertake risk assessment and prepare H&S plan in accordance with EHS Guidelines, considering occupational and community H&S and including adherence emergency preparedness and response plan with communication systems and protocols to report an emergency situation. • Mitigation measures applicable to the construction stage are also applicable to the O&M activities and workers. • Ensure EMF ICNRP occupational and community exposure limits (reference and peak values) are complied with. • Prohibit the use of herbicides, pesticides or burning to control any vegetation growth or to manage vegetation waste. • O&M to be performed only by suitably qualified and experienced	• ADB SPS (2009) • Project GRM • WBG EHS Guidelines: Community Health and Safety (2007) • WBG EHS Guidelines: Electrical Power and Distribution (2007)	PTCUL	N/A

Table R-4: PTCUL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		workers who are regularly trained staff of PTCUL or a contactor under supervision of a Health and Safety Officer with an appropriately equipped first aid kit and appropriate fire extinguishers immediately available for use • Restricting working at height and with electricity only by workers who are trained and certified to do so. • O&M workers to be given required PPE and other requisite safety equipment • Proper grounding and deactivation of live power lines during maintenance work or when working near the lines. *Applicable to UG Cables* • Share the information of the routing of all underground cables to the relevant authorities and include warning marks above ground or over the cable, so when underground works need to be done by others, the location of the cables would be known and avoided. • In case of incident and cables are broken immediately inspect and repair. • Cable chambers are to be kept securely locked at all times (except when workers are in-coming or exiting) but at times when a gate or door is unlocked, ensure one member of staff is always present to control any unauthorized entry. • Map power lines in GIS and share the information of the routing of all underground cables to the relevant authorities that may be undertaking works that could disturb them • In the event of an incident such as cable break PTCUL staff/community must immediately notify the nearest PTCUL incident coordinator for handling measures: power cuts, technical O&M staffing to inspect and repair. *Applicable to SS* • Maintain incident logbook and medical tests / health check-up of staff • Provide everyone who enters the SS with an OHS induction • Keep vents/windows unblocked and replace defunct bulbs/lights immediately • Ensure all SS workers receive basic first aid and firefighting training with annual refreshers • Ensure that at least one staff at SS is fully trained as a first aider and fire marshal	• Occupational Safety, Health And Working Conditions Code, 2020 • Workmen's Compensation Act, 1923 and subsequent amendments • Interstate Migrant Workers Act, 1979		

Table R-4: PTCUL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• Maintain fully stocked, in-date first aid kit, keep first aid posters and emergency contact lists that are posted up to date • Maintain firefighting systems including in-date fire extinguishers and full sand buckets and keep fire safety posters up • Carry out regular inspections and periodic maintenance to ensure electrical standards are being upheld • Display clear emergency exits signs (in working order, if light signs, ensure they work) and keep exits clear of any blockages. Remove any trip hazards on the ground, e.g., materials, equipment, trash laying around. • Collect, segregate, and store in the designated and labelled storage areas all wastes including food wastes for onward disposal as per construction. • Undertake regular pest control using integrated pest management approach • Maintain vegetation at the SS that poses a health and safety hazard • Prohibit the use of herbicides, pesticides or burning to control any vegetation growth or to manage vegetation waste. • O&M to be performed only by suitably qualified and experienced workers who are regularly trained staff of PTCUL or a contactor under supervision of a Health and Safety Officer following the SOP for H&S. • O&M workers to be given required PPE and other requisite safety equipment, provide sufficient PPE spares available on site for visitors etc. • Per national regulations artificial respirators are required and training on same will be provided. • Sanitation and welfare facilities as per construction will also be required for O&M workers. • Potable water will be supplied to workers that meets national drinking water standards and ISO 10500 drinking water parameters (full suite). • Cleaning of toilets on daily basis, use of disinfectant and floor cleaners; keep toilets/septic tank/soakaway maintained • Periodic spot monitoring using mobile phone app of noise levels and ambient EMF for substations at the boundary fence/near transformers to ensure they are below the occupational/community noise levels and ICNRP occupational/community EMF exposure levels • Maintain security and prevent entry by the local community and			

Table R-4: PTCUL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		livestock by maintaining adequate boundary fencing or wall, always keeping control room doors and gates shut, and having security persons present 24x7 to prevent unauthorized public access and trespass. • PTCUL in conjunction with local municipalities, ward/village heads, and the media with the support of CSOs to continue to organize health and safety campaigns on electrical safety community awareness raising activities in local communities and schools within 500 m of the substations *Applicable to OHL* • Carry out regular inspections (at least monthly) on the power lines and periodic maintenance to ensure that integrity of the poles and line is in good condition including possible conductor snapping and de-energizing of the line within three cycles to avoid the potential for electrocution from a breakage, the clearances are maintained, and electrical standards are being upheld. • Inspection protocol should confirm electrical safety warning signs and lighting arrestors in place and identify any missing or corroded parts (including protection for birds) for immediate replacement. • If property is found to be encroaching into the safety clearances notification is to be immediately issued to the owner/occupier by PTCUL along with awareness raising materials with respect to the importance of maintaining the horizontal and vertical clearance from buildings and the matter will be taken up further in consultation with the appropriate authorities. • Regular pruning or lopping of trees ensure the integrity and safety of the OHL • Removal of invasive plant species during routine vegetation maintenance in an ecologically sound manner • Workers to observe guidelines to minimum approach distances to excavations, tools, vehicles, pruning, and other activities when working around power lines. • Testing of structural integrity prior to proceeding with the work and the use of fall protection measures such as harnesses, tool bags, ropes etc. • PTCUL in conjunction with local municipalities, ward/village heads, and the media with the support of CSOs to continue to organize health and safety campaigns on electrical safety community awareness raising			

Table R-4: PTCUL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		activities in local communities and schools within 50 m of the ROWs • In case of fire events, explosion, and other related situations, given the PTCUL may not be available immediately in rural locations the community should be educated with respect to emergency response with 24/7 emergency contact numbers included on signs; PTCUL will need to ensure this is manned 24/7 to ensure that it is effective reporting route.			

Appendix R – UPCL EMP

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
Existing SS	Corrective Action	*Applicable to Existing SS* UPCL to implement the short-term corrective action plan included in the IEE prior to handing over the SS to the contractor. PISC will conduct environmental audit to confirm the status of implementation. UPCL to implement the long-term corrective action plan prior to commissioning of the renovated/upgraded SS. PISC will conduct environmental audit to confirm the status of implementation.	• ADB SPS (2009)	UPCL UPCL counterpart cost	UPCL PIU / PISC
		Applicable to Existing SS Contractors at request of UPCL to address any short-term or long-term corrective actions as part of their scope of works in construction at locations which are also supporting existing substations and in the connection of OHL to PTCUL substation.		EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	UPCL PIU / PISC

General	Design Phase Site-Specific Assessment	*Applicable to all OHL, UG Works, CSS and RMU:*
		• Confirm the scope of work and complete the environmental assessment checklist included in Appendix H for each overhead line/underground cable route including the:
		  ○ related LTFP
		  ○ related RMU
		  ○ related CSS
		  ○ related existing substation bay connections
		• Checklist shall be provided to UPCL approval (after having received ADB clearance) alongside design and confirm all components meet the subproject component selection criteria/will not have worse impact than predicted in the IEE. Prior to UPCL approval of the designs and commencement of construction UPCL will seek ADB clearance of the consolidated environmental assessment forms and update the IEE as required, confirming no change from the impacts and risks described and
			• ADB SPS (2009)	EPC Contractor
				
				Include in EPC contract cost
				
				Before design approval for further implementation during construction phase
					UPCL PIU / PISC

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		assessed in the IEE, or undertaking site-specific assessment and developing a site-specific EMP if required, seeking ADB clearance of any updated IEE before works start. • Contractors to undertake and document meaningful consultations with potentially affected persons and local communities within 50m of OHL/UG RoWs, LTFP, RMU and CSS ensuring representation of at least 30% women, as well as other stakeholders including local authorities and public utilities during design in order that any concerns raised during consultations can be reflected in the choice of site layout, route alignment and construction method – consultation proforma in Appendix H to be completed during design and will be submitted as part of the IEE update. • Each individual on whose land OHL poles will be installed will also be consulted one-on-one by the Contractor prior to finalization of the pole locations. *Applicable to all Existing and New SS:* • Contractors to confirm the scope of work then undertake and document meaningful consultations with potentially affected persons and local communities within 500m of the substations ensuring representation of at least 30% women, as well as other stakeholders including local authorities and public utilities during design in order that any concerns raised during consultations can be reflected in the choice of site layout, route alignment and construction method – consultation proforma in Appendix H to be completed during design and will be submitted as part of the IEE update.			
	Review of documentation, update of the IEE	*Applicable to all Components* • Detailed designs will be reviewed by the contractor and UPCL to confirm all measures required by the IEE/EMP have been adequately incorporated and that they reflect international engineering best practice/good EHS practice before they are approved. • Prior to UPCL approval of the designs and commencement of construction, ensure that UPCL have updated the IEE as required to reflect the final scope of SS works/design/route alignment, seeking ADB clearance of any updated IEE before works start by contractor.	• ADB SPS (2009) •	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC
	Statutory compliances	*Applicable to all Components:* • Ensure all designs comply with all applicable national and state environment, health, and safety (EHS) regulatory requirements in addition to the mitigation measures set out in the EMP – if there is any conflict between national requirements and measures set out in the EMP the most stringent provisions will take precedence.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost	UPCL PIU / PISC

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
				During design phase	
Siting and design of Project Infrastructure	Finalization of existing and new substation design and layout, routing of OHL/UG cables including the design of compact substations (CSS), ring main units (RMUs) and LT feeder pillar boxes (LTFP)	*Applicable to all Components:* • Designs to reflect the requirements of the EMP and international engineering best practice/good EHS practices • Preference shall be given to locating above ground equipment on modified habitat. • Identify presence of any unstable land and where equipment (RMU, CSS, LTFP) and SS are not on flat land conduct geotechnical/slope stability analysis with slopes to be graded with drainage installed to minimize landslide risk. Ensure resulting slope design/topography does not exacerbate surface erosion and/or trigger a landslide; all disturbed areas are to be revegetated. Bioengineering methods can be considered for slope protection. • Stability of slopes over 30% shall be checked and approved by the PISC prior to selection of pole location/substation layout and related foundation to be used. • Cut and fill requirements shall be minimized by design to reduce changes in topography and the extent of earthworks and thus dust generation during construction. Contractor shall quantify the extent of earthworks required and locations for disposal of excavated spoil such as through landscaping within SS site. • Identify presence of floodplain or depressions that get waterlogged in the rainy season. • Conduct flood and drainage risk assessment and incorporate effective drainage design (allowing for climate change) to prevent possible flooding or waterlogging of the SS / RMU / CSS / LTFP during the wet season, whilst ensuring that surface runoff from the SS site is no more than the greenfield runoff rate.	• ADB SPS (2009) • IFC EHS General Guidelines • IFC EHS Electric Power T&D Guidelines • EBRD[29] • ILO Worker Housing[30] • The Electricity Act, 2003 • Indian Standards 7194 •	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	UPCL PIU / PISC

[29] https://www.ebrd.com/downloads/about/sustainability/Workers_accomodation.pdf

[30] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwipxs7J1eP3AhWbdHAKHU25CRMQFnoECAQQAQ&url=http%3A%2F%2Fwww.ilo.org%2Fwcmsp5%2Fgroups%2Fpublic%2F%40ed_emp%2F%40emp_ent%2F%40multi%2Fdocuments%2Fpublication%2Fwcms_116344.pdf&usg=AOvVaw2-ApSPNhOLrUokrZPmdcL3

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		Applicable to OHL/Underground Cabling: • Carefully select the route/siting to minimize impacts on existing structures (e.g., buildings) etc. • UG cables shall generally follow the existing overhead distribution line routes that they shall replace sticking to the existing RoW of the road, although a slight shift towards the road center and minor diversions may be required to avoid impact on trees, properties, public utility services, street furniture etc. • In urban areas above ground infrastructure associated with underground cables (CSS/RMU/LTFP) will be placed so they do block the footpath/road or sites used by informal settlers, street vendors etc. OHL poles will be placed to avoid impacts on trees, properties, public utility services, street furniture etc. • Any temporary disturbance compensated for in accordance with the LARP. • Minimize visual impact and clutter in locating the above ground equipment. • CSS/RMU/LTFP in the public domain are to be in locked cabinet or fenced and gated, vehicular access is not required. • CSS to be designed with Cast Resin, Dry Type Transformer to avoid risk of oil leak. • Ensure maximum external sound power level of equipment in public domain (CSS, RMU, LTFP) is 70 dBA through use of sound attenuation, if internal sound power level is more than 85 dBA OHS noise warning signage identifying that ear protection to be worn must be installed as part of design. • For all UG works crossing rivers they must be in conduit attached to a bridge or buried beneath the river using HDD method. *Applicable only to Existing and New SS* • Substation transformers to be mounted on impermeable surface extending beyond the transformer footprint, bunded to 110% capacity and not connected to the surface water drainage system to collect oil spill, leaks, and overflows; transformers to be sited in a separately fenced area that can be kept locked. • Substation designs will follow the Draft Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2021, including Soak Pit and Oil collecting pit. An oil soak pit shall be designed and provided below each oil filled transformer / reactor to accommodate at least 150% of total quantity of oil contained in the transformer / reactor with minimum 300 mm thick layer of gravels /			

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		pebbles of approximately 40 mm size (spread over a steel iron grating / trans rack) providing free space below the grating. Alternatively, an oil soak pit shall be provided below each transformer or reactor, to accommodate one third of total quantity of oil contained in the transformer / reactor with minimum 300 mm thick layer of gravels/ pebbles of approximately 40 mm size (spread over a steel iron grating/ trans rack) providing free space below the grating provided a common remote oil collecting pit of capacity at least equal to oil quantity in the largest size transformer or reactor is provided for a group of transformers or reactors and bottom of the soak pit below the transformer or reactor shall be connected to the common remote oil collecting pit with drain pipe of minimum 150 mm diameter with a slope not less than 1/96 for fast draining of oil or water through gravity from soak pit to the common remote oil collecting pit. Every soak pit below a transformer or reactor shall be designed to contain oil dropping from any part of the transformer or reactor. The common remote oil collecting pit and soak pit (when remote oil collecting pit is not provided) shall be provided with automatic pumping facility, to always keep the pit empty and available for an emergency. • Provision of oil-water separator on all surface water drainage. • Provide fire walls to transformers or between transformer and nearby buildings as per Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations. • Ensure maximum sound power level of equipment in SS at 1 m is 85 dBA through use of sound attenuation, in areas where these noise levels will be exceeded OHS noise warning signage identifying that ear protection to be worn must be installed as part of design. • Locate new transformers at least 50m from waterbodies and borewells to reduce pollution risk, if closer proximity is required due to site layout further assessment to be carried out to demonstrate using a source-pathway-receptor model there will be no adverse impact on aquatic ecology or human health. • Layout substations so transformers are the furthest distance possible from the adjacent receptors to minimize corona noise/transformer hum experienced. Where possible the quietest available equipment with manufacturer-supplied noise mitigation will be installed. Contractors to ensure that the design enables operation to always comply with 1-hour LAeq 70 dB(A) at the site boundary, 55dB(A) outside the fence line if located within a commercial zone, 45 dB(A) at the nearest residential properties			

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		including located those in commercial zones, and 40dB(A) at 100m distance from silent zones. • Given transformers are generally in the range 60-80 dBA at 1m they are to be located at least 5 m inside the substation site boundary but this distance will need to be increase to between 20m – 100m depending on the land use adjacent to the substation for noise limits to be met without additional attenuation. Diesel generator sets will similarly need to be located away from the SS boundaries. • If residential properties or other sensitive receptors are near the substation boundary, then measurements must be carried out during detailed design and baseline noise calculations (modelling) considering low frequencies associated with transformer hum will be undertaken by the Contractor to demonstrate that the noise standards/guidelines can be met. If background noise levels already exceed the standards/guidelines the design must ensure that noise levels result in a <3dBA increase in background. • If the noise levels at the site boundary or receptors cannot be met through siting alone, then an acoustically designed enclosures or fences will be installed around either the noise source and/or substation boundary to enable the required noise level to be met as a permanent installation as part of the design. • Ensure that ICNRP occupational and community EMF exposure levels (reference and peak values) will be achieved within the substation and outside of the fence line respectively • 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 *Applicable to New SS (or as needed for Correction Action Plan for Existing SS)* • Include a secure boundary fence or wall that is sufficiently high it cannot be climbed over, provide a gated, surfaced vehicular access for entry/exit off public highway having adequate sight lines for all drivers and warning signs of entranceway for road users. • Provide well designed, covered, segregated materials and waste storage area of sufficient size to accommodate all anticipated storage requirements, ensure storage areas can be locked, are well-ventilated and will not reach extreme temperatures. Ensure space also provided in the storage area for solid and hazardous waste garbage bins to be stored. Fuel/oil/chemical/waste storage areas must have an impervious floor and be bunded so that the capacity of each bund is sufficient to contain at least			

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Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		110% of the maximum design storage capacity within storage area, not connected to the surface water drainage system. • Locate new storage areas and septic tanks/soak away at least 50m from waterbodies and borewells to reduce pollution risk, if closer proximity is required due to site layout further assessment to be carried out to demonstrate using a source-pathway-receptor model there will be no adverse impact on aquatic ecology or human health. • Provide spill prevention kits (sorbent pads, loose sorbent material, etc.) at storage areas and other at-risk locations within clearly labelled containers. • 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. Detailed design is to include rainwater harvesting and enable UPCL to readily fit solar panels on building rooftop once operational. • Control building design will provide for sanitation and welfare facilities as per national regulations and international GIIP including indoor toilets with hand washing facilities (minimum of 1 unit to 6 males and 1 unit for 6 females shall be provided) and a dedicated cooking area / clean eating area / rest area for staff on-site etc. • Arrange for safe, hygienic facility/room for female workers' children below five years of age; any room provided for this purpose must be segregated from the operational elements of the substation • Dedicated shelter to be provided at the site entrance for use by security guards, shielding them from rain, wind, and extreme (hot / cold) temperatures. • All wastewater 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. • Potable water will be supplied that meets national drinking water standards. If this is unavailable, ensure regular supply of bottled water to the site during construction and operational phases.			

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		• Design of control building to include emergency exits with emergency exit signage • Provide automatic fire alarm and fire suppression system in control building. • Provide fully stocked, in-date first aid kit installed in a prominent, signed position, first aid posters and emergency contacts to also be displayed • Provide eye wash station and water supply to shower located near storage areas for fuel/oil/chemicals • Provide sand buckets, full of sand, placed in a prominent, signed location near to fire-risk locations such as transformers and oil storage areas • 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 • 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. • 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.			
	Exposure to safety risk from OHL Damage to private property, crops and water supplies etc.	*Applicable to Applicable to OHL* • Alignment to avoid or minimize crop disturbance where lines cross private land by crossing uncultivated land (not natural habitat) as much as possible. • During route survey identify and inventory presence of any surface waterbodies including rivers/ponds and groundwater sources including springs/wells/pumps within 50m of the ROW and confirm if any are used by local communities for drinking water or other purposes documenting distance to the center line. • Alignment to avoid impacting on rivers/ponds and groundwater sources especially water sources including springs/wells/pumps used by local communities. • All OHL river/stream crossings required will be single span. • Alignment to avoid impacting on men and women's access to common land for uses such as fuelwood and fodder and water resources; use of common land and water resources to be identified through consultation	• ADB SPS (2009) • Project LARP • Ministry of Power, Government of India, Guidelines for payment of compensation towards damages in regard to Right of Way for transmission lines dated 15th October 2015 • Ministry of Power, Government of India, Guidelines	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	UPCL PIU / PISC

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Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		• Ensure all relevant safety clearances and right of way are applied to power lines per national standards, see Appendix O. • During route survey identify presence of all buildings/properties within the ROWs with particular attention to mapping school compounds and playgrounds; minimum distances to center line to be inventoried. • Installation of power lines above or adjacent (within the horizontal clearance) to residential properties or other locations intended for highly frequent human occupancy (e.g., schools or offices) to be avoided. No school compounds or playgrounds will fall within the horizontal safety clearance. • Where properties cannot be avoided in the design and where they are present within national safety clearances the properties will be expropriated by UPCL following the procedures outlined in the Project LARP. The LARP will be updated by UPCL during the design phase to include any such properties • Barbed wire type anti-climbing device shall be provided and installed by the Contractor for all pole structures. • Ensure that ICNRP community EMF exposure levels (reference and peak values) will be achieved • All poles 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	for payment of compensation in regard to Right of Way (RoW) for transmission lines in urban areas, dated 16th July, 2020. • The Electricity Act (1910) and its Amendments (2004) & (2007); • The Electricity Rule (1956) & its Amendments (2000); • The Indian Telegraphic Act (1885) & its Amendments (2003); • Central Electricity Authority (CEA) (Installation and Operation of Meters) Regulations, 2006 – Notified on 17.3.2006; • CEA (Grid Standards for Operation & Maintenance of Transmission lines) Regulations, 2010-notified on 26.06.2010;		

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Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
			• CEA (amendment to the regulations on "Installation & Operation of meters") regulations, 2010-notified on 26.06.2010; • CEA (Measures relating to safety & Electric Supply) Regulations, 2010-notified on 24-09-2010; CEA (Technical Standards for Construction of Electric Plants and Electric Lines) regulations, 2010-notifed on 20-08-2010; • CEA (Safety Requirements for Construction, Operation and Maintenance of Electrical Plant and Electrical Lines) Regulations, 2011-notifed on 14-02.2011; • CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) – Regulations 2010; and		

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
			• CEA (Technical Standards for connectivity to the Grid) (Amendment) Regulations, 2010. • The Draft Standard Technical Specification for Steel Pole Structure. GoI. Ministry of Power. CEA. April 2021		
Biodiversity	Habitat and Flora	*Applicable only to UG and OHLs* • Carefully select the OHL/UG alignment and areas for installation within substation sites including CSS/RMU/LTFP locations to avoid or at least minimize the need to cut/trim trees by avoiding areas with a high concentration of trees. • Contractor to employ field ecologists to undertake ROW walkover, map habitat and species encountered, and enumerate the number and species of trees requiring to be cut and lopped, submit survey report alongside design. • Presence or absence of sensitive receptors and critical habitat species identified in IEE to be confirmed by field ecologists during route surveys. Adaptive management measures to be applied according to the findings of the surveys, e.g., realignment of route towards road center to avoid tree roots, etc. • Cutting or trimming of trees will only be planned when required to meet safety clearance requirements per CEA requirements • Entry/exit pits to be placed to avoid the area beneath tree crowns (zone for root protection) and other vegetation. • UG cable alignment placed to avoid the tree crowns, especially mature trees.	• ADB SPS (2009) • CEA (Safety Requirements for Construction, Operation and Maintenance of Electrical Plant and Electrical Lines) Regulations, 2011 notified on 14.02.2011	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC
	Impacts to Birds and Elephants	*Applicable to OHL* • OHL must be designed to prevent electrocutions per the IEE including covered conductors and ensuring that all energized parts at the poles are adequately spaced or insulated. Follow international best practice for phase-to-phase and phase-to-ground clearances for large birds at risk, as identified in the IEE. Maintain at least a 1.5 meter (60-inch) spacing between	• ADB SPS (2009) • The Environment (Protection) Act 1986 and Environment (Protection) Rules	EPC Contractor Include in EPC contract cost	UPCL PIU / PISC

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Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		all energized components and grounded hardware or, where this spacing is not feasible, covering all energized parts and hardware to avoid electrocution. • Ensure that the minimum height of lowest sag of MLV power line conductors is the minimum clearance stipulated by CEA or the height of an elephant's trunk whichever is the larger, for the safe passage of the terrestrial fauna.	1986 & its Amendments • Wild Life (Protection) Act, 1972 (amended 2003	Before design approval	
	Impacts to designated sites	*Applicable all SS, UG and OHL* • No OHL works will be permitted in ESZ or draft notified ESZ. • UG cables routed within 100m of notified forest areas/forest habitat must be installed within the existing road alignment. • SS/CSS/RMU/LTFP sites, route alignments, permanent or temporary facilities including those in ESA and ESZ will be at least 500m from the core / buffer zones of national parks, wildlife sanctuaries, conservation/tiger reserves, reserve forests, other notified forest areas, and other internationally and nationally recognized biodiversity sites such as Ramsar, Key Biodiversity Areas, Important Bird Areas, elephant corridors, tiger corridors etc. Exceptions are as follows: o UPCL cabling works shall not be permitted within 100m of New Forest Campus KBA. o UPCL cabling works shall not be permitted within 100m of Rajaji National Park. o Kaniya SS and UG cable will be permitted within 500m of KBA/IBA this is only due to the fact the MLV line will be UG cable. o Existing substations. • For those works within the ESA, ESZ, and within 10km of protected areas where the ESZ is not yet gazetted written permission will be obtained from the Mussoorie Dehradun Development Authority who maintain the land use plan, the State Pollution Control Board, and the Forest/Wildlife Department. • Except for laydown and storage areas that are not potential pollution sources temporary facilities (e.g., centralized concrete batching plant, hot mix plant, refueling areas, maintenance yards, storage areas for loose materials or fuel/oil/chemical, temporary worker camps) will not be sited in a notified or draft notified ESZ. However, they will be permitted in the Ecologically Sensitive Area and within 10km of protected areas where the ESZ is not yet gazetted if written permission is requested and provided to the contractor by the Mussoorie Dehradun Development Authority who	• ADB SPS (2009) • The Environment (Protection) Act 1986 and Environment (Protection) Rules 1986 & its Amendments • Wild Life (Protection) Act, 1972 (amended 2003	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		maintain the land use plan, the State Pollution Control Board, and the Forest/Wildlife Department. • Temporary laydown and storage areas that are not potential pollution sources may be located a minimum of 50m distant of notified forest areas/forest habitat.			
PCR	Damage to socially/ culturally/ historically/ archeologically sensitive sites	*Applicable to all Components* • Contractors to conduct an inventory of physical cultural resources in and adjacent to the SS and RoW prior to the start of any works including distances to the center line. • Careful selection of SS/CSS/RMU/LTFP sites and UG / OHL route alignment to avoid encroachment on socially, culturally, historically, and archaeologically sensitive areas (e.g., sacred groves, graveyards, religious worship place, monuments etc.) • Permanent or temporary facilities will strictly avoid protected ASI and GoUK monuments including the 300m regulated area associated with protected ASI and GoUK monuments.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC
Hazardous Materials	Release of chemicals and gases in receptors (air, water, land)	*Applicable all New and Existing SS* • PCBs will not be used in substation transformers or other project equipment. • Provide UPCL with material data sheets for the insulating oil used in transformers. • Batteries will be to national standards; use lithium-ion in preference to lead acid or cadmium nickel to minimize use of heavy metals. • Separate room for substation batteries will be provided with ventilation and exhaust fan for taking out fume gases in case of leaks and provision of monitoring of substation batteries (remote if not staffed substation) and exhaust fan will be made	• ADB SPS (2009) • Stockholm Convention	EPC Contractor Include in EPC contract cost Before design approval and then throughout project implementation	UPCL PIU / PISC
		Applicable all New and Existing SS • Processes, equipment, and systems not to use chlorofluorocarbons (CFCs) including halon.	• ADB SPS (2009) • Montreal Protocol	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
	SF6	*Applicable all New and Existing SS and UG works (CSS/RMU)* • Use of alternative insulation medium (such as Hydrophobic Cycloaliphatic Epoxy) to be considered as the preferred option. If no alternative the use of SF6 in gas insulated equipment must be minimized as part of design requirements. • Design of any gas insulated equipment will comply with international norms and standards for handling, storage, and management of SF6. 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. For CSS/RMU the SF6 content is to be less than 2kg per unit. • Installation 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. • Provide SF6 leakage detector at each substation, or the nearest substation for CSS/RMU. • SF6 in fire extinguishers provided at substations to be avoided.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC
	Hazardous Materials	*Applicable all Components* • No asbestos containing materials of any type will be used in the design and construction of project facilities. *Applicable to SS* • Secure oil storage areas bunded to 110% of capacity with an impervious floor of sufficient size to accommodate all anticipated oil storage requirements will be provided. Ensure these storage areas covered, can be locked, are well-ventilated, will not reach extreme temperatures and are not connected to the surface water drainage system. • Substation transformers to be mounted on impermeable surface extending beyond the transformer footprint, bunded to 110% capacity and not connected to the surface water drainage system to collect oil spill, leaks, and overflows; transformers to be sited in a separately fenced area that can be kept locked. • To manage leaks from oil containing equipment SS designs will follow the Draft Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2021, including Soak Pit and Oil collecting pit.	• ADB SPS (2009) • IFC EHS Guidelines • Model Factories Rules 120 (MFR 120) under Section 87 regarding handling and processing of Asbestos, manufacture of any article of Asbestos and any other process of manufacture or otherwise in which Asbestos is used in any form.	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC
Land Use	Land acquisition and resettlement/	*Applicable UG works* • Underground cables will be bored and laid using trenchless method through Horizontal Directional Drilling (HDD) machine as the preferred option.	• ADB SPS (2009) • Project LARP	EPC Contractor	UPCL PIU / PISC

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Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
	temporary disruption	• Open trenching will only be used with the permission of UPCL where sufficient open space is available away from narrow and congested roads, there will be no disturbance to vegetation/trees, and no social safeguard constraints present, and the trench will be open and backfilled within a single day. • UG cable alignment to be designed to be within road/sidewalk reserves as far as is practical, having minimal impact on private land holdings and any informal settlement, street vendors etc.	• Ministry of Power, Government of India, Guidelines for payment of compensation towards damages in regard to Right of Way for transmission lines dated 15 October 2015 • Ministry of Power, Government of India, Guidelines for payment of compensation in regard to Right of Way (RoW) for transmission lines in urban areas, dated 16 July 2020.	Include in EPC contract cost Before design approval	
	Damage to drainage and crops	*Applicable to SS:* • Drains bisecting the SS sites will be maintained with bridge/culvert to cross over sufficient to allow passage of flood water. • Irrigation channel at Kaniya SS will be diverted away from the site. Consultation with local community undertaken to confirm routing site and works schedule to avoid loss of irrigation water. *Applicable UG and OHL works* • UG cable and OHL route alignment to avoid or minimize crop disturbance where lines cross private land.			
Emergency Situations	Explosions / Fire	*Applicable all New and Existing SS* • All substations and other project facilities will be designed and constructed according to national fire safety standards. • All substations will follow preparedness planning and response in compliance with Ministry of Power, GoI Disaster Management Plan for Power Sector- 2021	• ADB SPS (2009) • IFC EHS Guidelines • Disaster Management Plan for Power Sector Jan-2021 • Usage of Usage of Flame Retardant Low Smoke (FRLS) Cables as per relevant IS/IEC • CEA (Measures relating to Safety and Electric Supply) Regulations, 2010-	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
			notified on 24-09-2010; CEA (Technical Standards for Construction of Electric Plants and Electric Lines) regulations, 2010-notifed on 20-08-2010		
Safety	Exposure to safety risk	*Applicable all OHL and UG works* • Ensure designs are in accordance with all national safety standards for UG cabling and electricity substations. • To prevent cable break incident of new UG cables, cable markings will be installed above the cable to inform those who may be excavating in future. • In case the armor is broken by a third party and the core damaged, protection relays to which the UG cables connect will be designed to detect this and stop sending electricity immediately by automatically opening switchgear to prevent a live shock to the person. • CSS/RMU/LTFP located in the public domain will be sited in a gated area or secured cabinet that automatically locks shut so that members of the public cannot access electrical equipment, fence and kiosk to 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. • If not already in-situ install around the base of all ground mounted transformers to which UG cables connect a fence with locked gate and for pole mounted transformers a fence or suitable anti-climbing deterrent, together with provision of hazard warning signs. • If during the route survey existing transformers not maintained in good condition and to which the MLV power lines must connect are identified these are to be reported to UPCL who will need to either remove or maintain/repair the transformer, so it is left in good condition. Health and safety risk assessment for exposure to PCBs to be undertaken before	• ADB SPS (2009) • IFC EHS Electric Power T&D Guidelines • Indian Standard Code of Practice For Installation And Maintenance Of Power Cables Up To And Including 33 kV Rating (IS: 1255-1983) • The Electricity Act (1910) and its Amendments (2004) & (2007); • The Electricity Rule (1956) & its Amendments (2000); • The Indian Telegraphic Act (1885) & its Amendments (2003); • CEA (Grid Standards for Operation &	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	UPCL PIU / PISC

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		removal/maintenance/repair/connection work is undertaken on any existing transformers.[31]	Maintenance of Transmission lines) Regulations, 2010- notified on 26.06.2010; • CEA (amendment to the regulations on "Installation & Operation of meters") regulations, 2010- notified on 26.06.2010; • CEA (Measures relating to safety & Electric Supply) Regulations, 2010- notified on 24-09-2010; CEA (Technical Standards for Construction of Electric Plants and Electric Lines) regulations, 2010- notifed on 20-08-2010; • CEA (Safety Requirements for		

[31] In the absence of documentary evidence (e.g., contract specification or certification for supply of original transformer, maintenance records for oil replacement including material safety data sheet, or transformer oil test results etc.) for given transformers confirming they are PCB-free, all old transformers must be considered by the staff at risk of containing PCBs. Mineral oil-filled transformers were not designed to use PCBs, but many have been found to be contaminated with PCBs due to oil changes etc. If existing transformers are at risk of containing PCBs UPCL will request the contractors to test them to inform their compliance with the Government of India Regulation of Use, Handling and Disposal of Polychlorinated Biphenyls by 31.12.25 (such testing by contractor is included in EMoP scope). In UPCL dechlorinating or removing those confirmed as containing PCBs from the distribution network by 31.12.25 follow national regulations for transport, storage, and disposal through facilities capable of safely transporting (closed trucks) and disposing of hazardous waste containing PCBs.

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
			Construction, Operation and Maintenance of Electrical Plant and Electrical Lines) Regulations, 2011-notifed on 14-02.2011; • CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) – Regulations 2010; and • CEA (Technical Standards for connectivity to the Grid) (Amendment) Regulations, 2010.		
	Building safety	*Applicable all New and Existing SS and UG components (CSS/RMU)* • All buildings will be designed in accordance with national building safety codes and Indian Standards for Earthquake Resistant Design of Structure • All structural designs to be checked for building and seismic safety by design team and an independent expert, separate to design team, to confirm national and international good practice standards are met. • The separation walls or fire barrier walls to be provided between the transformers / reactors or between transformer / reactor and nearby building as per Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations.	• ADB SPS (2009) • Indian Standards for Earthquake Resistant Design IS 1893-4 (2005) • IFC EHS General Guidelines/Occupational and Community Health and Safety • National Building Code of India 2016 (NBC 2016) • The Uttarakhand Building Construction and Development Bye	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
			Laws / Regulations, 2011		
	Access and access roads	*Applicable all Components* • No new permanent access roads will be constructed except to SS sites if needed, existing access roads will be used in the first instance along with manual construction to minimize soil compaction from vehicle movements. • Designs for access roads in steep terrain will be submitted for approval, no access roads will be cut into a hillside. • Access roads will be graded and sloped with drainage either side to prevent unnecessary flow of water across the road and to minimize soil erosion. • If new access roads are required the Contractor will make the access suitable for 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. *Applicable all New and Existing SS and UG works (CSS/RMU)* • Designs will ensure that there can be no illegal access to substations, CSS/RMU/LTFP or to UG cable connection chambers. • Include a secure boundary fence or wall around the substations that is sufficiently high it cannot be climbed over, provide a gated, surfaced vehicular access for entry/exit off public highway having adequate sight lines for all drivers and warning signs of entranceway for road users. Ensure this is applicable to all substations to be rehabilitated, per the Corrective Action Plan.	• ADB SPS (2009) • IFC EHS General Guidelines/Occupational and Community Health and Safety	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC
	Drainage	*Applicable to all SS and UG works (CSS/RMU)* • Final surface level of substation will be at least 0.5 m above the existing ground level or highest flood level including an allowance for climate change based on the findings of the climate change assessment prepared for the Project (whichever is higher) • Foundations to be constructed in such a way as to be adequately drained to prevent washouts and flooding impacts to adjacent land. • Junctions between new access roads and existing roads will not impede or damage the latter nor any associated drainage channels, irrigation infrastructure, etc.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	UPCL PIU / PISC
	OHS	*Applicable all Components* • For all construction works undertake facilitated H&S risk assessment through a workshop during the design (and at other key stages) so it can	• ADB SPS (2009) • IFC EHS General Guidelines/Occupa	EPC Contractor	UPCL PIU / PISC

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		inform both design and pre-construction preparations, considering both occupational and community H&S risks resulting from subsequent stages of the project. Facilitated workshop will involve the design and construction team of the contractors and UPCL operational staff.	tional and Community Health and Safety	Include in EPC contract cost Before design approval	
	Explosions / Fire	*Applicable to all Components* • All substations and other project facilities will be designed and constructed according to national fire safety standards. • All substations will follow any national requirements for emergency response planning and response in compliance with Ministry of Power, GoI Disaster Management Plan for Power Sector- 2021 • Ensure detailed design of OHL incorporates lightening protection to minimize forest fire risks. *Applicable to all SS* • Ensure designs of substations in vicinity of forest habitat where dry pine needles accumulate account for potential forest fires.	• ADB SPS (2009) • CEA (Measures relating to safety & Electric Supply) Regulations, 2010-notified on 24-09-2010; CEA (Technical Standards for Construction of Electric Plants and Electric Lines) regulations, 2010-notifed on 20-08-2010	EPC Contractor	UPCL PIU / Engineer
	Exposure to electromagnetic interference	*Applicable all Components* • Designs to comply with the ICRNP limits of electromagnetic interference	• ADB SPS (2009) • IFC EHS Guidelines	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC
Natural Hazards	Climate hazards	*Applicable all Components* Designs shall incorporate climate change adaptation measures per the climate risk assessment 2023, for example in relation to the substations: *Examples of Climate Adaptation Measures Applicable to SS* • Locate or relocate substations away from areas highly susceptible to flooding/landslides when selecting substation sites. • Conducting geotechnical investigations at substation sites. • Designing strong foundations with higher elevation and safety factors for substation equipment including power transformers.	• ADB CRA (2023)	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		• Building parapet walls, drainage systems, embankments as required at substation sites. • Building fire walls between power transformers at substations. • Providing proper lightning protection measures including station class surge arresters, equipment earthing, earth mesh etc. to minimize risks due to lightening. • Implementing GIS substations at required locations to save space and minimize climate and disaster risks. • Using power transformers with higher efficiency ratings at substations.			
	Geohazards	*Applicable to all Components* • All designs shall incorporate specific measures, as required by Indian Standards for Earthquake Resistant Design of Structures and in coherence with the MoP, GoI Disaster Management Plan for Power Sector to mitigate the risk of damage from seismic events, and other natural hazards including flooding and landslides. • All structural designs are to be checked for seismic safety by design team and an independent expert, separate to design team, to confirm national and international good practice standards are met *Applicable to all new SS and Sahiya, Garampani, Rudrapur and Sairaghat SSs* • Conduct flood, landslide and drainage risk assessment and incorporate effective drainage design (allowing for climate change) to prevent possible flooding or waterlogging during the wet season, whilst ensuring that surface runoff from the project site is no more than the greenfield runoff rate. The areas requiring special foundations and those prone to flooding should be avoided. • Further, per Draft Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2021: ○ The substation or switchyard shall be constructed above the highest flood level and, wherever required, flood protection walls shall also be provided. ○ The substation shall be designed for seismic requirement of the site as per relevant IS. ○ Gas insulated substation (GIS) shall be constructed in seismic prone areas, coastal areas, high altitude areas, very heavily polluted areas and for locations where space is major constraint.	• ADB SPS (2009) • IFC EHS Guidelines • Indian Standards for Earthquake Resistant Design IS 1893-4 (2005) • Disaster Management Plan for Power Sector, MoP, GoI Jan 2021 • CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) – Regulations 2010	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
		Applicable to Sarghakhet SS Snow fall has previously ceased works at the substation, complete works outside of the winter snow season.			
	Slope stability	*Applicable to all SS* Project components on slopes must incorporate slope stability measures such as bioengineering methods and retaining walls with adequate drainage to avoid exacerbating surface erosion and/or triggering a landslide. All designs for works in steep topography to be checked by design team and an independent geotechnical engineer, separate to design team, to confirm national and international good practice standards are met.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	UPCL PIU / PISC
Soils	Contaminated Land	*Applicable to all SS* • Existing substations will be surveyed by a contaminated land professional employed by the contactor during the design phase to assess the potential for soil contamination to be present in the area proposed for works (Phase 1 Site Investigation). • If signs of potential 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 proposed work area to determine the level of soil contamination. • The findings and recommendations of the survey will be submitted to UPCL for approval. • If soil contamination is noted in the work area, a method statement for the management and/or removal and disposal of the contaminated soil as hazardous waste following international good EHS practices will be prepared and submitted to UPCL for approval.	• Solid Waste Management rules, 2016 • The Hazardous Waste (Management, Handling and Trans-boundary Movements) rules, 2009 • Construction and Demolition Waste Management rules, 2016 • IFC EHS Guidelines: Contaminated Land (2007) • IFC EHS Guidelines: Hazardous Materials and	EPC Contractor Include in EPC contract cost Before design approval	UCPL PIU / PISC

Table R-1: UPCL Design Phase EMP					
Topic	Impact / Issue	Commitment	Project Standards	Implementation Responsibilities	Monitoring Responsibilities
			Waste Management • Stockholm Convention		
Asbestos	Removal of asbestos at existing substations	*Applicable to all SS* • If demolition of existing buildings or structures is required, then they will be surveyed by a competent asbestos surveyor employed by the contractor during the design phase to confirm the risk of asbestos being present. The findings and recommendations of the survey will be submitted to UPCL for approval. • If asbestos is found a method statement (Asbestos Management Plan) for its management and/or safe removal and disposal of asbestos as hazardous waste following international good EHS practices will be prepared and submitted to UPCL for approval. • Removal and disposal of asbestos will be in accordance with the asbestos management plan. Site will need to be confirmed "clean" by a competent asbestos surveyor before any works on the new SS will be started.	• ADB SPS (2009) • Model Factories Rules 120 (MFR 120) under Section 87 regarding handling and processing of asbestos, manufacture of any article of asbestos and any other process of manufacture or otherwise in which asbestos is used in any form. • ADB Good Practice Guidance for the Management and Control of Asbestos: Protecting Workplaces and Communities from Asbestos Exposure Risks •	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
General	Unanticipated impacts and corrective actions	*Applicable all Components* • Comply with the definite version of the EMP which is the version disclosed on ADB's website. This includes any site-specific EMP included in an updated IEE following design or any updates in response to unanticipated impacts. • Comply with any corrective action plan required by UPCL, contractor to cover the costs where corrective action is required due to non-compliance on behalf of the contractor, its subcontractors or third parties. • Ensure all subcontractors and third parties, irrespective of being formally or informally employed also comply with the EMP and any updates to it, as well as the CSEMP and that this responsibility is cascaded down any chain involved. • Do not engage in any activities described on the ADB Prohibited Investment Activities List in Appendix 5 of ADB's SPS (2009) • Put in place appropriate incentives and/or penalties for (non-) compliance by workers related to use of PPE, and any violations of the Contractors Code of Conduct. • Comply with all applicable national and state environment, health, and safety (EHS) regulatory requirements in addition to the mitigation measures set out in the EMP – if there is any conflict between national requirements and measures set out in the EMP the most stringent provisions will take precedence	ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before the start of start any related works including construction site establishment then ongoing through project implementation	UPCL PIU / PISC
	Management Planning	*Applicable all Components* Preparation for UPCL approval and implementation of the CSEMP and its associated management sub-plans reflecting the EMP requirements and international engineering best practice/good EHS practices- CSEMP shall include: **Construction Method Statement** Identifying all construction activities, schedule, access routes, anticipated traffic volumes, and construction methods to be used as well as temporary construction facilities needed and their location e.g., laydown areas, stores, worker rest areas, toilets/washrooms, worker overnight accommodation etc. **Waste Management Plan**	ADB SPS (2009) IFC EHS General Guidelines/Electric Power T&D Guidelines	EPC Contractor Include in EPC contract cost Before the start of any works including construction site establishment for UPCL approval then implement throughout	UPCL PIU / PISC

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		Dealing with all solid and hazardous waste as well as wastewater generated in an environmentally sound and safe manner. Where possible it will ensure surplus materials will be reused or recycled, disposal will be the last resort. **Pollution Prevention Plan** Covering dust and emissions to air management, noise management, the protection of water resources and environmentally sound and safe storage, use, and disposal of all fuels, chemicals and oils used on site and an emergency preparedness and response plan in the event of any leaks or spills (e.g., of oil, etc.) or an incident such as flood **Occupational Health and Safety Plan & Emergency Response Plan(s)** See Appendix K. H&S plan to include emergency preparedness and response plan including flow chart and contact details to deal with situation should any construction worker or community member be diagnosed with COVID-19 during the works. **Community Health and Safety Plan** Outlining all of the relevant measures in this EMP relating to community health and safety **Labor Management Plan** Addressing employment of migrant workers, sanitation and welfare, gender-based violence/sexual exploitation, abuse, and harassment prevention etc. LMP shall include a Code of Conduct. **Traffic Management Plan** Considering both the safety of pedestrians and vehicles and need to avoid traffic congestion; it is to be developed in consultation with relevant local authorities to ensure proper execution of traffic controls including where temporary blockage of one lane of the road or footpath is needed for installation **Biodiversity and Physical Cultural Resources Plan** Including (i) prohibitions on fishing, hunting, poaching, protected areas etc. (ii) a wildlife incident reporting procedure and emergency fauna rescue and handling procedure, including contacts of forest and protected area management, nearest veterinary etc. (iii) measures to avoid the spread of invasive species including the installation of washing stations for the		construction phase	

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		pressure washing of vehicles at the site entrance, and (iv) a Chance Find Procedure for physical cultural resources **Communication Plan** **Training Plan** • CSEMP and its associated management sub-plans will be living documents, to be updated as required and re-approved by UPCL as construction proceeds, if construction methods or site conditions change, in response to an accident, incident, near miss etc. • CSEMP will identify all temporary construction facilities needed e.g., laydown and storage areas, temporary workers facilities etc.			
	Advance Notice	*Applicable all Components* • No works will start until UPCL has locally disclosed the IEE and any update to it with executive summary translated into Hindi via the UPCL website, UPCL offices, existing substations, and other construction site offices. • Brochures and posters on the main findings of the IEE and where the full version can be accessed, as well as a translation of the executive summary of the IEE, will be printed in Hindi and made available/displayed for public scrutiny at places easily accessible to affected persons. • Directly liaise one-on-one with receptors in the RoW or in the vicinity of work sites, including informal settlers/street vendors and specifically notify them about the commencement of work etc. • Local communities as well as individual property owners within 500m are to be consulted when selecting sites for temporary construction facilities outside of UPCL substations prior to finalization of their location.	ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before the start of any works including construction site establishment then ongoing throughout project implementation	UPCL PIU / PISC
	GRM	*Applicable all Components* • UPCL with support of contractor to inform all potentially affected persons and local communities within 500m of substations and 50m of UG and OHL ROWs of the existence of the GRM as well as the GRM process and means of submitting project grievance to. Inform all residents and businesses of the GRM in advance of works (at least one month).	ADB SPS (2009) Project GRM	EPC Contractor Include in EPC contract cost Before the start of any works including construction site	UPCL PIU / PISC

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• Community awareness raising of the GRM will be undertaken verbally, through community meetings, one-on-one consultations with landowners; through the distribution of notices/pamphlets/posters; and through other media outlets. • Provide notice boards at all substations, construction site offices and active work sites including details of the GRM including the name, designation, contact numbers including phone/SMS/What's App, address of both the UPCL and contractor's GRM focal persons plus the timeline and process of redressal together with a suggestion box that will be regularly checked for any grievances received. • UPCL will create a WhatsApp Group with Ward member. Before construction community leaders/ward members will be informed through WhatsApp messages. • Provide EMF awareness sessions at villages within 500m of LILO OHL and substations. The awareness sessions should provide information regarding the findings of the IEE on EMF and specifically discuss best practice reference limits for EMF and how they have been applied to the Project.		establishment then ongoing throughout project implementation	
	General Statutory compliances	*Applicable all Components* • Acquire all requisite environment, health, safety and labor permits and licenses for construction activities as required by national laws and regulations, prior to the commencement of works. • Statutory H&S and labor requirements including permits, licenses, and insurances for all workers to be obtained and maintained. • Contractors are to obtain Consent to Establish for all construction plant including DG sets and all other applicable national EHS permissions or requirements prior to construction. • Construction plant must not be operated by contractors until their Consent to Operate is obtained.	ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before the start of start any related works including construction site establishment then ongoing	UPCL PIU / PISC

Table R-2: UPCL Pre-construction Phase EMP					
Topic	**Impact / Issue**	**Commitment**	**Applicable National Requirements / International Best Practice**	**Implementation Responsibility/ Budget Source/Schedule**	**Supervision and Monitoring Responsibility**
	Insurances	*Applicable all Components* • Medical insurance will be provided for all workers with sick leave allowance to ensure symptomatic workers do not attend site due to no work-no pay policies. Given the specialist nature of responding to COVID-19 public health officials/experts to be consulted in undertaking the risk assessment and management planning for COVID-19. • Insurance to include a community liability clause for payment of compensation in case of any accidents because of construction.		through project implementation	
	Specific Statutory Compliance	*Applicable all Components* • Permissions for any new borewell installation (for construction or permanent supply to substation) shall be obtained including NOC from CGWB together with agreement of local communities before abstraction, include water meter on the borewell for monitoring of water abstracted. • Obtain necessary clearances consistent with the regulatory requirements from other utilities that could be affected by the Project (municipality for street furniture, electric, water, sewerage, telecommunications, road, rail etc.) • Coordinate with relevant authorities where the RoW crosses irrigation canals, roads, rail, other power and communications lines to obtain no objection, required vertical clearances to be maintained.	ADB SPS (2009) IFC EHS General Guidelines IFC EHS Electric Power T&D Guidelines EBRD[32] ILO Worker Housing[33] The Electricity Act 2003 (Provisions as to opening up of Streets, Railways, etc.)	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	UPCL PIU / PISC

[32] https://www.ebrd.com/downloads/about/sustainability/Workers_accomodation.pdf

[33] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwipxs7J1eP3AhWbdHAKHU25CRMQFnoECAQQAQ&url=http%3A%2F%2Fwww.ilo.org%2Fwcmsp5%2Fgroups%2Fpublic%2F%40ed_emp%2F%40emp_ent%2F%40multi%2Fdocuments%2Fpublication%2Fwcms_116344.pdf&usg=AOvVaw2-ApSPNhOLrUokrZPmdcL3

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
Staffing	Inadequate staff to provide supervision and oversight	*Applicable all Components* • Appoint a suitably qualified and experienced, dedicated Environment Officer and dedicated Health and Safety Officer for each contract package/lot to be based on site full-time. • Each active construction site is to have adequate health and safety supervision to ensure the health and safety of all workers and local communities to include a suitably qualified and experienced Senior Engineer having NEBOSH/IOSH certification or similar qualification who is based on-site full-time and nominated to the role of EHS Supervisor with responsibility for ensuring EMP implementation, acting on the advice of, and reporting to their safeguards team. Each Senior Engineer will be supported by full-time on-site Health and Safety steward(s) with at least one steward to each 50 persons. • Do not discriminate and proactively encourage the employment of (i) suitably skilled women, and (ii) local employment for unskilled roles whilst ensuring suitably qualified and experienced workers for skilled roles; noting that all workers must be appropriately skilled given the hazardous nature of distribution works. • No child will be employed, and no under 18 will be engaged on construction site (hazardous work). • Provide medical/accident insurance for all workers (formal and informal) for the duration of their contracts as well as at least 10 days of sick leave for all construction workers.	ADB SPS (2009)	EPC Contractor Include in EPC contract cost with BOQ line for staff Staff in place prior to the start of construction and ongoing through project Implementation	UPCL PIU / PISC
	Induction and Orientation	*Applicable all Components* • Ensure all members of contractor's safeguards team, design team, and construction management team attend UPCL EMP trainings. • 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, protected areas, forest land, interaction with wildlife etc.	ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before the start of any works including construction site establishment then on an ongoing basis	UPCL PIU / PISC

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• 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 firewood and NTFP collection by workers; prohibition on trapping, hunting, fishing, or poaching by workers; chance find procedures; H&S including use of PPE; etc. • 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. • Prepare with guidance of health experts HIV/AIDS/COVID-19 information video/brochures/leaflets for distribution to all workers during induction, covering factual health issues as well as behavior change issues (e.g., social distancing for COVID-19) around the transmission and infection of HIV/AIDS/COVID-19 and other communicable diseases • 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 must be informed by the CSEMP and address the following aspects: o Zero tolerance in respect of health and safety o Requirement on always wearing PPE on site o Zero tolerance of bribery or corruption o Respect for local community and customs, avoiding community conflict situations especially in tribal areas o 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			

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		○ Alcohol and drugs policy and testing regime ○ Role of workers in good housekeeping ○ Role of workers in maintaining good hygiene including COVID-19 measures e.g., social distancing ○ Respect of wildlife and the environment ○ Description of disciplinary measures for infringement of the code of conduct and other employer rules (e.g., immediate removal from site, fine etc.)			
Biodiversity	Tree cutting / removal	*Applicable all Components* • Ensure the requisite forest department approvals for any tree cutting are in place pre-construction. • Public trees will be compensated by compensatory afforestation (planting at least 10 trees for each tree cut) as per forest department requirements and the requisite forest department approvals for any tree cutting will be sought pre-construction. UPCL will provide funds to the forest department based on the number of public trees counted by the EPC Contractor to be cut and monitor the progress of the compensatory plantation process that it has funded to ensure that planting takes place such that no net loss of biodiversity is obtained. • Compensation for the loss of any private trees in the RoW would be based on their replacement cost, as defined in the LARP.	1. ADB SPS (2009) 2. The Environment (Protection) Act 1986 and Environment (Protection) Rules 1986 & its Amendments 3. Wild Life (Protection) Act, 1972 (amended 2003	EPC Contractor Include in EPC contract cost Before construction commences	UPCL PIU / PISC
	Project Footprint	*Applicable all Components* • Demarcation of the working area and avoid encroachment outside the agreed corridor of impact. • Follow design drawings and implement careful construction practices to avoid damage to trees. • Sensitive habitats that need to be avoided during construction (e.g., specific trees that are to be retained) will be marked for protection by the contractor's environmental specialist who shall with support of field ecologists make a pre-work survey of the work sites to identify and conduct an inventory of trees to be cut prior to the start of works with the PISC. • Demarcation of mature trees to be avoided and retained. Only the marked trees within the ROW are to be felled after joint verification and approval of tree list.			

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
	Bird Electrocutions	*Applicable to OHL* To further reduce the potential for electrocutions in general, i.e., both on HV and MLV power lines, it is recommended, to identify, and if possible, move carcass dumps away from Project alignments (but not closer to other lines). A two-step approach is required as follows: a) UPCL consult with local village heads and any 'skinners' in Bharauni and Near Collectorate to identify the presence of any carcass dumps in relation to the proposed alignments. b) If carcass dumps are identified in close proximity (within 500m) of the lines recommend to the village heads / skinners that the dumps be moved away from the line, but not closer to other lines. It is noted that these recommendations may not be actioned by village heads, or the skinners that use the dumps. In addition, the Project, through UPCL, will provide community awareness raising with the support of an NGO in relation to vulture conservation and the need to avoid carcass dumps near power lines.			
	Designated sites	*Applicable all Components* • Where biodiversity sites are present within 10km and there may be a risk of workers accidentally straying into these areas then worker trainings and the code of conduct will cover measures to ensure that wildlife will be protected.			
Soils	Contaminated Land	*Applicable all existing SS* • Existing substations will be surveyed by a contaminated land professional employed by the contactor to assess the potential for soil contamination to be present at the substation and in the working area. • If signs of potential contamination are present, e.g., oil storage tanks, old leaking transformers, oil staining, etc. soil sampling and testing shall be undertaken in the working area to determine the level of soil contamination. • The findings and recommendations of the survey will be submitted to UPCL for approval. • If soil contamination is noted in the working area, a method statement for the management and/or removal and disposal of the contaminated soil as hazardous waste will be prepared and submitted to UPCL for approval.	• IFC EHS Guidelines: Contaminated Land (2007) • Solid Waste Management rules, 2016 • The Hazardous Waste (Management, Handling and Trans-boundary Movements) rules, 2009	EPC Contractor Include in EPC contract cost Before design approval	UPCL PIU / PISC

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
			• Construction and Demolition Waste Management rules, 2016 • Stockholm Convention		
Access	Access to existing SS	*Applicable to all Existing SS* Lamgarah substation needs to be repaired and connected to the access road in front for entry of vehicles. Substations on high altitudes like Pines, Bajol, Sairaghat, Lamgarah, have elevated and sloping pathways, without steps to enter substation from the access/main road. Safe access is to provided prior to the start of construction. Vehicle movement will not be possible for Pines substation as it is narrow, very steep and with sharp bends. Alternative equipment delivery methods required.	• ADB SPS	EPC Contractor Include in EPC contract cost	UPCL PIU / PISC
Hazardous Materials	Release of chemicals and gases in receptors (Air, water, land)	*Applicable all Components* • 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.	• ADB SPS (2009) • Stockholm Convention	EPC Contractor Include in EPC contract cost Before construction commences	UPCL PIU / PISC
Hydrology	Water Users	*Applicable all Components* • Any drilling or excavation works within 50m of boreholes and wells used as a drinking water source by local communities will require pre-construction and post construction water quality monitoring against GoI drinking water standards to ensure there is no contamination of the supply. • Construction water to be sourced from an existing licensed commercial supplier (preferred option) where available; if using an existing surface water or an existing borewell for construction water, permissions to be obtained from authorities together with agreement of local communities	• ADB SPS (2009) • BIS for Drinking Water 10500:2012	EPC Contractor Include in EPC contract cost Before construction commences	UPCL PIU / PISC

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
Utilities and Roads	Coordination and planning with utilities and PWD	*Applicable all Components* • Check with relevant local authorities (electric, water, telecoms) whether there are known pipes, cables, or other utility lines and carry out a scan using cable avoidance tool to identify any unknown underground utilities prior to excavation. • Contractors to identify in consultation with service providers appropriate measures to minimize period of disruption to utilities and reduce health and safety risks during installation. If services must be disrupted contractors (via service providers if appropriate) to notify affected communities well in advance of any power outage etc. • In relation to cumulative impact liaise with other utilities regarding the timing and extent of other construction works in the same road ROW and ensure plans for construction works are coordinated so emissions/disruption/ disturbance are minimized. • For private property or public utilities/street furniture that may be damaged during construction, including from potential breaking/drilling vibration damage (buildings, roads, drains etc.) photographic and/or structural pre-condition surveys are to be completed and agreed with UPCL prior to any works, including site establishment. To be documented in a pre-project condition report, which will serve as baseline in case any inadvertent damage or vibration impact to property occurs. If risk of structural damage to adjacent properties from vibration identified due to current condition, consider alternative construction methods or temporary relocation of occupants during works if at risk. • Through a request via a Project high-level committee which will be established to coordinate the Project, Uttarakhand Public Works Department (PWD) must appoint a dedicated contractor for the PTCUL and UPCL resurfacing work in Dehradun to ensure timely reinstatement. • The high-level committee must also be requested to cooperate with PTCUL and UPCL to enable them to meet their environmental	• ADB SPS (2009) • BIS Standards for Drinking Water 10500:2012	EPC Contractor Include in EPC contract cost Before construction commences	UPCL PIU / PISC

Table R-2: UPCL Pre-construction Phase EMP					
Topic	**Impact / Issue**	**Commitment**	**Applicable National Requirements / International Best Practice**	**Implementation Responsibility/ Budget Source/Schedule**	**Supervision and Monitoring Responsibility**
		safeguard obligations including prompt reinstatement of damaged utilities etc. • High-level committee coordination and agreements on the timely reinstatement of roads with the Public Works Department are required to ensure there is no more than a 15-day period after construction works are completed to complete final rehabilitation. • PWD must also ensure that all public spaces are restored to their original condition within 15 days of works completion.			
	Awareness and Communications	*Applicable all Components* • 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. • The authorities will be notified when oversize heavy loads need to be transported and the loads will be escorted by the Project.			
Temporary facility	Selection of temporary construction facilities	*Applicable all Components* • Provide a central covered warehouse for storage of construction materials etc. Only volumes of material required for the day's work will be stored on-site. • Contractor to seek to locate all temporary construction facilities required including laydown and storage areas within the boundaries of UPCL land (substations) except for overnight accommodation that could be provided in existing properties off-site. • All temporary facilities to have separate toilet facilities for men and women and childcare facilities (where staff are posted) • If other public or private land is required for temporary construction facilities noisy and dusty facilities or those that may generate sediment laden runoff or wastewater (e.g., centralized concrete batching plant, hot mix plant, refueling areas, maintenance yards, storage areas, temporary worker camps) must be sited 500m from residential property. Laydown and storage areas that are not potential pollution	ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before design approval for further implementation during construction phase	UPCL PIU / PISC

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		sources may be located 50m distant but must not block accesses or road use. • No public or private land requiring clearance of vegetation or supporting forest habitat or having waterbodies is to be used. • Land use to be negotiated with private landowner, submit land ownership papers and copy of agreement for temporary land use with a photographic record of pre-project condition.			
Community Safety	Awareness raising	*Applicable all Components* • In conjunction with the local municipality (Nagar Palika/Nagar Palika Parishad) and the media organize health and safety campaigns including the distribution of posters, leaflets, and safety booklets to all households in local language with strong use of graphics for construction and electrical safety community awareness raising activities in local communities and schools within 500 m of the new and existing substations and at least 50m of the MLV power line ROW (UG & OHL) prior to construction and then again prior to commissioning of substations/energizing the MLV power lines about how to avoid electrical incidents having greater emphasis on operational hazard and risks, etc. This is specifically important at the school adjacent to the switchyard and close to the transformers in the existing Phoolchaur SS. • Develop and distribute leaflets/pamphlets/posters to the local community covering (i) health awareness including HIV/AIDS/Covid-19 and other communicable diseases, and (ii) the conduct of construction workers that can be expected.	4. ADB SPS (2009)	EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	UPCL PIU / PISC

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
OHS	General	*Applicable all Components* • Informed by risk assessment prepare H&S plan for approval by UPCL in accordance with the IFC EHS General Guidelines on OHS, considering occupational and community H&S and including adherence to electrical safety standards and emergency preparedness and response plan with communication systems and protocols to report an emergency situation. • For all pre-construction and construction works comply with Government of India rules and regulations for the protection of workers. • Contractors will set up an accident reporting system for any health and safety incidents (near miss, minor, lost time, fatal) involving workers or community to be reported to UPCL within 24 hours of occurrence with a response plan detailing the incident and how its reoccurrence will be avoided. Record of all incidents and response taken should include date, time, details of incident, treatment given and outcome, and lessons learnt for the future. Contractors will ensure all workers are covered by insurance to pay out in the event of a disability or fatality. • Emergency contact number and details for medical, fire, etc. are to be displayed in all construction sites.	• ADB SPS (2009) • WBG EHS Guidelines: Electrical Power and Distribution (2007) • Occupational Safety, Health And Working Conditions Code, 2020 • Workmen's Compensation Act, 1923 and subsequent amendments • Interstate Migrant Workers Act, 1979	EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	UPCL PIU / PISC
	Sub-contractors	*Applicable all Components* • All Project sub-contractors will be supplied with copies of the EMP and CSEMP. • Provisions will be incorporated into all sub-contracts to ensure the compliance with the EMP and CSEMP at all tiers of the sub-contracting. • All subcontractors will be required to appoint an OHS representative who will be available on each work site.			
	Grievances	*Applicable all Components* • Establish a formal Grievance Mechanism for workers, including on sexual harassment at work.			
	COVID-19	*Applicable all Components* • Prior to any pre-construction field work being undertaken the Contractor will develop procedures to ensure that national COVID-19			

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		requirements[34] and WHO workplace[35] and hand hygiene[36] guidelines are followed, including providing awareness raising activities for surveyors, minimizing travel requirements, undertaking screening health checks to confirm those going in the field are not symptomatic, providing surveyors with adequate supplies of personal hand sanitizer and masks, ensuring social distancing of at least 1m, that masks are worn at all times during consultations, and that a register of all contacts is maintained etc. • In undertaking H&S risk assessment for construction and preparing H&S Plan adequate attention will be given to the risks associated with COVID-19 pandemic and other communicable viral diseases. National restrictions for containing the spread of COVID-19 must be complied with and ADB guidance to be followed, as well as the control measures set out in Appendix M. • COVID-19 vaccination program to be completed for all workers before works commencement and kept up to date with booster vaccinations on schedule as recommended by national requirements. • Construction workers to be given medical checkup per statutory requirements and including checks for COVID-19 symptoms before being allowed on site; medical records are to be maintained on-site.			
Labor Accommodation/ Camps	General living conditions, Safety and Security	*Applicable all Components* • Design of temporary worker camps/overnight accommodation to conform to national requirements and international good practice. Contractors to provide all basic requirements (beds and beddings, mosquito nets, artificial lights, natural light, windows and ventilation, fans, emergency exits, firefighting equipment, kitchen and dining halls, mobile charging points, toilets and washing facilities, potable drinking water, recreational space etc. The contractor shall ensure the camps established for providing accommodation to labors engaged in construction activities meet following requirements:	• ADB SPS (2009) • World Bank Guidance Note on Managing Labor Influx, 2016 • The Buildings and Other Construction Workers Act	EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	UPCL PIU / PISC

[34] https://www.mygov.in/covid-19 and https://www.mohfw.gov.in/
[35]https://www.who.int/docs/default-source/coronaviruse/advice-for-workplace-clean-19-03-2020.pdf
[36]https://www.who.int/infection-prevention/campaigns/clean-hands/WHO_HH-Community-Campaign_finalv3.pdf?ua=1

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Topic	**Impact / Issue**	**Commitment**	**Applicable National Requirements / International Best Practice**	**Implementation Responsibility/ Budget Source/Schedule**	**Supervision and Monitoring Responsibility**
		• Arrange for safe, hygienic facility/ room for female workers' children below five years of age • The camp site is adequately drained and no water logging takes place; • The premise of the labor camp is kept clean and free from rubbish and other refuse/waste. Separate housekeeping staff shall be engaged in the labor camps for regular cleaning of the accommodation, kitchen and toilet premises • For each worker, a minimum floor surface area of 4 to 5.5 m^2 shall be provided with a minimum ceiling height of 2.10 m and about 15 - 20% additional area shall be provided for circulation • Security at worker's accommodation shall be ensured. • Adequate and appropriate firefighting equipment's are available and routine maintenance and inspection is undertaken. • Emergency evacuation plans are displayed at strategic areas in language understood by most workers.	1996, Section 34 • Inter-state Migrant Workmen Act 1979 • IFC and EBRD Workers Accommodation: Processes and Standards, 2009 • ILO's guidance on worker accommodation[37]		
	Room facilities	*Applicable all Components* • Rooms provided have adequate ventilation, lighting including emergency lighting. • Rooms built with easily cleanable flooring material and are cleaned at regular intervals • The doors and windows are lockable and provided with mosquito screens where necessary. • A separate bed provided for every worker with minimum space of 1m between beds. • Rooms have provision of separate storages areas for work clothes, PPEs and personal belongings of workers. • Separate rooms are provided for male and female workers.		EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	UPCL PIU / PISC
	Drinking water	*Applicable all Components* • Residents have easy access to a supply of clean/potable water meeting national drinking water standards in adequate quantities. • Source water from an existing licensed commercial supplier (preferred option) where available		EPC Contractor Include in EPC contract cost	PISC

[37] https://www.ilo.org/wcmsp5/groups/public/@ed_emp/@emp_ent/@multi/documents/publication/wcms_116344.pdf

Table R-2: UPCL Pre-construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• Water tanks used for the storage of drinking water covered to prevent water stored therein from becoming polluted or contaminated. • The quality of the drinking water is regularly monitored and records maintained.		Before commencement of works and then ongoing through project implementation	
	Sanitary and toilet facilities	<u>*Applicable all Components*</u> • Adequate number of indoor toilets shall be provided with hand washing facilities. A minimum of 1 unit to 6 males and 1 unit for 6 females shall be provided. • Separate sanitary and toilet facilities provided for men and women, including private bathing area, showers or baths in overnight accommodation • Sanitary and toilet facilities constructed from materials that are easily cleanable and shall have adequate (at least 80-100 liters per capita per day) supply of water. • There are adequate facilities for washing and drying clothes. • Disposal of sewage and other wastewater shall be connected to existing sewage system or made through a septic tank-soak pit arrangement. • Separate enclosed (lidded) bins with proper markings in terms of recyclable or non-recyclable waste shall be provided in the labor camps and kitchen premises in sufficient numbers for collection of garbage. The solid waste shall be disposed through authorized waste collectors.		EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	UPCL PIU / PISC
	Canteen and cooking facilities	<u>*Applicable all Components*</u> • The wall surfaces adjacent to cooking areas are made of fire-resistant materials. • Food preparation tables equipped with a smooth, durable, non-corrosive, non-toxic, washable surface. • If workers cook their own meals, kitchen space is provided separately from the sleeping areas. • The refuse and food waste are frequently removed from the kitchen to avoid accumulation and attracting pests and rodents.		EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through	UPCL PIU / PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• Proper drainage system shall be provided for collection of waste water from washing areas and kitchens, that shall be further disposed through the septic tank. • Daily food served to workers shall have appropriate level of nutrition value. • The religious and cultural background of workers shall be kept in mind for food selection and they should have choice of food through their employees.		project implementation	
	Medical, leisure and social facilities	*Applicable all Components* • First aid kits provided in adequate numbers considering the capacity of the camp. • There are an adequate number of staff/workers trained to provide first aid. • Residents are provided guidance on alcohol, drug and HIV/AIDS and other health risks. • Basic social collective spaces and adequate recreational areas provided to workers. • In addition, National/State/Local guidelines on Covid-19 shall be followed		EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	UPCL PIU / PISC
	Small labor camp/fly camps for short duration	*Applicable all Components* • Shaded rest area that is accessible and can accommodate the number of workers on site • Facilities are located within a reasonable distance (less than 10km) from any main labor camp. • The temporary structures erected should be good enough to provide protection against the weather condition appropriate for the season. • The camp should not be provided for overnight accommodation. • Either cooked food is supplied or a hygienic arrangement for cooking (separate from the living area) shall be provided. • If food is cooked at camp, appropriate fire precaution and fire-safety measures to be adopted. • No labor shall be allowed to collect fuel wood/NTFP or purchase fuel wood/NTFP from unauthorized vendors.		EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	UPCL PIU / PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• LPG cylinders or kerosene purchased from authorized vendors shall be provided. • Adequate quantity of safe drinking water and container for their safe storage shall be provided. • If public toilets are not available within a distance of 100m, portable toilets for men and women workers shall be provided where the wastewater generated is enclosed in a container and will later be taken offsite for wastewater treatment and disposal. • There shall be provisions for lighting in the night.			
Physical Cultural Resources	Pre-work surveys	*Applicable all Components* • EPC Contractor for all components will be required to conduct an inventory of physical cultural resources in and adjacent to the RoW and within 50m of substations prior to the start of any works. Where any PCR is identified within the RoW they will be demarcated and where any are found to be directly impacted, due to their presence within the RoW micro-alignment changes will be made to avoid impacts to the sites. • Demarcation of physical cultural resources such as trees or shrines to be avoided and retained.	• ADB SPS (2009) • The Ancient Monuments and Archaeological Sites and Remains Act of 1958 • Indian Treasure Trove Act, 1878 (as modified up to September 1949) • The Antiquities and Art Treasures Act, 1972	EPC Contractor Include in EPC contract cost Before commencement of works and then ongoing through project implementation	UPCL PIU / PISC
	Chance Finds	*Applicable all Components* • A chance find procedure will be developed for implementation in the event physical cultural resources are found, to include the following procedures: ○ If suspected physical cultural resources are encountered, all works at the find site should be immediately halted; ○ The find should be assessed by a competent local official managing cultural issues, and procedures to avoid, minimize or mitigate impacts to such physical cultural objects should be agreed in writing with them. ○ Work should not begin until the procedures to avoid, minimize or mitigate impacts to the physical cultural resources have been agreed and implemented in full. ○ If avoidance is not feasible, and no alternatives to removal exist, and the Project benefits outweigh the anticipated cultural heritage loss from removal which is unlikely unless in			

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		case of resource of local value, following clearance of ADB the physical cultural resources should be removed and preserved using the best available technique in accordance with relevant provisions of national heritage protection laws and decrees. ○ Records should be maintained of all finds, including chain of custody instructions for movable finds. • All construction workers to be made aware of the chance-find procedure and types of finds to be reported.			
Procurement	Material Specifications	*Applicable all Components* • Contractors will use locally sourced materials as far as practical to reduce transportation, but all raw materials will be sourced only from existing licensed sources e.g., aggregates from quarries which hold Prior Environmental Clearance and valid crusher operating documents from SPCB. Records to be kept of all the materials used and source with copies of licenses etc.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Comply throughout project implementation	UPCL PIU / PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
Training	Pollution Prevention	*Applicable all Components* • 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.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Bi-monthly throughout project implementation	UPCL PIU / PISC
	OHS	*Applicable all Components* • 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. • 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. • 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. • Untrained workers must not be permitted to work with live electricity or to work at height.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
	Emergency Response	*Applicable all Components* • 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 hazard, disease outbreak etc. To include training for subcontractors before commencement of works. • Emergency preparedness and response training for construction management will include modules on first aid and fire safety including include training on how to use first aid and firefighting equipment provided on-site, and scenario of potential or confirmed COVID-19 infection.	• ADB SPS (2009)	EPC Contractor Monthly and throughout project implementation	UPCL PIU / PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
	Driver Training	*Applicable all Components* • Driver training, monthly, to include advice on behaviors to reduce the potential for disturbance, including use of horn, loud radios with windows open, switching engines off when not in use, strictly observing speed limits and not accelerating or braking aggressively.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Monthly throughout project implementation	UPCL PIU / PISC
Communications	GRM	*Applicable all Components* • Contractor's safeguards team will act as site GRM Focal and keep affected persons and local communities informed of the status of work and be readily available onsite to receive, document and deal with grievances at site level. • Encourage use of the GRM and clarify that this does not prevent affected persons from pursuing any legal action, if they feel it is needed, and inform communities about the ADB Accountability Mechanism and their possibility to resort to it if any grievance is not resolved by the project level GRM.	• ADB SPS (2009) • Project GRM	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
	Worker GRM	*Applicable all Components* • 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. • Construction workers will be given access to register any grievances with the contractors or direct access to the UPCL GRM Focal			

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
Air Quality	Release of Exhaust Gases and Fugitive Emissions	*Applicable all Components* • Emission sources (vehicles such as excavators) shall be positioned as far as is practical from sensitive receptors.	• ADB SPS (2009) • Air (prevention and control of pollution) Act, 1981 • WBG EHS Guidelines: Air Emissions and Ambient Air Quality (2007)	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
		Applicable all Components • Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to maximize fuel efficiency and help minimize emissions. • Construction equipment and vehicles will meet national emissions standards. • Hold valid PUC emission certificates of all construction vehicles • Belching of black smoke is prohibited. • Limit engine idling to maximum 5 minutes. • The open burning of wastes generated by project-related activities is strictly prohibited. • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery-powered equipment where practicable. • Stack emissions of temporary diesel generator set or hot mix to comply with national emission standards with the stack height designed according to both national requirements and IFC EHS General Guidelines.			

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	Dust	*Applicable all Components* • Carry out watering for dust control at least twice a day (within 50m of work sites) in the area of excavation works in dry weather with temperatures of over 25° or in windy weather. • Dust emissions will be further minimized by adopting a rolling construction method and immediately restoring the surface of excavations including road pavements once construction activities are completed. • Soil scattered on pavements and roads shall be immediately swept up to avoid windblown dust. • Vehicle movements will be restricted to defined access routes and demarcated working areas (unless in the event of an emergency). • 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. • Keep stockpiles of soil, aggregate and waste materials covered with canvas or tarpaulin when spoil heaps are not active to avoid suspension or dispersal of fine soil particles during windy days and to prevent disturbance by stray animals. • Vehicles delivering friable construction materials shall be covered with canvas or tarpaulin. • Impose speed limits on construction vehicles to minimize the spread of dust from roads. • 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. • Undertake weekly dust soiling checks of surfaces of adjacent properties during earthworks and help with cleaning of external surfaces of property if dust is evident. • If there is an increase in existing background air pollution or complaints are received contractor will be required to implement additional dust or noise mitigation e.g., barricading/isolating sources of dust, use of wheel wash etc. • Provide workers with N95 dust masks to be worn when ambient conditions are dusty or when dust generating activities take place. *Applicable new and existing SS*			

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• For SS a solid temporary fencing shall be installed around the boundary/works area to minimize the dispersion of dust, it will also function as a temporary acoustic noise fence to minimize the noise and visual impact. *Applicable to UG works* • For UG cables entry/exit pits will be refilled with temporary repaving of the excavated area done immediately once cable installation is completed.			
Hydrology	Water resources	*Applicable all Components* • Construction activities must not limit the availability of or restrict access to water sources (e.g., wells) used by local communities. • Natural flow of waterbodies must not be obstructed or diverted to another direction.	• ADB SPS (2009) • BIS For Drinking Water 10500:2012	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
	Water pollution	*Applicable all Components* • Follow liquid management and storage requirements listed below under 'soils'. • No wastewater will be discharged direct to surface waterbodies or groundwater without adequate treatment. • Use of pit latrines is prohibited as is open defecation and urination and uncivil use of roads or private premises by construction workers. • Locate mobile generators and site construction equipment at least 50m from groundwater resources and surface waters.	• ADB SPS (2009) • WBG EHS Guidelines: Hazardous Materials Management (2007)	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC

Table R-3: UPCL Construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
Soils	Soil Compaction, Topsoil & Excavated materials	*Applicable all Components* • Vehicle movements will be restricted to working areas (unless in the event of an emergency). • Minimize removal of existing vegetation and topsoil. Topsoil disturbed will be separately stored and used to restore the surface of the excavated area. • On completion of works, stockpiled topsoil will be spread over the surface of the SS/pole foundations/UG alignment (if not under hard surfaces) and used in the restoration of temporary construction facilities. 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. Revegetation of the soils will follow using native seed mixes to Uttarakhand. • Infertile and rocky material will where possible be reused as fill material, 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. • Soil exposed to oil leakage from transformer equipment that MLV power lines are connecting to or at existing SS is to be removed from site for disposal as a hazardous waste. • Records of excavated soil, generated waste, and transfer records will be kept. • Excavation will be limited to within the agreed corridor of impact, ideally road reserve.	• ADB SPS (2009) • IFC EHS Guidelines: Contaminated Land (2007) • Solid Waste Management rules, 2016 • The Hazardous Waste (Management, Handling and Trans-boundary Movements) rules, 2009 • Construction and Demolition Waste Management rules, 2016 • Stockholm Convention	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
	Soil erosion	*Applicable all Components* • Slope stability measures to be implemented during construction to minimize landslide risk. • Schedule works during the dry season where practical to minimize any exposed areas subject to erosion by surface water runoff. • Rehabilitate any disturbed areas beyond footprint of the UG / OHL alignment and substation footprint to at least original condition through revegetation using native species.			
	Contaminated Land	*Applicable all Components* • Any soils within work sites that appear to be contaminated by leaked oil and fuels shall be removed and disposed of as hazardous materials per the Contaminated Land Management Plan, similarly asbestos will be managed per the Asbestos Management Plan.			

Table R-3: UPCL Construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
	Drilling fluid	*Applicable UG works* • HDD equipment will use water as a drilling fluid to reduce noise level. Do not allow the use of oil or bentonite clay as a drilling fluid. • Where water is used any excess must be disposed of to open ground for percolation, or if no open ground to waiting tanker trucks for proper disposal, it must not be disposed of to surface water.			
	Spill and leaks	*Applicable all Components* • Fuel, oil, and chemicals used to be kept under lock and key and stored in labelled, sealed containers on drip trays to provide secondary containment. They will be located on an impermeable surface and be under cover. • Mount plant containing oil and diesel on drip trays to catch leaks. • Refueling operations, equipment servicing and washdown to take place on an impermeable surface at least 50m from watercourses, springs and wells, with drainage directed through oil and grease interceptors before being discharged into a settling pond prior to discharge offsite. • If transformers are temporarily disturbed, they must be handled carefully and stored (ideally undercover) on drip trays to provide secondary containment of 110% of the liquid contents should they spill or leak. Unless transformers have been certified PCB free workers interacting with them must wear suitable chemical and/or oil resistant gloves, goggles, and protective clothing whilst taking samples and/or working with transformers. • Provide sufficient absorbent materials (e.g., sorbents, dry sand, sandbags) on-site for soaking up fuel, oil or chemical leaks/spills. • As part of the overall management process EPC Contractors for all components shall conduct bi-monthly training of workers on pollution prevention control including good housekeeping and how to clean up oil/fuel/chemical spills and dispose of contaminated sorbent material which would be treated as a hazardous waste. This will include emergency preparedness and response procedures (drills) in case of spill. Training for subcontractors before commencement of works will also be completed.			
Biodiversity	Project footprint	*Applicable all Components* • Vehicle movements will be restricted to demarcated working areas (unless in the event of an emergency) to reduce unnecessary impacts to habitat.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost	UPCL PIU / PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• Minimize removal of existing vegetation and topsoil to that which is necessary.	• IFC EHS Guidelines: Electrical Power and Distribution (2007) • Procedure For Grant of Tree Felling Permission for Establishment Of An Industry Under Uttarakhand Enterprises Single Window Facilitation And Clearance Act, 2012 will be followed for the works in non-forest area • Forest Conservation Act (FCA), 1980	Throughout project implementation	
	Tree Cutting	*Applicable all Components* • Record all trees removed during construction, compensation paid, and replacements planted (including location, species, size, and economic value) and monitor their current health and survival status, for up to two years following plantation. • Cut/trimmed trees and other vegetation trimmings will be removed off-site as soon as line is completed. Unless sold for reuse, to be disposed of to a suitably licensed waste management facility with all waste transfer records retained. • Store cut vegetation away from the roadside, any vegetation material not handed over to the landowner will be immediately removed from site for disposal by a licensed waste management contractor once cutting works are completed. • Prompt revegetation of disturbed areas on the completion of works with plant species native to Uttarakhand. • Routine inspection of re-planted trees to ensure the correct numbers of trees are re-planted according to the compensation payments made to Forest Department. • Trees shall not be removed during the nesting season.			
	Invasive Species	*Applicable all Components* • Removal and disposal of identified invasive plant species in an ecologically sound manner. • 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. • Cleaning of machinery before import to site, use wheel washes on site.			
	Pesticides	*Applicable all Components* • Use of herbicides or burning to clear vegetation is strictly prohibited.			
	Disturbance	*Applicable all Components* • No construction works from one hour before sunset to one hour after sunrise in rural areas outside of settlements within the ESZ or within 10km of a protected area for which an ESZ has not been notified.			

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• 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.			
	Nest Management	*Applicable all Components* • Trees or poles with nests shall not be removed during the nesting season.			
Land Acquisition and Compensation for Damages	Land Acquisition and Compensation	*Applicable all Components* • Temporary impacts (e.g., land rentals) that are not within the assessed corridor of impact to be compensated by the Contractor in line with the LARP entitlement matrix.	• ADB SPS (2009) • Project LARP • The Electricity Act, 2003, Section 67 (3)	UPCL GoUK Budget	PISC
	Damage to Property or cause detriment or inconvenience	*Applicable all Components* • UG / OHL construction work will make effort to cause as little damage to property or cause detriment and inconvenience. If caused, the UPCL shall make full compensation. • All unanticipated damage to existing public and private property shall be restored to pre-project condition and/or compensated at the cost of the contractor in line with the LARP entitlement matrix. • If any borewells, water pumps and water supply networks are damaged during works the contractor must provide the affected users with an adequate, alternative drinking water supply meeting national standards whilst immediately repairing the damage caused.	• ADB SPS (2009) • Project LARP • The Electricity Act, 2003, Section 67 (3)	EPC Contractor Include in EPC contract cost Throughout project implementation	PISC
	Damage to trees and crops	*Applicable all UG / OHL components* • UG / OHL Route alignment to avoid or minimize tree cutting and crop disturbance where lines cross private land. For all trees which exist prior to placing of the overhead line, the person interested in the tree/crop shall be provided reasonable compensation. • EPC contractor will schedule works to avoid or minimize crop disturbance where lines cross private land, such as undertaking works in between crops • The loss of trees and crops are to be compensated at the rate estimated by (i) Forest Department for timber trees, (ii) State Agriculture Extension Department for crops, and (iii) Horticulture Department for fruit/flower trees.	• ADB SPS (2009) • Project LARP • The Electricity Act, 2003, Section 68 (6)	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• Ensure that the project activities do not affect men and women's access to common land and water resources for uses such as fuelwood and fodder • 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. • Repair any temporary damage caused to agricultural fields after construction is completed. • Saving the topsoil and restoration of land will be done by the contractor to previous use and farmers will be allowed to continue their cultivation post the construction.			

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
Materials and Waste Management	General impacts	*Applicable all Components* • Provide adequate facilities for handling and storage of construction materials to reduce the amount of waste that is caused by damage or exposure to the elements and a system for the collection/storage of wastes generated. • Any plant or equipment that is rejected during the installation and commissioning due to damage or failure to immediately be removed from the site and returned to the supplier. • Ensure that the waste hierarchy is followed including prevention, minimization, reuse and recycling. • Restrict use of plastics and polyethene and use recyclable/biodegradable materials during construction to the extent possible. • In locations where waste is dumped (existing site conditions) the contractor will clean the site and collect the waste for onward disposal before they commence their works. • Ensure facilities are provided for the collection, segregation and storage of waste (including from overnight accommodation) on-site, maximum reuse and recycling of waste by reputable, legitimate, licensed third parties and timely removal and safe transportation of unusable waste to a suitably licensed and engineered waste management facility with all waste transfer records retained. Keep copies of the waste management company's licenses on file. Document all volumes and types of wastes generated and removed off site (inert, solid, hazardous) using transfer • Leaving or disposing of construction wastes by burying them on-site or disposing of them at unlicensed waste management facilities is strictly prohibited. • Unsanitary open dumps are not to be used by the contractor or their third parties. • Municipal waste collection systems must not be used as this is likely to mean that the waste is open dumped, arrangements should be made for direct disposal. • Burning of waste on-site is also strictly prohibited. • No construction material or waste to be poured or thrown into drains • Provide regular training of staff in waste management issues.	• ADB SPS (2009) • IFC EHS Guidelines: Waste Management (2007) • IFC EHS Guidelines: Contaminated Land (2007) • Solid Waste Management rules, 2016 • The Hazardous Waste (Management, Handling and Trans-boundary Movements) rules, 2009 • Construction and Demolition Waste Management rules, 2016	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
	PCBs	*Applicable UG and existing SS* • Removed electrical and mechanical equipment may be handed over to UPCL or transported to their designated workshop/store who will reuse or recycle using SPCB authorized vendors as per the condition of the equipment, if fit for use they will be stored for reuse by UPCL or they will be auctioned off as scrap material. Disposal of old transformers and other hazardous wastes shall be per national regulations. Other wastes will be recycled using SPCB authorized vendors or suitably engineered and licensed waste management facilities for inert or solid waste. • If removing PCB contaminated transformers disposal must involve facilities capable of safely transporting (closed trucks) and disposing of hazardous waste containing PCBs. In stores, these transformers will need to be stored undercover on a bunded concrete pad or drip tray enough to contain 110% of the liquid contents should they spill or leak.		EPC Contractor / UPCL Include in EPC contract cost Throughout project implementation	PISC
	Recycling	*Applicable all Components* • All recyclable waste (plastic, metal, paper, etc.) will be sorted on source and sent for recycling where facilities for recycling of these materials exist.		EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
	Domestic and Inert Waste	*Applicable all Components* • No domestic waste shall be left at work sites. • Ensure that wastes are not haphazardly dumped within the work sites and adjacent areas			
	Hazardous Waste	*Applicable all Components* • Use containers suitable for each type of waste. • Mark containers adequately specifying the waste types. • Do not mix various waste streams. • Remove waste at the completion of the work day and return it for storage at the appropriate Contractor facility before final disposal via a state licensed contractor for hazardous waste removal and keep agreements with hazardous waste management company's active.			

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
	Contaminated Soil	*Applicable UG and existing SS* • Any areas of oil leaks beneath existing equipment to be removed will be excavated, stored in labelled metal drums and returned to the Contractors facilities for storage. • The labelled containers will include a reference number which correlates with the removed transformer which will be tested for PCBs using rapid test kits. • If the PCB tests indicate that the transformer oil is contaminated, the container containing the soils will be labelled as PCB waste. • PCB waste shall be stored, handled and disposed of in line with national regulations.			
	Excavation Waste	*Applicable all Components* • Any spoil material from trenches and substation foundations will be removed from the site and sent to an appropriate state licensed waste management facility.			
	Old Poles and Wires	*Applicable UG works* • Poles shall be removed by pulling the complete pole from the ground (not be cut off at the ground level), cleaned with any material attached to the pole (including concrete) removed, and returned to UPCL warehouses for storage prior to their final disposal by UPCL through a state licensed waste management company, or for recycling / re-use. Unused pits will then be backfilled and compacted completely with enough backfill piled above grade to prevent depressions being created by natural compaction and the disturbed ground vegetated. • Existing poles may be used for other utilities e.g., street lighting in which case some poles may need to be retained or the utilities shifted in conjunction with utilities. • The high-level committee must be requested to cooperate with UPCL to enable them to meet their environmental safeguard obligations including completing relocation of utilities such as street lights from UPCL poles etc.		EPC Contractor / UPCL Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
		Applicable UG works • Overhead cables shall be returned to UPCL warehouses for storage by UPCL prior to their collection for recycling / re-use.		EPC Contractor / UPCL Include in EPC contract cost	PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
				Throughout project implementation	
Noise and Vibration	Elevated noise levels	*Applicable to all Components* • Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to help minimize noise emissions. • Contractor to use suitably designed mufflers or sound reduction equipment on breakers/drills and ensure all leaks in the air line are sealed on them. • Work will be undertaken in daytime hours only – in accordance with IFC EHS definitions (7am – 10pm). • Noisy construction activity at substations (especially earthworks) only between the hours of 8 am - 6 pm. • For UG cables only daytime working is permitted unless in commercial zones with dense urban areas for reasons of road safety and avoiding traffic congestion it is otherwise agreed in writing with the municipal authorities and following consultation with all adjacent residents/occupants of buildings to avoid noise nuisance. • Noise generating construction-related activities will be avoided during evenings, school hours, exam periods, prayer times, religious or cultural events near the sensitive receptors. • No works on Sundays, holidays or festival days. • Sensitive receptors to be consulted with any other special days when they would wish noise levels to be minimized. • Loud construction noise, breaking and drilling activities in particular, must be limited to very short periods of activity adjacent to receptors to minimize disturbance. • Construction noise in the vicinity of houses must be limited to 55dB(A) as 1hour LAeq – if nighttime work is permitted it must be limited to 45dB(A) as 1hour LAeq • In silent zones it must be limited to 50dB(A) as 1hour LAeq – if nighttime work is permitted it must be limited to 40dB(A) as 1hour LAeq • In commercial zones it must be limited to 65dB(A) as 1hour LAeq – if nighttime work is permitted it must be limited to 55dB(A) as 1hourLAeq (if residential property is found in the commercial zone then the above limits apply for works in the vicinity of houses)	• ADB SPS (2009) • IFC EHS Guidelines – Noise Management (2007) • IFC EHS Guidelines: Electrical Power and Distribution (2007) • Noise Pollution (Regulation & Control) Rules, 2000	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• On the boundary of the substation construction noise will be limited to 1- hour LAeq 70 dB(A) unless sensitive receptors are found within 0m.			
		• If these noise levels are exceeded, or background levels >3dBA where already exceeded at the nearest monitored substation, 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. • No piling or blasting is to be undertaken for construction. Any rock removal will be undertaken using pneumatic hammer (handheld or excavator mounted). • Use low noise generating equipment e.g., less than 55dBA sound pressure level at 1m. • The use of horns in areas where sensitive receptors are located (houses, schools, clinics, temples, etc.) will be prohibited. • Residents within 500m of substations and 50m of the RoW for UG cables will be forewarned of planned activities that are considered to be noisy (e.g., trench excavation / drilling). • 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. • 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 e.g., 85 dB(A) during continuation of 8 working hours without wearing PPE.			

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
Physical Cultural Resources	Chance Finds	*Applicable to all Components* Implement the Chance find procedure, if required. *Applicable to Existing SS* Ensure there is no damage to a roadside temple at Lamgarah SS during the delivery of equipment and movement of construction vehicles along the access road.	• ADB SPS (2009) • Ancient Monuments and Archaeological Sites and Remains Act 1958 as amended • Indian Treasure Trove Act, 1878 (as modified up to September 1949) • The Antiquities and Art Treasures Act, 1972	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
Utilities and Infrastructure	Damage to utilities	*Applicable to all Components* • Liaise with utilities to ensure their operation throughout the construction period, e.g., by obtaining necessary clearances pre-construction from other utilities that could be affected by the Project (water, sewerage, telecommunications, road, railways etc.). • Check with relevant local authorities (water, telecoms) whether there are known pipes, cables, or other utility lines and carry out a scan using cable avoidance tool to identify any unknown underground utilities prior to excavation. • On completion restore or rehabilitate any shut off or damaged utilities/street furniture to at least their original condition in conjunction with the relevant utilities to minimize the public inconvenience. • All unanticipated damage to existing public utilities shall be restored immediately to pre-project condition and/or compensated at the cost of the contractor. • If existing structures (e.g., buildings) and roads, tracks, crops, or, canals, or drains are damaged by works, the Contractor will be required	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		to rehabilitate them to at least their condition prior to construction works to the satisfaction of the property owner having reference to pre-condition surveys.			
Occupational Health and Safety	General	*Applicable to all Components* • Strictly implement all the measures outlined in Appendix L and all the measures outlined below. • Emergency contact number and details for medical, fire, etc. are to be displayed in all construction sites.	• ADB SPS (2009) • WBG EHS Guidelines: Electrical Power and Distribution (2007) • Occupational Safety, Health And Working Conditions Code, 2020 • Workmen's Compensation Act, 1923 and subsequent amendments • Interstate Migrant Workers Act, 1979	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
	High altitude sites	*Applicable to Existing SS* Complete a risk assessment of all sites at high altitudes and design include specific measures to address any risks identified as part of the OHS Plan.			
	Fatalities	*Applicable to all Components* • In the event of any fatality occurring during the construction phase at any Project work site, provide UPCL with the details of the fatality within one day of the event occurring in a Fatality Report (for onward reporting to ADB within 48 hours).		EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
	Transformers (PCBs)	*Applicable to UG and Existing SS* • Unless transformers have been certified PCB free workers interacting with them must wear suitable chemical and/or oil resistant gloves, goggles, and protective clothing whilst taking samples and/or working with transformers. • Water supply to sink/shower and eye wash station to be provided on-site during works due to risk of PCB coming into contact with skin.		EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
	Work sites	*Applicable to all Components*			

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		• Contractor is responsible for ensuring H&S of everyone on construction site including visitors and sub-contractor workers regardless they have been formally or informally employed. • Ensure adequate health and safety supervision is always on site (if staff temporarily off sick or on short term leave of less than a fortnight contractor to provide a named alternate in advance; if safeguard staff are on longer term leave, are posted elsewhere, or resign, contractor to ensure replacement CV is submitted to UPCL in seven days of the contractor becoming aware with the staff joining the site within one month). • Construction plant and equipment used will be modern and fitted with appropriate safety devices. • Temporary safety fences shall be erected around each work site. • Ensure good housekeeping at construction site, storage areas, staff accommodation, etc. -- to be kept neat and tidy, e.g., no materials, equipment, trash laying around, cleanup worksites so that they are free of debris on daily basis. • Require workers to confirm they have seen and understood the requirements of the OHS plan before proceeding with the work. • Warning signs will be displayed around work sites to warn workers and members of the local community of potential risks in Hindi and other languages of the workers found on site. • MSDS are to be readily available to any exposed workers and the first-aid personnel. • All crews shall have a competent person responsible for first aid. • Only allow suitably trained and qualified workers to be allowed 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 have a recent medical checkup to confirm they are fit for work. • Require other workers to observe the minimum approach distances for excavations, tools, vehicles, pruning, and other activities when working around power lines. • Provide personal protective equipment (PPEs) for workers in accordance with national OHS regulations OHS with additional PPE provided as needed for COVID-19 risks. • Handwashing facilities with clean running water supply and soap as well as hand sanitizers and closed bins for disposal of hygiene-related			

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		wastes to be provided on-site during works. Display posters to promote handwashing and respiratory hygiene etc. • Sanitation and welfare facilities used by construction workers to be regularly cleaned and disinfected by the contractor. • Enforce disciplinary system (e.g., immediate removal from site) for non-compliance with PPE requirements. • Ensure proper grounding and deactivation of live power lines during construction /decommissioning work or before any work near the lines and this will be checked and certified by Health and Safety Officer in advance. • Require workers to observe WBG EHS Guideline on T&D requirements for working at height. • Require workers to test the structural integrity of poles prior to proceeding with the work. • Use fall protection measures when working on poles, i.e., mobile elevated working platform, all workers are required to wear body harness. • During construction works ensure qualified first aider and trained fire marshal is always available on-site with an appropriately equipped first aid kit and appropriate fire extinguisher and other firefighting equipment immediately available for use. • Every crew shall have a first aid box at the worksite. First-Aid Box are compliant to Schedule-III of the BOCW Rules 1998. • Arrange with nearest Health Center and/or Hospital for emergency cares of workers. • Provide workers with access to an existing functional toilet facility (toilets and hand washing area) or provide a self-contained portable toilet with hand washing facilities (open defecation and use of pit latrines to be prohibited) generated wastewater to be disposed of to wastewater treatment plant. • Toilet facilities to be provided with adequate supplies of hot and cold running water, soap, and hand drying device. • Sufficient toilet facilities should be provided for the number of workers, and there should be an indication of whether the toilet facility is “in use” or “vacant” if not segregated.			

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	Food and drink	*Applicable to all Components* • Provide workers with access to clean eating area with supply of drinking water. • Adequate supplies of potable drinking water meeting national standards should be provided to workers.			
	COVID-19	*Applicable to all Components* • Ensure employees can take time off sick without being penalized, including any self-isolation for COVID-19 that is required.	• Ministry of Labour & Employment Safe Workplace Guidelines For Industry & Establishment • Ministry of Health & Family Welfare Guidelines	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
	Forced and Child Labour	*Applicable to all Components* • No forced or child labor to be employed in construction with the minimum age for employment on construction site to be 18 given hazardous nature of works involved. • Verifiable proof of age documentation is maintained for every worker. • Workers operate within the legal working hours and additional work hours are adequately compensated. • All overtime hours are voluntary; coercion, threats or penalties not used to pressure the workers into overtime. • Wages being paid to workers confirms to the minimum wage rated specified under applicable laws. • All wages including overtime are paid within legally defined time limits. • Pay statements shows earned wages, regular and overtime pay, bonuses and all relevant deductions. • No unreasonable restraints on the workers freedom of movement. • Terms of employment outlined at the time of recruitment do not differ from the terms offered during the course of employment.	• ADB SPS (2009) • ILO Convention - Minimum Age Convention (1973) • ILO Convention - Worst Forms of Child Labour Convention (1999) • ILO Convention – Forced Labour • Child Labour (Prohibition and Regulation) Act, 1986 amended in 2016 • The Bonded Labour System (Abolition) Act 1976	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
Community Health and Safety	Grievances	*Applicable to all Components* • Implement the grievance procedure to provide opportunity for residents to raise concerns.	• ADB SPS (2009) • Project GRM • WBG EHS Guidelines: Community Health and Safety (2007)	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
	Hazardous work sites	*Applicable to all Components* • Robustly fence and sign immediate working area including stores/stockpiles with security presence to prevent public access during construction works. • Do not allow children to play in or adjacent to the construction site • Do not leave hazardous conditions (e.g., unsigned, unfenced, no unlit open excavations without means of escape, emergency contacts posted in case of accident) overnight unless no access by public can be ensured. • Prevent standing water as it may become a breeding habitat for mosquitoes etc. • Construction near schools will be completed in the summer and construction in commercial area, crowded area, religious places and public area will be done at night and after prior consultation with stakeholder groups.		EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
	Signs and Labels	*Applicable to all Components* • All Project infrastructure will be labeled / signposted in accordance with national regulations to inform the public of the specific safety risks of each item. • All work sites will be appropriately signposted and isolated (through fencing or bunting) to prevent encroachment into these areas. Where there are open excavations then solid fencing barrier must be used.			
	Outages	*Applicable to all Components* • Provide 72 hours advance notice of any works (not including emergency works) to the local community.			
	Safety Awareness	*Applicable to all Components* • Prepare a Project Safety Awareness leaflet to be distributed to all homes within the vicinity of the work sites. The leaflets shall provide information relating to the risks of interfering with the distribution network. The leaflets will be written in Non-Technical language and will provide illustrations where practical. • Keep a record of the number of leaflets distributed and their locations. • Provide special work site safety awareness sessions at all educational facilities within 50m of any work zone.			

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Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
	Record Keeping	*Applicable to all Components* • Keep a specific record of any community accidents that occur during the construction phase. Report the numbers to UPCL monthly.		EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC
Traffic Management	Traffic and Pedestrian Safety	*Applicable to all Components* • Implement agreed traffic management plan. Safe access to property and roads should be maintained and alternative routes and access provided where there are temporary diversions or blockages. Diversion works to be immediately dismantled on completion of works and the footpath and roads restored to their original condition. • Transport equipment only during non-rush hours i.e., avoid the hours of 9am to 11 am and 4pm to 6 pm to minimize traffic congestion. • In dense urban areas or on busy roads installation works affecting footpaths and roads to avoid rush hours i.e., avoid the hours of 9am to 11 am and 4pm to 6 pm. • Stockpiling of old poles, spoil and any new equipment (cable reels) shall be away from properties and only in designated areas where no access or road use will be blocked. • Ensure that safe access ways to public and private amenities (including schools) are maintained, safe alternative routes provided and clearly signed where there are temporary diversions or blockages. • Safety guides should be provided where works are on footpaths or in locations of pedestrian crossings to help guide pedestrians, especially vulnerable persons, safely around the working area. • Traffic management will need to be done in consultation with the affected communities to ensure they are aware of likely disruption. • Implement traffic management controls during construction works with advance warning signs or flag persons to ensure health and safety of construction workers and road users. • Road safety and warning signs must be posted at 500m, 100m, and immediately in advance of the works at least two days prior to the works commencing to inform the public of the temporary blockage of one lane of the road.	• ADB SPS (2009)	EPC Contractor Include in EPC contract cost Throughout project implementation	UPCL PIU / PISC

Table R-3: UPCL Construction Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• For congested and narrow roads flagmen should be utilized to warn road users of the situation. • For removal of existing lines scaffolds and safety nets will be used to protect pedestrians and vehicles (and the conductor itself) from potential injury/damage – this will be used wherever stringing crosses over roads and securing a road closure is not possible, presenting a possible risk to traffic, waterbodies, or is in settlement presenting a possible risk to local communities where access cannot be completely prevented, especially where buildings have encroached into the safety clearances and in the vicinity of schools. • Where the execution of the works requires single-lane operation/beside public road the contractor will provide and maintain all necessary barriers, warning signs and traffic control signals to the satisfaction of the Local authority. Wherever traffic diversions, warning signs, traffic control signals, barriers and the like are required, the contractor will install them to the satisfaction of the PISC (Engineer) and local authority prior to commencing the work, in that area. • Upon completion of the works for which the temporary traffic arrangements or diversions have been made, the contractor shall remove all temporary installations and signs and reinstate all affected roads/sections and other structures or installations to the conditions that existed before the work started, as directed by the PISC (Engineer). • No more than a 15-day period after construction works are completed to complete final rehabilitation. • All public spaces are restored to their original condition within 15 days of works completion. *Applicable to existing SS* • Ensure that traffic is managed adequately to prevent delays when cranes are delivering transformers to Pines SS.			

Table R-4: UPCL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
Corrective Actions at Existing Substations	General	During the operational phase UPCL will be responsible for ensuring that all required corrective actions for existing substations continue to be complied with per the Corrective Action Plan.	• ADB SPS (2009)	UPCL	N/A
General	General impacts of O&M on environment, health, and safety and disturbance to local community	*Applicable to all Components* Develop SOP for environmental, health and safety management of SS and power lines operation and maintenance including inspections schedules etc. SOP to cover pollution control, solid and hazardous waste management, health and safety risk assessments and management plans addressing both occupational and community risks and including permit to work system of critical activities such as electrical or work at height and emergency preparedness and response provisions. Implementation of SOP environment, health and safety measures, provision of regular EHS trainings to O&M workers on SOP implementation and good housekeeping practices including how to clean up oil/fuel spills and dispose of contaminated sorbent material which would be treated as hazardous waste etc. Continually improve compliance with national requirements and good international practice for EHS including health and safety and solid and hazardous materials and waste management in particular: • undertake regular visual and technical inspection of condition of substations, CSS, RMU, distribution transformers and power lines and carry out maintenance as required, if encroachment into safety clearances of OHL, SF6 or an oil leak encountered these are to be immediately addressed. • During maintenance works provide signage detailing UPCL contacts in case of grievance. • Provide at least one-month advance notice to local community through the about the schedule of, location plan, and details of planned major maintenance works. • Mitigation measures applicable to the construction stage are also applicable to the O&M activities and workers. During O&M, internal audits will be undertaken by the UPCL ESSO and HSO.	• ADB SPS (2009) • Project GRM • WBG EHS Guidelines: Community Health and Safety (2007) • WBG EHS Guidelines: Electrical Power and Distribution (2007) • Occupational Safety, Health And Working Conditions Code, 2020 • Workmen's Compensation Act, 1923 and subsequent amendments • Interstate Migrant Workers Act, 1979	UPCL with support PISC for development of SOP	N/A
Climate change and pollution prevention	Climate change from fugitive emission of SF6 from SS/CSS/RMU, transformer oil spill	• Inventory to be maintained of all SF6 containing equipment, their make and model, volume of SF6 contained, details of repair works undertaken, dates of SF6 replenishment, leakage incidents etc. Inventory to be used to monitor SF6 leakage. If trend of lowering gas	• ADB SPS (2009) • IFC EHS Guidelines:	PTCUL	N/A

Table R-4: UPCL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
	and leakage, and forest fire risk at SS due to dry pine needles.	pressure is observed investigate the cause and rectify any leak per the manufacturer's instruction. • SF_6 in fire extinguishers provided to be avoided. • During operation, regular visual and technical inspections will be undertaken, SF_6 leakage detection kits will be provided at each substation with sufficient additional meters also available to monitor CSS/RMU and remote gas pressure alarms are to be installed where daily inspection is not an option, such that any leaks can be immediately addressed. • UPCL do not currently have procedures for safe disposal of SF_6. Therefore, SOP must detail and on disposal at end-of-life UCPL must ensure SF_6 is first removed in accordance with International Electrotechnical Commission (IEC) standard 61634 to a very low pressure so losses of SF6 are less than 0.5% at end of life and then reused, recycled, or destroyed in a high-temperature incinerator. • Training of all project and O&M staff on the climate change impact of SF6, alternatives, H&S risks during O&M due to presence of toxic byproducts, leakage minimization, and environmentally sound and safe disposal • Maintain inventory of transformers on site, make, model, risk of PCBs and other details including transformer test report, details any maintenance works undertaken, dates oil changes, leakage incidents etc. • Maintain transformers and other noise generating equipment to meet operational noise standards. • Carry out regular inspections and periodic preventive maintenance to minimize oil leakages; ensure values, nuts and bolts are fully functional and tightly secured, ensure rubber seals of radiators are intact • Maintenance of and handling of transformer oil to be carried out only by trained workers using appropriate PPE. • The acceptance of mineral oil at substation to be accompanied with Material Safety Data Sheet and certification that it is PCB free. • Unless transformers have been certified PCB free workers interacting with them must wear suitable chemical and/or oil resistant gloves, goggles, and protective clothing whilst taking samples and/or working with transformers.	Waste Management (2007) • IFC EHS Guidelines: Contaminated Land (2007) • Solid Waste Management rules, 2016 • The Hazardous Waste (Management, Handling and Trans-boundary Movements) rules, 2009 • Construction and Demolition Waste Management rules, 2016		

Table R-4: UPCL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		• Material Safety Data Sheets for all fuel/oil/chemical kept on site to be posted • Keep spill prevention equipment available on site at all times. • Collect and segregate all O&M wastes including scrap metal, oil, and solid waste; ensure all workers are familiar with this segregation. Store all the wastes produced in an environmentally sound manner in designated, labelled area with separate waste containers (drums, bins, skips) for each type of waste with solid waste in enclosed bins to contain leachate and avoid vermin. • Encourage recovery of recyclable wastes that could be reused or sold to recyclers, rather than disposing of it. • Document all wastes removed off site using transfer notes, to be taken by licensed waste contractors who should reuse/recycle or dispose of the waste to a suitably engineered and licensed solid waste management facility. • Hazardous wastes (asbestos, old wooden poles treated with preservatives, oily rags, etc.) must be disposed of using appropriately licensed waste management company with all storage, transport, and disposal as per the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 • Records volumes of waste generated and keep transfer records at the substation with copies of the waste management company's licenses on file. • Maintain spill management materials (sorbent pads, loose sorbent material, sand, etc.) next to storage areas for immediately soaking up any leaks or spills that do accidentally occur • Ensure pine needles are regularly cleared from substations and the areas immediately around them.			
Health and Safety	Impacts on occupational health and safety due to exposure to live power and risks of accidents (electrocution, fire, etc.)	*Applicable to all Components* • Maintain warning / advisory signs in good and visible condition. • For all maintenance works undertake risk assessment and prepare H&S plan in accordance with EHS Guidelines, considering occupational and community H&S and including adherence emergency preparedness and response plan with communication systems and protocols to report an emergency situation. • Mitigation measures applicable to the construction stage are also applicable to the O&M activities and workers.	• ADB SPS (2009) • Project GRM • WBG EHS Guidelines: Community Health and Safety (2007)	PTCUL	N/A

Table R-4: UPCL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
	Impacts to community health and safety such as electrocution and fire, etc.	• Ensure EMF ICNRP occupational and community exposure limits (reference and peak values) are complied with. • Prohibit the use of herbicides, pesticides or burning to control any vegetation growth or to manage vegetation waste. • O&M to be performed only by suitably qualified and experienced workers who are regularly trained staff of UCPL or a contactor under supervision of a Health and Safety Officer following the SOP for H&S with an appropriately equipped first aid kit and appropriate fire extinguishers immediately available for use. • Restricting working at height and with electricity only by workers who are trained and certified to do so. • O&M workers to be given required PPE and other requisite safety equipment, provide sufficient PPE spares available on site for visitors etc. • Workers to observe guidelines to minimum approach distances to excavations, tools, vehicles, pruning, and other activities when working around power lines. • Proper grounding and deactivation of live power lines during maintenance work or when working near the lines. *Applicable to UG Cables* • Share the information of the routing of all underground cables to the relevant authorities and include warning marks above ground or over the cable, so when underground works need to be done by others, the location of the cables would be known and avoided. • In case of incident and cables are broken immediately inspect and repair. • CSS and RMUs and cable chambers are to be kept securely locked at all times (except when workers are in-coming or exiting) but at times when a gate or door is unlocked, ensure one member of staff is always present to control any unauthorized entry. • Map power lines in GIS and share the information of the routing of all underground cables to the relevant authorities that may be undertaking works that could disturb them • In the event of an incident such as cable break UPCL staff/community must immediately notify the nearest UPCL incident coordinator for handling measures: power cuts, technical O&M staffing to inspect and repair.	• WBG EHS Guidelines: Electrical Power and Distribution (2007) • Occupational Safety, Health And Working Conditions Code, 2020 • Workmen's Compensation Act, 1923 and subsequent amendments • Interstate Migrant Workers Act, 1979		

Table R-4: UPCL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		Applicable to SS • Maintain incident logbook and medical tests / health check-up of staff • Provide everyone who enters the SS with an OHS induction • Keep vents/windows unblocked and replace defunct bulbs/lights immediately • Ensure all SS workers receive basic first aid and firefighting training with annual refreshers • Ensure that at least one staff at SS is fully trained as a first aider and fire marshal • Maintain fully stocked, in-date first aid kit, keep first aid posters and emergency contact lists that are posted up to date • Maintain firefighting systems including in-date fire extinguishers and full sand buckets and keep fire safety posters up • Carry out regular inspections and periodic maintenance to ensure electrical standards are being upheld • Display clear emergency exits signs (in working order, if light signs, ensure they work) and keep exits clear of any blockages. Remove any trip hazards on the ground, e.g., materials, equipment, trash laying around. • Collect, segregate, and store in the designated and labelled storage areas all wastes including food wastes for onward disposal as per construction. • Undertake regular pest control using integrated pest management approach • Maintain vegetation at the SS that poses a health and safety hazard • Sanitation and welfare facilities as per construction will also be required for O&M workers. • Potable water will be supplied to workers that meets national drinking water standards and ISO 10500 drinking water parameters (full suite). • Cleaning of toilets on daily basis, use of disinfectant and floor cleaners; keep toilets/septic tank/soakaway maintained • Periodic spot monitoring using mobile phone app of noise levels and ambient EMF for substations at the boundary fence/near transformers to ensure they are below the occupational/community noise levels and ICNRP occupational/community EMF exposure levels • Maintain security and prevent entry by the local community and			

Table R-4: UPCL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		livestock by maintaining adequate boundary fencing or wall, always keeping control room doors and gates shut, and having security persons present 24x7 to prevent unauthorized public access and trespass. • UPCL in conjunction with local municipalities, ward/village heads, and the media with the support of CSOs to continue to organize health and safety campaigns on electrical safety community awareness raising activities in local communities and schools within 500 m of the substations *Applicable to OHL Power Lines* • Carry out regular inspections (at least monthly) on the power lines and periodic maintenance to ensure that integrity of the poles and line is in good condition including possible conductor snapping and de-energizing of the line within three cycles to avoid the potential for electrocution from a breakage, the clearances are maintained, and electrical standards are being upheld. • Inspection protocol should confirm electrical safety warning signs and lighting arrestors in place and identify any missing or corroded parts (including protection for birds) for immediate replacement. • If property is found to be encroaching into the safety clearances notification is to be immediately issued to the owner/occupier by UPCL along with awareness raising materials with respect to the importance of maintaining the horizontal and vertical clearance from buildings and the matter will be taken up further in consultation with the appropriate authorities. • Regular pruning or lopping of trees ensure the integrity and safety of the OHL • Removal of invasive plant species during routine vegetation maintenance in an ecologically sound manner • Testing of structural integrity prior to proceeding with the work and the use of fall protection measures such as harnesses, tool bags, ropes etc. • UPCL in conjunction with local municipalities, ward/village heads, and the media with the support of CSOs to continue to organize health and safety campaigns on electrical safety community awareness raising activities in local communities and schools within 50 m of the ROWs • In case of fire events, explosion, and other related situations, given the UPCL may not be available immediately in rural locations the			

Table R-4: UPCL Operational Phase EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		community should be educated with respect to emergency response with 24/7 emergency contact numbers included on signs; PTCUL will need to ensure this is manned 24/7 to ensure that it is effective reporting route.			

Appendix S – Component 3 Environmental Measures

Table S-1: Component 3 EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
Compliance with national laws and regulations and GIIP	General	Comply with all applicable national and state environment, health, and safety (EHS) regulatory requirements in addition to the mitigation measures set out in this table Follow international good practice per the IFC EHS Guidelines and ILO code of practice	ADB SPS (2009) ILO code of practice[38]	Contractor	UREDA
Community Interaction, Disruption and Disturbance	Solar Panel Site Selection	Only rooftops will be used for solar panel installation, under no circumstances will ground mounted solar be installed. Before the installation of a solar plant, due consent needs to be acquired from the residents/users of the buildings. Ensure none of the buildings are of heritage or cultural value. Ensure suitable supplies of water are available for cleaning of solar PV panels.	ADB SPS (2009) Project GRM Air (prevention and control of pollution) Act, 1981 WBG EHS Guidelines: Air Emissions and Ambient Air Quality (2007) IFC EHS Guidelines – Noise Management (2007) IFC EHS Guidelines: Electrical Power and Distribution (2007) Noise Pollution (Regulation & Control) Rules, 2000	UREDA	ADB
	Air Quality	Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery-powered equipment where practicable Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to help minimize emissions. 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.		Contractor	UREDA
	Elevated noise levels	Equipment and vehicles will be regularly maintained in accordance with the manufacturer's recommendations to help minimize noise Work will be undertaken in daytime hours only – in accordance with IFC EHS definitions (7am – 10pm). Noise generating construction-related activities will be avoided during evenings, school hours, exam periods, religious or cultural events near the sensitive receptors. No works on Sundays, holidays or festival days. Loud construction noise must be limited to very short periods of activity adjacent to receptors to minimize disturbance. Construction noise in the vicinity of houses must be limited to 55dB(A) as 1hour LAeq In silent zones it must be limited to 50dB(A) as 1hour LAeq		Contractor	UREDA

[38] https://www.ilo.org/sector/Resources/codes-of-practice-and-guidelines/WCMS_861584/lang--en/index.htm

Table S-1: Component 3 EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		In commercial zones it must be limited to 65dB(A) as 1hour LAeq (if residential property is found in the commercial zone, then the above limits apply for works in the vicinity of houses)			
	Damage to Property or cause detriment or inconvenience	All unanticipated damage to existing public and private property shall be restored to pre-project condition and/or compensated at the cost of the contractor in line with the LARP entitlement matrix.		Contractor	UREDA
	GRM	Contractor will act as site GRM Focal and keep affected persons and local communities informed of the status of work and be readily available onsite to receive, document and deal with grievances at the site level. Encourage use of the GRM and clarify that this does not prevent affected persons from pursuing any legal action, if they feel it is needed Inform communities about the ADB Accountability Mechanism and their possibility to resort to it if any grievance is not resolved by the project level GRM.		Contractor	UREDA
Hazardous Materials and Waste Management	Waste management	Prepare a waste management plan applicable to all work activities and sites under the component. Any plant or equipment that is rejected during the installation and commissioning due to damage or failure to immediately be removed from the site and returned to the supplier. Ensure that the waste hierarchy is followed including prevention, minimization, reuse and recycling. Restrict use of plastics and polyethene and use recyclable/biodegradable materials during construction to the extent possible. Ensure facilities are provided for the collection, segregation and storage of waste on-site, maximum reuse and recycling of waste by reputable, legitimate, licensed third parties and timely removal and safe transportation of unusable waste to a suitably licensed and engineered waste management facility. Provide adequate waste containers for handling and storage of construction materials. Use containers suitable for each type of waste. Mark containers adequately specifying the waste types. Do not mix various waste streams. All recyclable waste (plastic, metal, paper, etc.) will be sorted at source and sent for recycling where facilities for recycling of these materials exist. Document all volumes and types of wastes generated and removed off site (inert, solid, hazardous).	ADB SPS (2009) IFC EHS Guidelines: Waste Management (2007) IFC EHS Guidelines: Contaminated Land (2007) Solid Waste Management rules, 2016 The Hazardous Waste (Management, Handling and Trans-boundary Movements) rules, 2009 Construction and Demolition Waste	Contractor	UREDA

Table S-1: Component 3 EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		Ensure that wastes are not haphazardly dumped within the work sites and adjacent areas. No construction material or waste to be poured or thrown into drains Leaving or disposing of construction wastes by burying them on-site or disposing of them at unlicensed waste management facilities is strictly prohibited. Unsanitary open dumps are not to be used by the contractor or their third parties. Municipal waste collection systems must not be used as this is likely to mean that the waste is open dumped, arrangements should be made for direct disposal to a suitably licensed and engineered waste management facility with all waste transfer records retained. Burning of waste on-site is also strictly prohibited. No wastewater will be discharged direct to surface waterbodies or groundwater without adequate treatment.	Management rules, 2016		
	Solar Panels	Solar panels installed must not contain hazardous materials e.g., cadmium, lead or selenium. Solar panel equipment purchased for use on the project is to be accompanied by letter from the manufacturer stating its composition and the leaching potential of any heavy metal content with MDS to be provided to determine how it is to be disposed of at end-of-life. It will be required to select an environmentally safe and sound solar photovoltaic panel ideally from a manufacturer who offers a facility for return of end-of-life equipment. All solar PV modules after their end of life (when they become defective / non-operational / non-repairable) are to be disposed in accordance with the "E-waste Management Rules, 2022" notified by the Government of India and as revised and amended from time to time.		Contractor	UREDA
	Asbestos	Some properties may have asbestos containing materials present in the structure/roof. Ensure assessment and identification of any asbestos materials by competent surveyor prior to commencement of works. Rooftops containing asbestos will not be used for the solar panel installation.		Contractor	UREDA
	Waste electrical and electronic equipment	Ensure that all end-of-life PV equipment and other electrical and electronic waste are either recycled or disposed of according to national waste management legislation. All solar PV modules after their end of life (when they become defective / non-operational / non-repairable) are to be disposed in accordance with the "E-		UREDA	N/A

Table S-1: Component 3 EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		waste Management Rules, 2022" notified by the Government of India and as revised and amended from time to time.			
Biodiversity	Nest and Roost Management	Assess whether there are any nests or bat roosts present at the project site/roof and identify the species (including its status). In case of presence of nests or roosts, consult ecologist. Nests will not be removed during the nesting season.	ADB SPS (2009)	Contractor	UREDA
Occupational Health and Safety	Installation risks including working on rooftops and electrocution	Complete a risk assessment applicable to all work activities and sites and develop an OHS Plan to include specific measures to address any risks identified, including • Risk of falls from heights – either from open edges of the roof or through fragile sections of roofing, such as skylights, or tripping when moving from one level to another (e.g., from ladder to the roof) • Risk of electrocution from an accidental contact with overhead service lines or from damaged solar panels or short circuits in the array wiring Sufficient training of the workers provided to minimize the risks that are identified. Require workers to confirm they have seen and understood the requirements of the OHS plan before proceeding with the work. Appoint a dedicated Health and Safety Officer for each contract package/lot involving physical works. Sufficient supervision of the works to ensure to ensure the health and safety of all workers and local communities to include a suitably qualified and experienced Senior Engineer having NEBOSH/IOSH certification or similar qualification who is based on-site full-time and nominated to the role of EHS Supervisor.	ADB SPS (2009) WBG EHS Guidelines (2007) Occupational Safety, Health And Working Conditions Code, 2020 Workmen's Compensation Act, 1923 and subsequent amendments Interstate Migrant Workers Act, 1979 Ministry of Labour & Employment Safe Workplace Guidelines For Industry & Establishment Ministry of Health & Family Welfare Guidelines	Contractor	UREDA
	OHS Training	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. 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, working with electricity, etc. 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.		Contractor	UREDA

Table S-1: Component 3 EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		Untrained workers must not be permitted to work with live electricity or to work at height.			
	Work site	Contractor is responsible for ensuring H&S of everyone on construction site including visitors and subcontractor workers regardless they have been formally or informally employed. Ensure adequate health and safety supervision is always on site. Construction equipment used will be modern and fitted with appropriate safety devices. Installers and O&M personnel should be provided with a personal fall protection system, ensuring proper lifting and ladder usage policies and procedures at sites and installation of the guard rail system on a rooftop during the construction phase. Temporary safety fences shall be erected around work site. Ensure good housekeeping at construction site, storage areas, staff accommodation, etc. -- to be kept neat and tidy, e.g., no materials, equipment, trash laying around, cleanup worksites so that they are free of debris on daily basis. Only allow suitably trained and qualified workers to be allowed 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 have a recent medical checkup to confirm they are fit for work. Provide personal protective equipment (PPEs) for workers in accordance with national OHS regulations OHS with additional PPE provided as needed for COVID-19 risks. Enforce disciplinary system (e.g., immediate removal from site) for non-compliance with PPE requirements. During construction works ensure qualified first aider and trained fire marshal is always available on-site with an appropriately equipped first aid kit and appropriate fire extinguisher and other firefighting equipment immediately available for use. Every crew shall have a first aid box at the worksite; compliant to Schedule-III of the BOCW Rules 1998. Along with a fire protection and extinguishing system, basic measures shall be provided such as protection of equipment with ground fault circuit interrupters, a short circuit protection system shall be installed to protect the solar plant from a short circuit. Arrange with nearest Health Center and/or Hospital for emergency care of workers.		Contractor	UREDA

Table S-1: Component 3 EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		Provide workers with access to an existing functional toilet facility (toilets and hand washing area) or provide a self-contained portable toilet with hand washing facilities (open defecation and use of pit latrines to be prohibited) with the contained wastewater moved off-site to be disposed of to wastewater treatment plant. Provide workers with N95 dust masks to be worn when ambient conditions are dusty or when dust generating activities take place. 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 e.g., 85 dB(A) during continuation of 8 working hours without wearing PPE. Ensure all worksites are adequately illuminated. Provide adequate supplies of potable drinking water meeting national standards to workers.			
	Worker GRM	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. Construction workers will be given access to register any grievances with the contractors or direct access to UREDA		Contractor	UREDA
	Forced and Child Labour, Employment Conditions	No forced or child labor to be employed in construction with the minimum age for employment on construction site to be 18 given hazardous nature of works involved. Ensure employees can take time off sick without being penalized, including any self-isolation for COVID-19 that is required. Verifiable proof of age documentation is maintained for every worker. Workers operate within the legal working hours and additional work hours are adequately compensated. All overtime hours are voluntary; coercion, threats or penalties not used to pressure the workers into overtime. Wages being paid to workers confirms to the minimum wage rated specified under applicable laws. All wages including overtime are paid within legally defined time limits. Pay statements shows earned wages, regular and overtime pay, bonuses and all relevant deductions. No unreasonable restraints on the workers' freedom of movement. Terms of employment outlined at the time of recruitment do not differ from the terms offered during the course of employment.		Contractor	UREDA

Table S-1: Component 3 EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
	Record Keeping	Keep a specific record of any community accidents that occur during the construction phase. Report the numbers to UREDA monthly with any fatalities immediately reported. In the event of any fatality occurring during the construction phase at the Project work site, provide UPCL with the details of the fatality within one day of the event occurring in a Fatality Report.		Contractor	UREDA
Community Health and Safety	Structural safety and access	Conduct a structural assessment of selected buildings. Ensure the roof is accessible to carry out installation and maintenance. It must be possible to lift the solar system components onto the roof (with scaffolding if needed) and for personnel to physically access the site to install and maintain the system. Prepare a roof plan to quantify the roof area available for the PV power plant. The plan should indicate the location (including longitude and latitude), height, and slope of the roof itself, as well as any additional structures present on the roof to be protected such as sky light.	ADB SPS (2009) Project GRM WBG EHS Guidelines: Community Health and Safety (2007)	Contractor	UREDA
	Hazardous work sites	Robustly fence and sign immediate working area including stores/stockpiles with security presence to prevent public access during construction works. Do not allow children to play in or adjacent to the construction site Do not leave hazardous conditions overnight unless no access by public can be ensured Ensure isolation and restricted access of pedestrians within the boundaries of the work site to avoid accidents related to dislodged or unsecured objects or tools falling and hitting pedestrians. Emergency contacts posted in case of accident.		Contractor	UREDA
	Signs and Labels	Project infrastructure and work sites will be labeled / signposted in accordance with national regulations to inform the public of the specific safety risks of each item. Ensure that all electrical equipment have visual and written warning signages including the ISO 7010 Hazard Type: Electrical Symbol warning of the risk of electrocution Ensure emergency procedures are posted and fire extinguishers available at the location of the solar panels in the event of a fire.		Contractor	UREDA
	Safety Awareness	Prepare a Project Safety Awareness leaflet to be distributed to all homes within the vicinity of the work site. The leaflets shall provide information relating to the risks of interfering with the solar panels. The leaflets will be written in Non-Technical language and will provide illustrations where practical.		Contractor	UREDA

Table S-1: Component 3 EMP					
Topic	***Impact / Issue***	***Commitment***	***Applicable National Requirements / International Best Practice***	***Implementation Responsibility/ Budget Source/Schedule***	***Supervision and Monitoring Responsibility***
		Keep a record of the number of leaflets distributed and their locations.			
	Record Keeping	Keep a specific record of any community accidents that occur during the construction phase. Report the numbers to UREDA monthly with any fatalities immediately reported.		Contractor	UREDA

Appendix T – PTCUL EMoP

Table T1 – General EMoP (Applicable To All)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
Pre-construction							
Statutory Clearances	Licenses / Permits and Insurances	Review of all applicable licenses, permits and insurances before the start of construction	One time prior to the start of construction	N/A	All relevant permits, licenses and insurances outlined in the Project IEE are obtained.	EPC contractor to undertake monitoring and report to PTCUL in first monthly report.	Review all licenses, permits and insurances and document compliance in EMR
Staffing	Contractors environmental, social, health and safety staff	Review of staff contracts and timesheets	Prior to the start of construction then periodically throughout construction	N/A	All staff outlined in the IEE are in place at the start of construction and are on site for the allotted periods specified in the EMP	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Review contracts and timesheets and document compliance in EMR
Training / Inductions	Training records	Review of all induction training records, including training materials & attendance sheets.	One time prior to the start of construction. Then periodically through construction to ensure new staff have received induction training.	N/A	All staff on-site have received the required induction training.	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Review all training records and document compliance in EMR
Community Awareness	Pre-construction awareness documents	Review documents prepared for community awareness. Sample of residents to assess if they have received any awareness materials	One time prior to the start of construction	N/A	Awareness documents completed and distributed to sampled residents	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Review awareness documents and document compliance in EMR

Table T1 – General EMoP (Applicable To All)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
Camps and Accommodation	EBRD / IFC guidance on worker accommodation	Audit of camps and accommodation	Prior to the start of construction then periodically throughout construction	All camps and accommodation areas	Camps and accommodation are compliant with EBRD / IFC guidance on worker accommodation	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Review of audit and document compliance in EMR
OHS	OHS Risk Assessment and Accidents Reporting System	Review of risk assessment and accident reporting system	One time prior to the start of construction	N/A	Documents completed	EPC contractor to undertake monitoring and report to PTCUL in first monthly report.	Review assessment and reporting system and document compliance in EMR
Drinking water supplies	ISO 10500 drinking water parameters (full suite) & National Drinking water standards	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time for baseline establishment to ensure source of water suitable as drinking water	Sources of drinking water for construction/ operation of project for which supplier is unable to provide copies of drinking water tests to confirm compliance.	ISO 10500 drinking water parameters	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Construction							
Health and Safety – incidents	Records of health and safety incidents	Keep records of near miss, minor, lost time, and fatal health and safety incidents related to the project, compile records from construction sites Carry out interviews with workers and the community to identify if any unrecorded incidents occurred.	Monthly	Construction sites, including temporary construction facilities	Zero lost time incidents or fatalities (among workers and community) For 100% lost time incidents or fatalities /confirmed COVID-19 cases immediate action taken to avoid repeat or escalation of situation	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Table T1 – General EMoP (Applicable To All)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
		During the COVID-19 pandemic, temperature checks to be carried out at entrance of the work site at start of shift			All incidents including minor and near miss dealt with in accordance with EMP with lessons learnt for future 100% lost time and fatalities/confirmed COVID-19 cases reported to PTCUL within 24 hours and ADB within 48 hours		
Drinking water supplies	ISO 10500 drinking water parameters (full suite)	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	Monthly	Sources of drinking water for construction of project for which supplier is unable to provide copies of drinking water tests to confirm compliance.	ISO 10500 drinking water parameters	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Water resources	Water volume used and source	Keep records of all water used and source.	Ongoing	Construction sites, including temporary construction facilities	No grievance received during construction or operation regarding conflict with other water users	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Soil (earthworks)	Volume of soil disturbed during construction	Keep records of earthworks involved, including total volume in m^3 of soil excavated and reused (any disposed of as spoil off site to	Monthly	Construction sites involving earthworks/cut and fill activities	Earthworks documented, and all excavated and cut and fill volumes accounted for, either reused on-	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress	Check monitoring being undertaken and document compliance in EMR

Table T1 – General EMoP (Applicable To All)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
		licensed waste disposal facilities recorded as per waste generation)			site or disposed of off-site to licensed waste disposal facilities	reports.	
Hazardous materials– incidents	Pollution incidents	Records of pollution incidents (e.g., type of material spilled, amount in kg or $m^{3,}$ and action taken to clean up) Carry out visual inspection and interviews with workers and the community to identify if any unrecorded incidents occurred	Monthly	Construction sites, including temporary construction facilities	Zero major incidents occurred. Minor incidents responded to in accordance with EMP with lessons learnt for future.	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Natural Resource Use (Construction Materials) and Waste Generation	Volume of construction materials used, and waste generated, and disposal route	Keep records of all types of materials used and wastes produced by type, volume/ weight. Document waste disposal through transfer notes including type, volume/ weight, transport provider, intermediaries if any and final treatment or disposal facility (with its license and capacity)	Monthly	Construction sites, including temporary construction facilities	Transfer of 100% of construction wastes documented, and all wastes disposed of in an environmentally safe and sound manner in accordance with IFC General EHS Guidelines	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Operation							
Health and Safety – incidents	Records of health and safety incidents	Keep records of near miss, minor, lost time, and fatal health and safety incidents related to the project, compile records from construction sites Carry out interviews with	Monthly	Substations and Power Lines	Zero lost time incidents or fatalities (among workers and community) For 100% lost time incidents or fatalities /confirmed	PTCUL engineers to undertake monitoring and report to ESSO/HSO in monthly reports to ESU	Check monitoring being undertaken and document compliance in EMR

Table T1 – General EMoP (Applicable To All)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
		workers and the community to identify if any unrecorded incidents occurred. During the COVID-19 pandemic, temperature checks to be carried out at entrance of the work site at start of shift			COVID-19 cases immediate action taken to avoid repeat or escalation of situation All incidents including minor and near miss dealt with in accordance with EMP with lessons learnt for future 100% lost time and fatalities/confirmed COVID-19 cases reported to PTCUL within 24 hours and ADB within 48 hours		
Hazardous materials– incidents	Pollution incidents	Records of pollution incidents (e.g., type of material spilled, amount in kg or m3, and action taken to clean up) Carry out visual inspection and interviews with workers and the community to identify if any unrecorded incidents occurred	Monthly	Substations and Power Lines	Zero major incidents occurred. Minor incidents responded to in accordance with EMP with lessons learnt for future.	PTCUL engineers to undertake monitoring and report to ESSO/HSO in monthly reports to ESU	Check monitoring being undertaken and document compliance in EMR

Table T2 – Substation EMoP (Applicable To Substations Only)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
Pre-construction							
Air Quality	PM10, PM2.5, to be measured as 24hrs average over a fortnight along with meteorological data-temperature, humidity, wind speed, and wind direction.	Measurement professional, calibrated portable monitoring devices by accredited service provider (record 24-hour data over a fortnight)	One time for baseline establishment prior to the start of any activity on site (during dry season)	Site boundary and nearest receptor to substation sites with receptors <500m from site boundary – if no receptors in 500m no receptor monitoring is required.	National air quality standards of CPCB complied with no increase in baseline levels at sensitive receptors as WHO PM10 and PM2.5 guidelines already exceeded	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Noise	LAeq 1hr day and night for representative 48hr period (ideally 24hr weekday + 24hr weekend and avoid holidays, festivities, strong wind, rain etc.)	Measurement professional, calibrated portable monitoring devices by accredited service provider	One time for baseline establishment prior to the start of any activity on site	Site boundary and nearest receptor to substation sites with receptors <500m from site boundary – if no receptors in 500m no receptor monitoring is required.	CPCB standards and WHO Guidelines for ambient noise at site boundary and sensitive receptors (or less than 3dBA increase if ambient already exceeded) GoI and IFC General EHS Guidelines for occupational noise exposure not exceeded at 1m from noisy equipment	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Water Quality	pH, EC, turbidity, color, TSS, DO, BOD5, COD, oil and grease, total and faecal coliform bacteria, total nitrogen, total phosphorus	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time for baseline establishment prior to the start of any activity on site	Surface waterbody and groundwater wells within 500m of substation sites, at least one surface water sample from nearest surface water body and one	GoI guidelines for surface water/drinking water for groundwater	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Table T2 – Substation EMoP (Applicable To Substations Only)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
	If used by local community as a source of drinking water to also test against GOI drinking water standards (full suite of parameters)			groundwater sample from nearest groundwater well to be sampled – if no receptors in 500m no receptor monitoring is required.			
Soil Quality	pH, TPH, heavy metals, PCBs, PAHs, and any other contaminants indicated by contaminated land professional	Soil samples to be taken from surface and at depth in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time for baseline establishment prior to the start of any activity on site	Existing substation sites where contamination is evident	International soil quality guidelines e.g., Australian	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Construction							
Air Quality	PM10, PM2.5, to be measured as 24hrs average over a fortnight along with meteorological data-temperature, humidity, wind speed, and wind	Measurement professional, calibrated portable monitoring devices by accredited service provider (record 24-hour data over a fortnight)	Monitor at least once every 6 months during active earthworks (at substations) As requested by PIU in event	Site boundary and nearest receptor to substation sites with receptors <500m from site boundary, same locations as baseline – if no receptors in 500m	National air quality standards of CPCB complied with no increase in baseline levels at sensitive receptors as WHO PM10 and PM2.5 guidelines already exceeded	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Table T2 – Substation EMoP (Applicable To Substations Only)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
	direction.		excessive dust or grievance received during construction.	no receptor monitoring is required. Undertake additional locations at request PTCUL in event excessive dust experienced or grievance received			
Noise	LAeq 1hr day and night for representative 48hr period (ideally 24hr weekday + 24hr weekend and avoid holidays, festivities, strong wind, rain etc.)	Measurement professional, calibrated portable monitoring devices by accredited service provider	Monitor at least once every 6 months during active construction works (at substations) One time during commissioning (at substations) Then as requested by PIU/PIU in event excessive noise heard or grievance received during construction.	1m from noisy equipment within substation in respect of commissioning Site boundary and nearest receptor to substation sites with receptors <500m from site boundary, same locations as baseline – if no receptors in 500m no receptor monitoring is required. Undertake additional locations at request PTCUL in event excessive noise heard or grievance received	CPCB standards and WHO Guidelines for ambient noise at site boundary and sensitive receptors (or less than 3dBA increase if ambient already exceeded) GoI and IFC General EHS Guidelines for occupational noise exposure not exceeded at 1m from noisy equipment	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Water Quality	pH, EC, turbidity, color, TSS, DO, BOD5, COD, oil and grease, total	Water sample is to be taken in a clean, non-contaminated, well-sealed container and	Monitor at least once every 6 months during active	Surface waterbody and groundwater wells within 500m of substation sites,	GOI guidelines for surface water/drinking	EPC contractor to undertake monitoring and report to PTCUL in	Check monitoring being undertaken and document

Table T2 – Substation EMoP (Applicable To Substations Only)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
	and faecal coliform bacteria, total nitrogen, total phosphorus If used by local community as a source of drinking water to also test against GOI drinking water standards (full suite of parameters)	tested within the next 48h by accredited laboratory	construction involving earthworks, one time during commissioning (at substations) and then as requested by PTCUL in event of visible water pollution or grievance received during construction	same locations as baseline– if no receptors in 500m no receptor monitoring is required. Undertake additional locations at request PTCUL in event excessive noise heard or grievance received	water for groundwater	monthly and quarterly progress reports.	compliance in EMR
EMF	EMF exposure levels	EMF meter	One time during commissioning (after HV power line connection to measure cumulative EMF levels)	Substation equipment and boundary beneath HV power line	ICNIRP public exposure limits for EMF complied with	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports during commissioning phase.	Check monitoring being undertaken and document compliance in EMR
Operation							
Drinking water supplies	ISO 10500 drinking water parameters (full suite)	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	Monthly	Sources of drinking water for operation of substations for which supplier is unable to provide copies of drinking water tests to confirm compliance.	ISO 10500 drinking water parameters	PTCUL engineers to undertake monitoring and report to ESSO/HSO in monthly reports to ESU	Check monitoring being undertaken and document compliance in EMR
Water resources	Water volume used and source	Keep records of all water used and source.	Ongoing	Substations with borewells	No grievance received during construction or	PTCUL engineers to undertake monitoring and	Check monitoring being undertaken and document

Table T2 – Substation EMoP (Applicable To Substations Only)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
					operation regarding conflict with other water users	report to ESSO/HSO in monthly reports to ESU	compliance in EMR
Waste Generation	Volume of waste generated, and disposal route	Document waste disposal through transfer notes including type, volume/ weight, transport provider, intermediaries if any and final treatment or disposal facility (with its license and capacity)	Monthly	Substations	Transfer of 100% of construction wastes documented, and all wastes disposed of in an environmentally safe and sound manner in accordance with IFC General EHS Guidelines	PTCUL engineers to undertake monitoring and report to ESSO/HSO in monthly reports to ESU	Check monitoring being undertaken and document compliance in EMR

Table T3 – UG / OHL / LILO / SC OHL EMoP (Applicable To Power Line Activities Only)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
Pre-construction							
Property Damage	Surveys of existing property condition including structures, roads, canals, rail, utilities, etc.	Photographic and/or structural pre-condition surveys of existing property condition	One time for baseline establishment prior to the start of any activity on site	Properties along HV power lines requiring condition survey (see EMP)	Damages avoided but if caused paid for by contractor	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Water Quality	Test against GOI drinking water standards (full suite of parameters)	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time for baseline establishment prior to the start of any activity on site	Groundwater wells used for drinking water within 50m of drilling or excavations, at least one groundwater sample from	GoI guidelines for drinking water for groundwater	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Table T3 – UG / OHL / LILO / SC OHL EMoP (Applicable To Power Line Activities Only)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
				nearest groundwater well to be sampled – if no receptors in 50m no receptor monitoring is required.			
Vegetation and Tree Loss/Wildlife Disturbance	Habitats, presence of notable flora and fauna pre-construction	Habitat walkover survey by field ecologist	One time for baseline establishment prior to the start of any activity on site	Construction sites, including temporary construction facilities	Only types of habitats and number of trees documented in IEE are lost, including no natural habitat and minimum number of trees through appropriate detailed design. No damage to other habitats/trees/ vegetation outside the RoWs No loss of CR/EN/VU species of flora and fauna including critical habitat species.	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
	Number of trees to be removed by EPC Contractor	Record all trees to be felled or lopped during construction, and replacements planted (including species, size, and economic value)					
Bird collision and electrocution	Bird carcass survey of single circuit line	Record all bird carcasses found beneath entire length of HV power line during route survey following methodology to be agreed with ADB	One time for baseline establishment prior to the start of any activity on site	Beneath HV power line of 132 KV D/C HV power line on Panther conductor from Pithoragarh (PGCIL) -	Marking of sections of HV power line currently posing a risk to birds	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress	Check monitoring being undertaken and document compliance in EMR

Table T3 – UG / OHL / LILO / SC OHL EMoP (Applicable To Power Line Activities Only)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
				Champawat (Lohaghat)	No increase (reduction) in bird collisions	reports.	
Construction							
Vegetation and Tree Loss/Wildlife Disturbance	Restoration of habitats, presence of notable flora and fauna post-construction	Habitat walkover survey by field ecologist to compare to baseline situation	One-time during commissioning once construction completed and temporary construction facilities restored	Construction sites, including temporary construction facilities	Only types of habitats and number of trees documented in IEE are lost, including no natural habitat and minimum number of trees through appropriate detailed design. No damage to other habitats/trees/ vegetation outside the RoWs Zero biodiversity incidents occurred. No loss of CR/EN/VU species of flora and fauna including critical habitat species. Temporarily disturbed areas restored to at least pre-project construction condition.	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
	Undertaking of compensatory	Record of all trees (species and location)	Monthly	Compensatory plantation sites of	100% of trees removed	PIU/Electrical Division to obtain	Check monitoring being undertaken

Table T3 – UG / OHL / LILO / SC OHL EMoP (Applicable To Power Line Activities Only)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
	plantation by Forest Department as funded by PTCUL	planted by Forest Department using PTCUL funds		Forest Department	compensated for with 1:10 replacement with native tree species in suitable alternative location to achieve “no net loss” biodiversity on project completion. 100% survival of compensatory reforestation trees, or continual replacement of those that did not survive	records from Forest Department and report to headquarters	and document compliance in EMR
	Undertaking of dwarf species plantation in ROW of second stringing OHL by contractor per agreed detailed scheme	Record of all trees (species and location) planted by contractor	Monthly	RoW of second stringing OHL	100% survival of dwarf trees, or continual replacement of those that did not survive	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Water Quality	Test against GOI drinking water standards (full suite of parameters)	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time on the completion of drilling or excavation works	Groundwater wells used for drinking water within 50m of drilling or excavations, at least one groundwater sample from nearest groundwater well to be sampled – if no receptors in 50m no receptor monitoring is	GoI guidelines for drinking water for groundwater	EPC contractor to undertake monitoring and report to PTCUL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Table T3 – UG / OHL / LILO / SC OHL EMoP (Applicable To Power Line Activities Only)							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (PTCUL PIU)
				required.			

Appendix U – UPCL EMoP

Table U-1: UPCL General EMOP							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (UPCL PIU)
Pre-construction							
Statutory Clearances	Licenses / Permits and Insurances	Review of all applicable licenses, permits and insurances before the start of construction	One time prior to the start of construction	N/A	All relevant permits, licenses and insurances outlined in the Project IEE are obtained.	EPC contractor to undertake monitoring and report to UPCL in first monthly report.	Review all licenses, permits and insurances and document compliance in EMR
Staffing	Contractors environmental, social, health and safety staff	Review of staff contracts & timesheets	Prior to the start of construction then periodically throughout construction	N/A	All staff outlined in the IEE are in place at the start of construction and are on site for the allotted periods specified in the EMP	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Review contracts and timesheets and document compliance in EMR
Training / Inductions	Training records	Review of all induction training records, including training materials & attendance sheets.	One time prior to the start of construction. Then periodically through construction to ensure new staff have received	N/A	All staff on-site have received the required induction training.	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Review all training records and document compliance in EMR

Table U-1: UPCL General EMOP							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (UPCL PIU)
			induction training.				
Community Awareness	Pre-construction awareness documents	Review documents prepared for community awareness. Sample of residents to assess if they have received any awareness materials	One time prior to the start of construction	N/A	Awareness documents completed and distributed to sampled residents	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Review awareness documents and document compliance in EMR
Camps and Accommodation	ILO's guidance on worker accommodation	Audit of camps and accommodation	Prior to the start of construction then periodically throughout construction	All camps and accommodation areas	Camps and accommodation are compliant with ILO's guidance on worker accommodation	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Review of audit and document compliance in EMR
OHS	OHS Risk Assessment and Accidents Reporting System	Review of risk assessment and accident reporting system	One time prior to the start of construction	N/A	Documents completed	EPC contractor to undertake monitoring and report to UPCL in first monthly report.	Review assessment and reporting system and document compliance in EMR
Drinking water supplies	ISO 10500 drinking water parameters (full suite)	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time for baseline establishment to ensure source of water suitable as drinking water	Sources of drinking water for construction/ operation of project for which supplier is unable to provide copies of drinking water tests to confirm compliance.	ISO 10500 drinking water parameters	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Hazardous materials - PCBs	Transformer oil for PCB content	Testing of transformer oil should follow UNEP Guidelines for PCB-testing	Once at the onset of the project, no additional impact as all equipment and	All existing transformers at substations and along the distribution network to which project	All existing substation transformers and transformers to which project MLV power lines are	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress	Check monitoring being undertaken and document compliance in EMR

Table U-1: UPCL General EMOP							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (UPCL PIU)
			oil procured by the project will be PCB-free.	MLV power lines connect or the EPC contractor will replace or remove for which documentation confirming PCB-status is not available from UPCL	connected PCB-free by project close.	reports.	
Construction							
Health and Safety – incidents	Records of health and safety incidents	Keep records of near miss, minor, lost time, and fatal health and safety incidents related to the project, compile records from construction sites Carry out interviews with workers and the community to identify if any unrecorded incidents occurred. During the COVID-19 pandemic, temperature checks to be carried out at entrance of the work site at start of shift	Monthly	Construction sites, including temporary construction facilities	Zero lost time incidents or fatalities (among workers and community) For 100% lost time incidents or fatalities /confirmed COVID-19 cases immediate action taken to avoid repeat or escalation of situation All incidents including minor and near miss dealt with in accordance with EMP with lessons learnt for future 100% lost time and fatalities/confirmed COVID-19 cases reported to UPCL within 24 hours and ADB within 48	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Table U-1: UPCL General EMOP							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (UPCL PIU)
					hours		
Drinking water supplies	ISO 10500 drinking water parameters (full suite)	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	Monthly	Sources of drinking water for construction of project for which supplier is unable to provide copies of drinking water tests to confirm compliance.	ISO 10500 drinking water parameters	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Water resources	Water volume used and source	Keep records of all water used and source.	Ongoing	Construction sites, including temporary construction facilities	No grievance received during construction or operation regarding conflict with other water users	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Soil (earthworks)	Volume of soil disturbed during construction	Keep records of earthworks involved, including total volume in m^3 of soil excavated and reused (any disposed of as spoil off site to licensed waste disposal facilities recorded as per waste generation)	Monthly	Construction sites involving earthworks/cut and fill activities	Earthworks documented, and all excavated and cut and fill volumes accounted for, either reused on-site or disposed of off-site to licensed waste disposal facilities	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Hazardous materials– incidents	Pollution incidents	Records of pollution incidents (e.g., type of material spilled, amount in kg or m^3, and action taken to clean up) Carry out visual inspection and interviews with workers and the community to identify if	Monthly	Construction sites, including temporary construction facilities	Zero major incidents occurred. Minor incidents responded to in accordance with EMP with lessons learnt for future.	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Table U-1: UPCL General EMOP							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (UPCL PIU)
		any unrecorded incidents occurred					
Natural Resource Use (Construction Materials) and Waste Generation	Volume of construction materials used, and waste generated, and disposal route	Keep records of all types of materials used and wastes produced by type, volume/ weight. Document waste disposal through transfer notes including type, volume/ weight, transport provider, intermediaries if any and final treatment or disposal facility (with its license and capacity)	Monthly	Construction sites, including temporary construction facilities	Transfer of 100% of construction wastes documented, and all wastes disposed of in an environmentally safe and sound manner in accordance with IFC General EHS Guidelines	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Operation							
Health and Safety – incidents	Records of health and safety incidents	Keep records of near miss, minor, lost time, and fatal health and safety incidents related to the project, compile records from construction sites Carry out interviews with workers and the community to identify if any unrecorded incidents occurred. During the COVID-19 pandemic, temperature checks to be carried out at entrance of the work site at start of shift	Monthly	Substations and Power Lines	Zero lost time incidents or fatalities (among workers and community) For 100% lost time incidents or fatalities /confirmed COVID-19 cases immediate action taken to avoid repeat or escalation of situation All incidents including minor and near miss dealt with in accordance with EMP with lessons learnt for future	UPCL engineers to undertake monitoring and report to ESSO/HSO in monthly reports to ESU	Check monitoring being undertaken and document compliance in EMR

Table U-1: UPCL General EMOP							
Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Indicator	Implementation	Supervision (UPCL PIU)
					100% lost time and fatalities/confirmed COVID-19 cases reported to PTCUL within 24 hours and ADB within 48 hours		
Hazardous materials– incidents	Pollution incidents	Records of pollution incidents (e.g., type of material spilled, amount in kg or m3, and action taken to clean up) Carry out visual inspection and interviews with workers and the community to identify if any unrecorded incidents occurred	Monthly	Substations and Power Lines	Zero major incidents occurred. Minor incidents responded to in accordance with EMP with lessons learnt for future.	PTCUL engineers to undertake monitoring and report to ESSO/HSO in monthly reports to ESU	Check monitoring being undertaken and document compliance in EMR

Table U-2: UPCL Existing and New Substation EMOP[39]

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
Pre-construction							

[39] For UG cabling works at existing SS this monitoring table will be followed

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
Air Quality	PM10, PM2.5, to be measured as 24hrs average over a fortnight along with meteorological data- temperature, humidity, wind speed, and wind direction.	Measurement professional, calibrated portable monitoring devices by accredited service provider (record 24-hour data over a fortnight)	One time for baseline establishment prior to the start of any activity on site (during dry season)	Site boundary and nearest receptor to substation sites with receptors <50m from site boundary – if no receptors in 50m no receptor monitoring is required.	National air quality standards of CPCB complied with no increase in baseline levels at sensitive receptors as WHO PM10 and PM2.5 guidelines already exceeded	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Noise	LAeq 1hr day and night for representative 48hr period (ideally 24hr weekday + 24hr weekend and avoid holidays, festivities, strong wind, rain etc.)	Measurement professional, calibrated portable monitoring devices by accredited service provider	One time for baseline establishment prior to the start of any activity on site	Site boundary and nearest receptor to substation sites with receptors <50m from site boundary – if no receptors in 50m no receptor monitoring is required.	CPCB standards and WHO Guidelines for ambient noise at site boundary and sensitive receptors (or less than 3dBA increase if ambient already exceeded) GoI and IFC General EHS Guidelines for occupational noise exposure not exceeded at 1m from noisy equipment	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
Water Quality	pH, EC, turbidity, color, TSS, DO, BOD5, COD, oil and grease, total and faecal coliform bacteria, total nitrogen, total phosphorus If used by local community as a source of drinking water to also test against GOI drinking water standards (full suite of parameters)	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time for baseline establishment prior to the start of any activity on site	Surface waterbody and groundwater wells within 500m of substation sites, at least one surface water sample from nearest surface water body and one groundwater sample from nearest groundwater well to be sampled – if no receptors in 500m no receptor monitoring is required.	GoI guidelines for surface water/drinking water for groundwater	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Soil Quality	pH, TPH, heavy metals, PCBs, PAHs, and any other contaminants indicated by contaminated land professional	Soil samples to be taken from surface and at depth in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time for baseline establishment prior to the start of any activity on site	Existing substation sites where contamination is evident	International soil quality guidelines e.g., Australian	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Construction							

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
Air Quality	PM10, PM2.5, to be measured as 24hrs average over a fortnight along with meteorological data- temperature, humidity, wind speed, and wind direction.	Measurement professional, calibrated portable monitoring devices by accredited service provider (record 24-hour data over a fortnight)	One time during active earthworks (at substations with site levelling/ foundation/cable trench work in their scope) As requested by PIU/PMU in event excessive dust or grievance received during construction.	Site boundary and nearest receptor to substation sites with receptors <500m from site boundary, same locations as baseline – if no receptors in 500m no receptor monitoring is required. Undertake additional locations at request UPCL in event excessive dust experienced or grievance received	National air quality standards of CPCB complied with no increase in baseline levels at sensitive receptors as WHO PM10 and PM2.5 guidelines already exceeded	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
Noise	LAeq 1hr day and night for representative 48hr period (ideally 24hr weekday + 24hr weekend and avoid holidays, festivities, strong wind, rain etc.)	Measurement professional, calibrated portable monitoring devices by accredited service provider	Monitor at least once every 6 months during active construction works (at substations) One time during commissioning (at substations) Then as requested by PIU/PMU in event excessive noise heard or grievance received during construction.	1m from noisy equipment within substation in respect of commissioning Site boundary and nearest receptor to substation sites with receptors <500m from site boundary, same locations as baseline – if no receptors in 500m no receptor monitoring is required. Undertake additional locations at request UPCL in event excessive noise heard or grievance received	CPCB standards and WHO Guidelines for ambient noise at site boundary and sensitive receptors (or less than 3dBA increase if ambient already exceeded) GoI and IFC General EHS Guidelines for occupational noise exposure not exceeded at 1m from noisy equipment	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
Water Quality	pH, EC, turbidity, color, TSS, DO, BOD5, COD, oil and grease, total and faecal coliform bacteria, total nitrogen, total phosphorus If used by local community as a source of drinking water to also test against GOI drinking water standards (full suite of parameters)	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	Monitor at least once every 6 months during active construction involving earthworks, one time during commissioning (at substations) and then as requested by UPCL in event of visible water pollution or grievance received during construction	Surface waterbody and groundwater wells within 500m of substation sites, same locations as baseline– if no receptors in 500m no receptor monitoring is required. Undertake additional locations at request UPCL in event excessive noise heard or grievance received	GOI guidelines for surface water/drinking water for groundwater	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
EMF	EMF exposure levels	EMF meter	One time during commissioning	Substation equipment and boundary and RMUs	ICNIRP public exposure limits for EMF complied with	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports during commissioning phase.	Check monitoring being undertaken and document compliance in EMR
Operation							
Drinking water supplies	ISO 10500 drinking water parameters (full suite)	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	Monthly	Sources of drinking water for operation of substations for which supplier is unable to provide copies of drinking water tests to confirm compliance.	ISO 10500 drinking water parameters	UPCL engineers to undertake monitoring and report to ESSO/HSO in monthly reports to ESU	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
Water resources	Water volume used and source	Keep records of all water used and source.	Ongoing	Substations with borewells	No grievance received during construction or operation regarding conflict with other water users	UPCL engineers to undertake monitoring and report to ESSO/HSO in monthly reports to ESU	Check monitoring being undertaken and document compliance in EMR
Waste Generation	Volume of waste generated, and disposal route	Document waste disposal through transfer notes including type, volume/ weight, transport provider, intermediaries if any and final treatment or disposal facility (with its license and capacity)	Monthly	Substations	Transfer of 100% of construction wastes documented, and all wastes disposed of in an environmentally safe and sound manner in accordance with IFC General EHS Guidelines	UPCL engineers to undertake monitoring and report to ESSO/HSO in monthly reports to ESU	Check monitoring being undertaken and document compliance in EMR

Table U-3: UPCL UG Cabling and OHL EMOP

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
Pre-construction							
Water Quality	Test against GOI drinking water standards (full suite of parameters)	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time for baseline establishment prior to the start of any activity on site	Groundwater wells used for drinking water within 50m of drilling or excavations, at least one groundwater sample from	GoI guidelines for drinking water for groundwater	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
				nearest groundwater well to be sampled – if no receptors in 50m no receptor monitoring is required.			
Property Damage	Surveys of existing property condition including structures, roads, canals, rail, utilities, etc.	Photographic and/or structural pre-condition surveys of existing property condition	One time for baseline establishment prior to the start of any activity on site	Properties along MLV power lines requiring condition survey (see EMP)	Damages avoided but if caused paid for by contractor	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Vegetation and Tree Loss/Wildlife Disturbance	Habitats, presence of notable flora and fauna pre-construction	Habitat walkover survey by field ecologist	One time for baseline establishment prior to the start of any activity on site	Construction sites, including temporary construction facilities	Only types of habitats and number of trees documented in IEE are lost, including no natural habitat and minimum number of trees through appropriate detailed design. No damage to other habitats/trees/ vegetation outside the RoWs No loss of CR/EN/VU species of flora and fauna including critical	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
	Number of trees to be removed by EPC Contractor	Record all trees to be felled or lopped during construction, and replacements planted (including species, size, and economic value)					

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
					habitat species.		
Construction							
Water Quality	Test against GOI drinking water standards (full suite of parameters)	Water sample is to be taken in a clean, non-contaminated, well-sealed container and tested within the next 48h by accredited laboratory	One time for on the completion of drilling or excavation works	Groundwater wells used for drinking water within 50m of drilling or excavations, at least one groundwater sample from nearest groundwater well to be sampled – if no receptors in 50m no receptor monitoring is required.	GoI guidelines for drinking water for groundwater	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR
Vegetation and Tree Loss/Wildlife Disturbance	Restoration of habitats, presence of notable flora and fauna post-construction	Habitat walkover survey by field ecologist to compare to baseline situation	One-time during commissioning once construction completed and temporary construction facilities restored	Construction sites, including temporary construction facilities	Only types of habitats and number of trees documented in IEE are lost, including no natural habitat and minimum number of trees through appropriate detailed design. No damage to other	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
					habitats/trees/ vegetation outside the RoWs Zero biodiversity incidents occurred. No loss of CR/EN/VU species of flora and fauna including critical habitat species. Temporarily disturbed areas restored to at least pre-project construction condition.		
	Undertaking of compensatory plantation by Forest Department as funded by UPCL	Record of all trees (species and location) planted by Forest Department using UPCL funds	Monthly	Compensatory plantation sites of Forest Department	100% of trees removed compensated for with 1:10 replacement with native tree species in suitable alternative location to achieve “no net loss” biodiversity on project completion.	PIU/Electrical Division to obtain records from Forest Department and report to headquarters	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
					100% survival of compensatory reforestation trees, or continual replacement of those that did not survive		
Noise	LAeq 1hr day and night for representative 48hr period (ideally 24hr weekday + 24hr weekend and avoid holidays, festivities, strong wind, rain etc.)	Measurement professional, calibrated portable monitoring devices by accredited service provider	One time during commissioning (at CSS and RMU locations) Then as requested by PIU/PMU in event excessive noise heard or grievance received during construction.	1m from CSS, RMU etc. in respect of commissioning Undertake additional locations at request UPCL in event excessive noise heard or grievance received	CPCB standards and WHO Guidelines for ambient noise at sensitive receptors (or less than 3dBA increase if ambient already exceeded) GoI and IFC General EHS Guidelines for occupational noise exposure not exceeded at 1m from noisy equipment	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Project Activity or Environment Impacts/ Risks	Monitoring Parameters	Method of Monitoring including Standards/ Guidelines	Frequency and Timing	Location	Performance Standard	Implementation	Supervision
EMF	EMF exposure levels	EMF meter	One time during commissioning	CSS, RMU etc.	ICNIRP public exposure limits for EMF complied with	EPC contractor to undertake monitoring and report to UPCL in monthly and quarterly progress reports.	Check monitoring being undertaken and document compliance in EMR

Appendix V – 132 kV Chilkiya Ramnagar Environmental Audit

Audit Checklist

Name of Auditor:	Anjali Semwal
Substation Name:	132 kV Chilkiya Ramnagar
Year of establishment:	July 2005
Type of Substation (GIS/AIS):	GIS
Voltage:	132 kV
No. incomers and voltage:	132 kV
No. outgoers and voltage:	33 kV
Grid Reference:	Lat 29.37173^{o} Long 79.103829^{o}

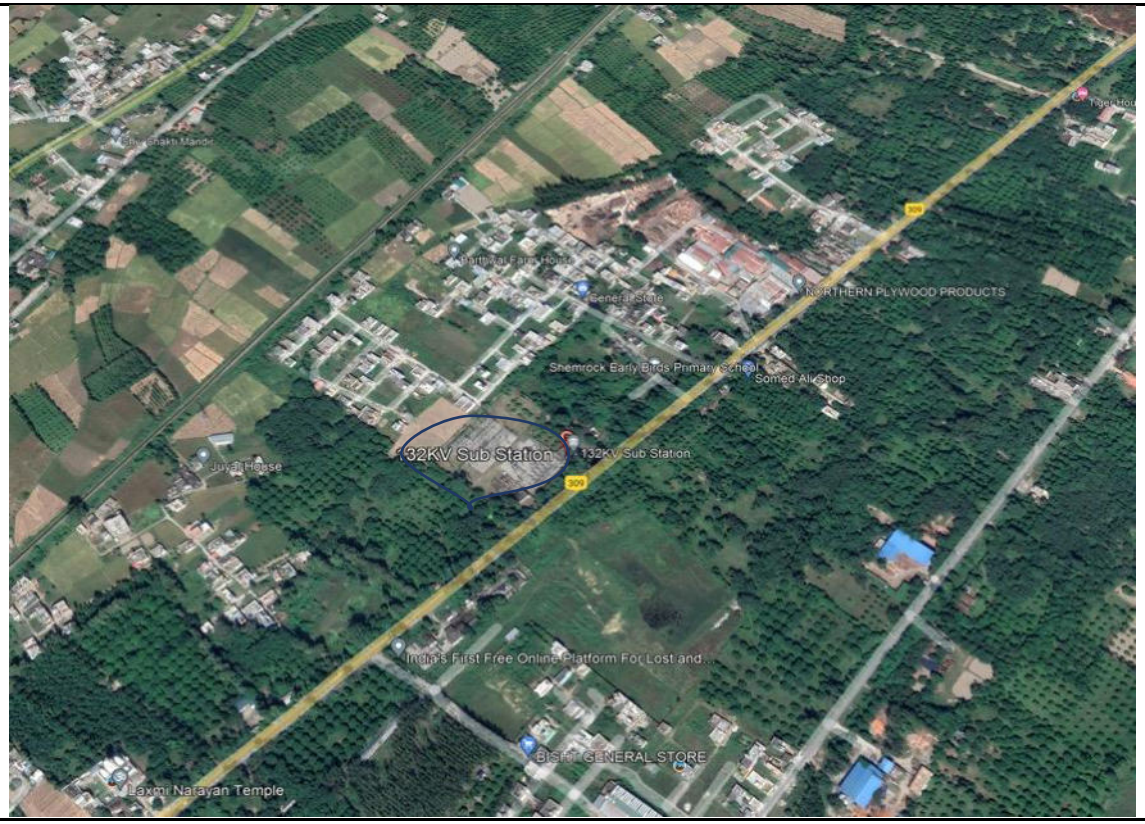
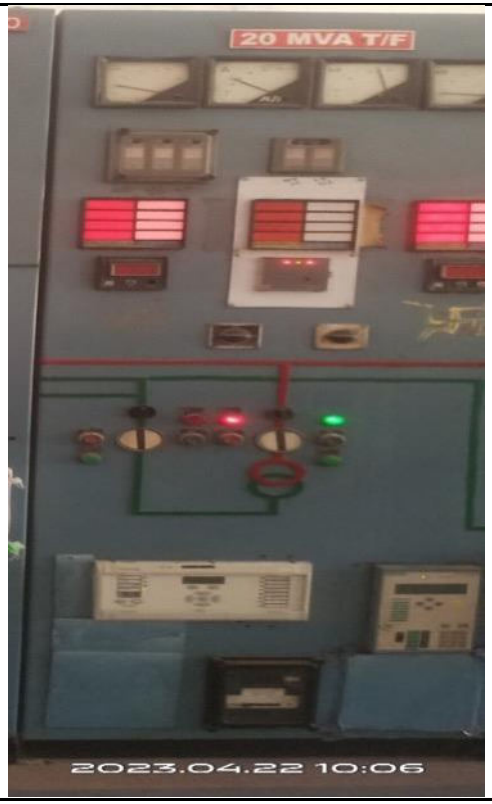
Aerial map of substation:	

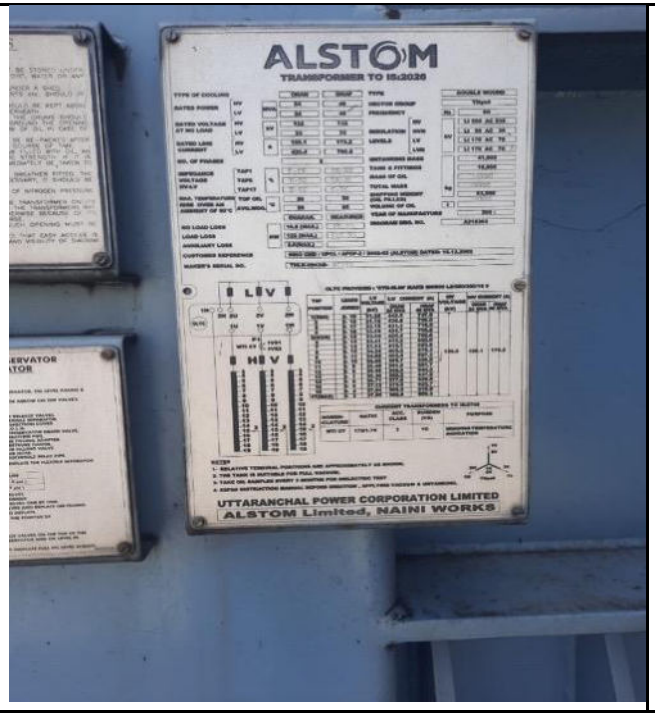
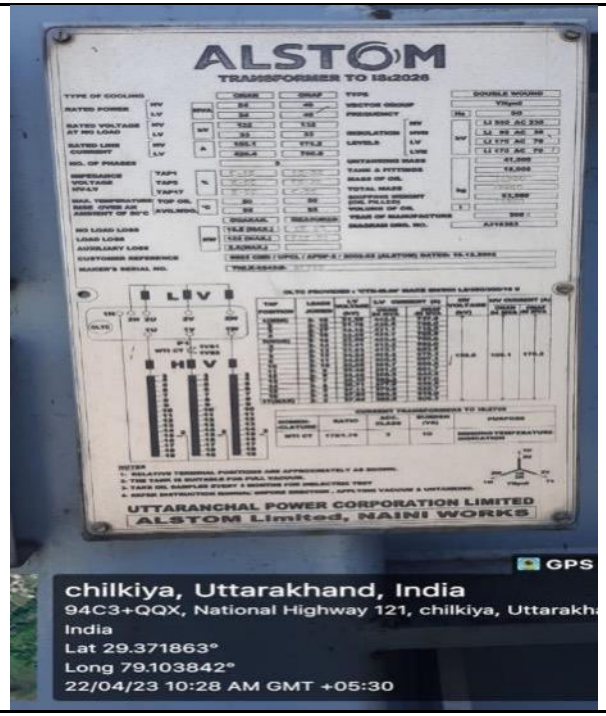
Photo of substation compound:	

	 पावर ट्रांसमिशन कारपोरेशन ऑफ उत्तराखण्ड लि0 (उत्तराखण्ड सरकार का उपक्रम) कारपोरेशन आई डी नं0 U40101UR2004GO1028675 132 के0 वी0 उपकेन्द्र, रामनगर - 244715 दूरभाष नं0 05947 - 25562 PTCUL मुख्यालय एवं पंजीकृत कार्यालय विद्युत भवन, नजदीक - आई0 एस0 बी0 टी0 क्रॉसिंग सहारनपुर रोड, देहरादून - 248002 दूरभाष नं0 0135 - 2646000 , फैक्स नं0 0135 - 2643460 , वेबसाईट www.ptcul.org

Proposed Sub Station location	Proposed SS of UPCL- Kaniya will be connected to this PTCUL SS via underground line. Existing bus line 
Photo of any control building and details of wall/roof materials:	Wall/ roof is made of RCC with false ceiling

Control Building Photographs	
No. transformers with make/model, MVA, manufacturer name and dates of manufacture/installation with photo of rating plate:	**1 No. 40 MVA ALSTOM** **1 No. 20 MVA ALSTOM**

	 40 MVA T/F 40MVA, 132/33kV TRANSFORMER REMOTE TAP CHANGER CONTROL	 20 MVA T/F 2023.04.22 10:06

	 
Noise level at site entrance, indicative reading:	**55 dB**
Noise level adjacent to transformer, indicative reading:	**51.3 dB**
EMF level at site entrance, indicative reading:	**-**
EMF level adjacent to transformer, indicative reading:	**-**
Outside temperature, indicative reading:	**28 deg C**
Area of substation, and layout map (area in use and available for expansion):	**33193.6 m^2 (8.2 acres) including colony** **Area of SS 14702 m^2 (3.63 acres)**
Photo of vehicle entrance: **Is it off a paved road?**	**Paved road**

Topography – flat land, sloped, or steep terrain:	**flat**
Previous land use (if known):	**Agricultural**
Describe the land uses within 500m (supported with photos): Confirm presence or absence of agricultural land-cultivated or uncultivated, protected or environmentally sensitive areas, community or protected forest, water bodies, religious or ancestral cultural resources (e.g. temples, shrines, sacred trees)?	**Agriculture, Residential, PTCUL Colony** **Railway line 200 m, NH 121 next** **Residential area at North and West side, Orchard at the South side**
Nearest protected or key biodiversity area (distance in m)?	**Jim Corbett National Park (2.5 km)**
Have endangered species been encountered in the vicinity (elephant, tiger, etc.)?	**Leopard seen in the SS compound in 2021. Other animals include mongoose, snake, porcupine, monster lizard etc.**
No. buildings within 50m and no. inhabitants:	**PTCUL Staff Colony within premises, Spice Colony and Nayagaon colony**
Nearest habitation (name and distance in m, mark on aerial map if possible):	**Chilkiya – 300 m** **Ramnagar – 300 m** **Shivlalpur, Tanda and Pirumdara within 400 m**
No. community facilities (schools, health centre etc.) within 50m with estimated no. of visitors (mark on aerial map if possible):	**School in nearby colony within 100 m**
Nearest surface water (distance in m, mark on aerial map if possible):	**Canal on eastern side**
No. groundwater wells/pumps/springs within 50m (mark on aerial map if possible):	**Ground water within premises**
Total staff at substation (technical and non-technical): **No. men / no. women:**	**Technical 9 Skilled Coolie -1, TG-1, JE-2, AE-1, TG 2- 4 (on contract)** **Non-Technical 4 Guard** **12 Men, 1 Women (AE)**

Audit Checks:	Y	P	N	N/A	Remarks (attach photos to support findings)
A. Housekeeping / Waste Management					
Is an environment policy available on site?			**X**		Note if one exits at organization level: No dedicated policy on Environment
Is a pollution prevention manual or procedure available on-site covering hazardous materials management, oil storage etc?			X		Note if one exits at organization level: PTCUL's Code of Practice for Safety
Is a waste management manual or procedure available on-site covering both solid and hazardous waste storage and disposal?		**X**			Waste is auctioned to authorized vendors. PTCUL has a scrap disposal policy
Is there vegetation (grass, trees, shrubs) on site?	X				Provide details of vegetation and how it is managed, note if trees will need to be cut if further development in compound: Many trees in the premises including mango, neem, guava. No tree felling needed for works of new line

					
Is the substation kept neat and tidy with no discarded wastes?		**X**			**Waste is stored in covered and secured area** Some waste is also stored in open

						
					Storage Room	Open Storage
Are there any trip hazards on the ground e.g. open channels, materials, equipment, trash laying around?			**X**			
Are there any other features that could post a danger e.g. broken or loose tiles?			**X**			
Is there any general waste storage and/or disposal on-site?	**X**				Provide details of types of waste stored and how disposed of? Empty drums, used batteries, discarded furniture, used PPEs (gloves, boots), cables and miscellaneous items all stored together. Waste disposal is done by the MM wing of PTCUL as per the scrap disposal policy.	

						
Is solid waste segregated into recycling and waste for disposal?			X		Covered and secured storage area for waste. No proper segregation seen. Some scrap is also kept in open but secured area. For office waste and sweepings, 1 dust bin kept	
Is there a dedicated, labelled storage area for solid waste?	X				Dedicated but not labelled area. All waste stored at one place without any segregation and labelling.	
Does the storage area have an impermeable floor?		X			1 Dedicated room for storage has impermeable floor. Other than that, some waste is also stored in open area	
Is the storage area under cover?		X			Some scrap storage is also done in open area	

Do garbage bins have lids?		X			There is only 1 garbage bin. It is with lid
Are garbage bins enclosed to contain leachates?			X		
Is any waste burning on site – open burning or incineration?			X		Not observed. It was informed by the staff that municipal waste is dumped outside near nala and also burnt sometimes**.**
Is any composting taking place on-site?			X		
Is end of life or unused equipment being stored on site?	X				Used batteries stored at site. Will be disposed as per auction time schedule. No unused equipment seen.
Is there a dedicated, labelled storage area for this equipment?	X				Dedicated but not labelled area. All waste stored at one place without any segregation and labelling.
Are supplies of fuel, oil, chemicals, SF6 tanks being stored on site?	X				SF6 is stored at site. (10-20 kg is generally stored)

Are material data sheets for the fuels, oil or chemicals displayed?		X			
Are there empty drums, old transformers or used batteries on site?	X				Stored in covered and secured storage area. But there is no demarcation and empty drums, used batteries all are stored at one place. No old transformers are there.

					
Are there any hazardous wastes (solid/liquid/gas) being stored and/or disposed of?	**X**				How are any hazardous wastes (solid/liquid/gas) being stored and disposed of? As Per PTCUL's scrap policy
Is there a dedicated, labelled storage area for fuels, oils, and chemicals, SF6 tanks, empty drums, old transformers, and/or		X			No labelled storage area. All kinds of waste are stored at one place.

hazardous wastes?					
Does the storage area have an impermeable floor?	X				
Is the storage area under cover?	X				
Is the storage area locked?	X				
Does the storage area have a spill containment bund of 110% capacity (see picture glossary at end of checklist for example)?			X		
Is the storage area drainage connected to sump to collect runoff?			X		
Are all storage barrels or tanks labelled with their contents and hazard warning signs?			X		
Are empty storage barrels or	X				Site or company level procedures for disposal: As per Scrap policy of PTCUL and the schedule of PTCUL's MM (Material Maintenance) wing.

tanks sent to stores for onwards disposal?					
Are redundant transformers sent to stores for onwards disposal?	X				Site or company level procedures for disposal: As per PTCUL's scrap policy. However, no redundant transformer in the SS so far.
Are used batteries sent to stores for onwards disposal?	X				Site or company level procedures for disposal: As per PTCUL's scrap policy.
Has there been any pest problem on site?			X		Not informed of any such problem. Treatment for termite was done 6 years back.
Are any pest control measures undertaken on site?	X				Provide details of control measures and how often undertaken: Termite control treatment was done in 2017.
B. Transformers and Oil Leakage					
Is the power circuit breaker oil insulated?			X		Gas insulated

					
Are there any oil insulated transformers?	X				Provide copies transformer oil material data sheets:
Are there any oil filled capacitors?			X		
Do the transformers and capacitors have a label indicating contains PCB			X		

(polychlorinated biphenyl) or is PCB free?[1]					
Is any other evidence available on-site to confirm transformers and/or capacitors PCB free e.g. supplier certification, oil test results?	X				Provide copies of any documentary evidence: Oil test report
Is it known when the transformer oil was last changed?	X				Oil was not changed totally. It was centrifuged.
Is a maintenance logbook kept on the premises?	X				Describe schedule of maintenance: Quarterly

Are the transformers mounted on an impermeable platform extending beyond the footprint of the transformer?	X				

Does the transformer platform have a spill containment bund/sump of 110% capacity?	X				
Is there any evidence of oil leaking or having previously leaked from transformers or other equipment?		X			
Have any oil spills occurred at the substation in the past 5 years?			X		If yes, number and details of incidents: Not reported
Is there any spill equipment	X				Sand available.

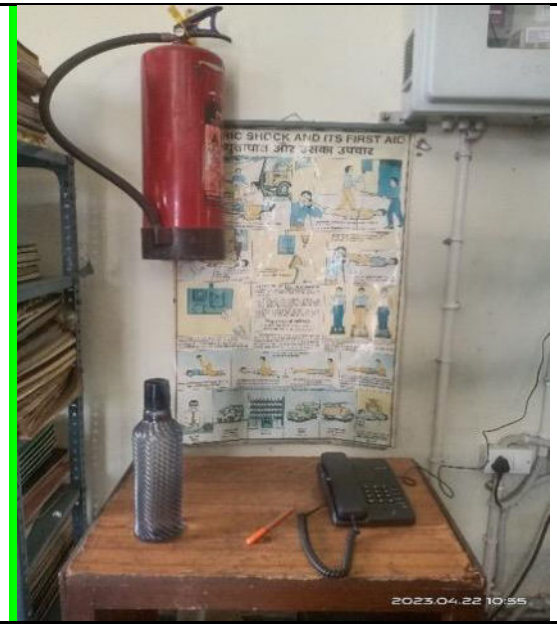
available on site (e.g. sand, cloths, or other absorbent material)?					
C. Escape of SF_6 (sulphur hexafluoride) and other greenhouse/hazardous gases					
Is there presence of SF_6 at the substation?	X				
Is this a GIS?	X				
Is the power circuit breaker gas insulated?		X			5 nos. Circuit Breakers are Gas insulated and 7 are vacuum CBs.
Is there gas insulated switchgear?	X				
Are there any gas insulated transformers?			**X**		
Are SF6 leakage detectors installed?			**X**		
Are portable SF6 leakage detectors available at the substation?			**X**		
Are records of SF6 use kept?	X				Stock Register Provide indication of annual usage:
Are records of SF6 leakage kept?			**X**		No such incident noted
Have any SF6 leakages			X		Provide indication annual leakage rate: Daily record of SF6 is kept on logsheet by shift staff.

occurred at the substation in the past 5 years?					
Is there a SF_6 retrieval arrangement on-site?			X		
Is redundant equipment with SF6 sent to stores for onwards disposal?	**X**				Not yet required Site or company level procedures for disposal of equipment containing SF6: Scrap Policy and PTCUL's Code of Practice for SF6 Equipment.
Are there presence of other hazardous gases within equipment or on the substation compound?			X		
D. Noise, EMF, Lighting and Ventilation					
Are there high levels of noise pollution at or around the site (e.g. traffic, etc.)		X			Site is located besides National Highway 121. But traffic flow is moderate.
Are there any warning signs noise levels may exceed >85dBA?			X		If yes, is ear protection available:
Is any transformer hum audible?	X				

Has noise monitoring been undertaken at the substations in last 5 years?			X		If yes, provide results if available:
Are there any sources of vibration?		X			Transformers are the only source
Are shielding equipment/materials installed to reduce EMF exposure?			X		
Has EMF monitoring been undertaken at the substations in last 5 years?			X		If yes, provide results if available:
Is adequate ventilation provided in control building?	X				
Are all vents free of blockages?	X				
Is heating and/or air conditioning available and adequate?	X				
Is adequate natural or artificial	X				

lighting provided in control building?					
Is adequate lighting provided in the substation compound at night?	X				
Are all lights in working order?	X				
Are there high level of air pollution at or around the site (e.g. dust, traffic, etc.)?		X			Moderate traffic on the road. However, the surrounding landuse is agriculture and residential mix. There are many trees both within and around the site.
Has air quality monitoring been undertaken at the substations in last 5 years?			X		If yes, provide results if available: NA
Is a first aid kit available on site?			X		Elaborate on contents: Nil
Is the first aid kit well equipped?			X		
Is it clearly labelled where the first aid kit is stored?			X		A dedicated area for kit. But no contents.

					
Is the first aid equipment within its expiry date?			X		Only Dettol and band aid.
Do any staff on site have first aid training?			X		
Is one staff with first aid training present on the site at all times?		X			Very basic training provided to the staff. No clarity on the risks and first aid measures.

Are there any posters showing first aid procedures especially for electrocution?		X			
F. Fire Safety Equipment					
Does the substation have any fire detectors and alarm?			**X**		Elaborate on equipment provided separately for yard and control room: Sand buckets and Fire extinguishers provided at the yard CO2, ABC, Mechanical Foam type Fire Extinguishers at the Control Room

						
					Fire Extinguishers Stored	Fire Extinguisher in Control Room. Expiry on 06.2023
Are the alarm systems operational?			X		No automatic alarm system	
Are any firewalls provided e.g.			X		Sufficient gap between the transformers	

between transformers?					
Does the substation have automatic fire suppression systems connected to the alarm systems e.g. sprinklers?			X		Elaborate on system: No automatic system
Is firefighting equipment present?	X				Elaborate on equipment provided separately for yard and control room, No. and type fire extinguishers – CO2 – 11nos. ABC – 12 nos. Mechanical Foam Type- 3 nos.
Do fire extinguishers have an in-date service record?	X				
Is a record of fire alarm tests and fire drills available on site?			X		
Do any staff on site have fire training?			X		
Is one staff with fire training present on the site at all times?			X		
Are there any notices or posters			X		

describing procedures to be followed in the event of a fire?					
G. Community Health and Safety					
Is there a security fence and gates?	X				
Does the security fence have any gaps, permitting entry?			X		
Are the gates kept locked?	X				
Is 24/7 security guard present?	X				
Is the door to the control room kept locked?	X				
Are there written or graphic "danger of electrocution" signs posted on the fence/gates?			X		
Are there written or graphic "danger of electrocution" signs posted on electrical equipment?			X		

H. Handling Emergencies					
Is an emergency plan available (e.g. for fire, earthquake, flood, accidents, illness etc.)?			**X**		Provide copies of any documentary evidence: PTCUL has its Code of Practice For Safety which includes Safety manual for emergencies.
Are any COVID-19 specific precautions being followed on-site?			X		
Are the staff trained on responding to emergency situations?		X			
Are emergency exits sign-posted and clear of blockages?			X		
Is the location and phone number of doctor and hospital posted in a clear location?			X		Distance to nearest doctor / clinic: Hospital in Ramnagar No MoU with Hospital and no contact details displayed at site Distance to nearest hospital able to treat electrocution accidents and other serious conditions: Ramnagar
Is there an emergency eye wash or shower?			X		
Is an accident logbook			X		Elaborate on incidents recorded: No such incident reported and recorded

available on site?					
Has the substation ever been subject to earthquakes?			X		Describe measures (if any) in place to improve disaster-resilience against earthquakes? As per PTCUL's Code of Practice; Emergency Plan
Has the substation ever been subject to flooding?			X		Describe measures (if any) in place to improve disaster-resilience against flooding? No such risk and history
Has the substation ever been subject to landslides / slope stability issues?				X	Describe measures (if any) in place to improve disaster-resilience against landslides / slope stability issues? Flat terrain, no slope stability issues.
I. Health and Safety of Staff					
Is a health and safety policy available on site?			X		Note if one exits at organization level: yes, corporate safety manual
Is a health and safety risk assessment available on site?			X		Note if one exits at organization level:
Is a health and safety manual or procedure available on site?			X		Note if one exits at organization level:
Are there records of safety inspections,			X		

testing and calibration?					
Is there signage indicating to workers the hazards present?			X		
Is there adequate depth of gravel provided?	X				
Does the control building look structurally sound?	X				

Has an asbestos survey ever been undertaken at the substation?			X		
Is there any evidence of asbestos on site especially lagging and roofing materials?			X		
Did auditor receive an OHS site induction?					
Have staff on site received OHS training?		X			
Are training materials and equipment available on site?			X		
Is maintenance handled by staff on site?			X		
Is there a strict written procedure available for de-energizing before working on electrical equipment?	X				

Do external maintenance workers come in to undertake more advanced maintenance?	X				Clarify division of labour between on-site workers and other in-coming Specialized NEA workers: Specialized workers for line maintenance. For regular works PTCUL's line staff
Are the staff working on operation and maintenance activities trained on working at heights?	X				Specialized workers for line maintenance.
Are the staff working on operation and maintenance activities trained on working with electricity?	X				
Are medical checks of staff undertaken?		X			
Are staff informed of appropriate PPE for job e.g. via signage?		X			
Are staff on site wearing personal protective equipment (PPE)?			**X**		
Is there a store of PPE		X			List the types of PPE that are available: Only 1 pair of Gloves

available on site[2]?					
Do staff avail of personal exposure monitoring equipment to warn of exceeding exposure levels to electromagnetic fields?			X		
J. Drainage					
Is there any standing water visible on site?			X		
Is a drainage system provided?	**X**				Identify where it connects to:
K. Sanitation and Welfare Facilities					

Is a toilet available on site?	**X**				Are there facilities for male and female? No
Is the toilet clean?			X		
Is the toilet inside staff building or outside it?	X				**Inside**
Does the toilet connect to existing municipal sewerage system?			X		
Does the toilet connect to septic tank?	X				
Is there also a soakaway for	X				

the septic tank overflows?					
Is there any sign on leakage/pollution from septic tank?			X		
Are handwashing facilities available?	X				
Is hot and cold water available?			X		Only cold water
Is soap provided?			X		
Does the toilet have lock or vacant indicator?	X				
Is potable water available on site?	X				Elaborate on the source: tubewell at site. RO Water purifier in the SS

					
Is there any evidence of potable water meeting Drinking Water Standards?		**X**			Provide copies of any documentary evidence: Records not available but it was informed that maintenance of the RO is done timely.
Are staff stationed at substation	**X**				If so, how many? 1 technical staff How long are staffs' shifts? 8 hrs

during on-shift hours (including security guards) ?					
Is there an undercover rest area available?			X		
Is a food preparation and clean eating area available?			X		No preparation area. Clean eating area available. Is the area free from any contamination from work processes? yes
Is cooking fuel used on site?			X		Describe fuel(s) used: NA
Are staff staying at the substation overnight (out of hours) and how many (including security guards)?	X				2 (1 Technical staff and 1 Security guard)
Is there a dedicated accommodation area for staff?	X				Describe worker accommodation and facilities provided e.g. is it clean, does it protect from wind, rain and sun; does it have a bed; heating; air conditioning etc.? No accommodation arrangement within the SS. The staff colony is within the premises of SS at a suitable distance.
Is a TV/Radio/Internet connection available for staff?			X		
Is there a dedicated shelter for any	X				Describe shelter e.g. is it clean, does it protect from wind, rain and sun; does it have a bed; heating; air conditioning; do the guards have access to the sanitation and cooking facilities within the compound etc.? Cabin for the Security guard. Sanitation facilities within the SS are used by the guard. No cooking facility available since guards stay in shifts.

security guards?					

Undertaken by:

Anjali Semwal

Environment Expert

Date:22/04/23

[1] PCBs are persistent organic pollutants, meaning they a resistant to environmental degradation through time and may remain indefinitely present in the environment.

[2] E.g., hard hats, safety glasses steel-toed boots, rated dielectric footwear, insulated gloves, insulated tools, electrical insultation blankets, live-line tools/hot sticks, respiratory equipment etc.

Appendix W – Second Circuit Stringing Permissions and Current Status

Forest Clearance Permission for Single Circuit Works

FP/UK/TRANS/21921/2016
8B/UCP/04/13/2017

EDS Sought(State Government):
25/08/2017

Compliance Report:
12/05/2019

Stage-I :
07/09/2017

Stage-II:
25/04/2022

View Form A Part 1 (forestsclearance.nic.in)
View Form A Part II (forestsclearance.nic.in)

भारत सरकार
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
एकीकृत क्षेत्रीय कार्यालय, देहरादून
25 सुभाष रोड, देहरादून–248001
दूरभाष: 0135–2650809
फैक्स–0135–2653010
ईमेल- moef.ddn@gov.in

सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
INTEGRATED REGIONAL OFFICE, DEHRADUN
25 SUBASH ROAD, DEHRADUN-248001
PHONE- 0135-2650809
FAX- 0135-2653010
Email- moef.ddn@gov.in

पत्र सं0 8बी/यू0सी0पी0/04/13/2017/एफ0सी0 1112 दिनांक: 25/04/2022

सेवा में,

अपर मुख्य सचिव (वन),
उत्तराखण्ड शासन,
सुभाष रोड़, देहरादून।

विषय : जनपद – पिथौरागढ़ के 132 के0वी0 सिंगल सर्किट लाईन डबल सर्किट टावर पर पिथौरागढ़ से चम्पावत के निर्माण हेतु 37.2897 हे0 वन भूमि का गैर वानिकी कार्यों हेतु पॉवर ट्रांसमिशन कार्पोरेशन उत्तराखण्ड लि0 को प्रत्यावर्तन। (online no. FP/UK/TRANS/21921/2016)

सन्दर्भ: अपर प्रमुख वन संरक्षक एवं नोडल अधिकारी, उत्तराखण्ड शासन की पत्र संख्या– 2340/FP/UK/TRANS/21921/2016 दिनांक 01-04-2022

महोदय,

उपरोक्त विषय पर अपर सचिव, उत्तराखण्ड शासन के पत्र दिनांक 27.02.2017 का आशय ग्रहण करने का कष्ट करें, जिसके द्वारा विषयांकित प्रस्ताव पर केन्द्र सरकार से वन (संरक्षण) अधिनियम, 1980 की धारा–2 के तहत स्वीकृति मांगी थी।

प्रश्नगत प्रकरण में इस कार्यालय के समसंख्यक पत्र दिनांक–07.09.2017 द्वारा प्रस्ताव में सैद्धान्तिक स्वीकृति प्रदान की गयी थी जिसमें उल्लिखित शर्तों की अनुपालन आख्या अपर प्रमुख वन संरक्षक एवं नोडल अधिकारी, उत्तराखण्ड शासन के उपरोक्त संदर्भित पत्र द्वारा प्रस्तुत कर दी गयी है। राज्य सरकार के प्रस्ताव पर ध्यानपूर्वक विचार करने के उपरान्त केन्द्र सरकार **जनपद – पिथौरागढ़ के 132 के0वी0 सिंगल सर्किट लाईन डबल सर्किट टावर पर पिथौरागढ़ से चम्पावत के निर्माण हेतु 37.2897 हे0 वन भूमि का गैर वानिकी कार्यों हेतु पॉवर ट्रांसमिशन कार्पोरेशन उत्तराखण्ड लि0 को प्रत्यावर्तन** हेतु **विधिवत् स्वीकृति** निम्नलिखित शर्तों पर प्रदान करती है–

1. वन भूमि की विधिक परिस्थिति अपरिवर्तित रहेगी।
2. परियोजना के लिए आवश्यक गैर–वानिकी भूमि प्रयोक्ता अभिकरण को सौंपने के बाद ही वन भूमि सौंपी जाएगी।
3. **प्रतिपूरक वनीकरण**

   (क) वन विभाग द्वारा प्रयोक्ता अभिकरण की लागत पर 74.5794 हे0 ग्राम –पांमै– 11.925, नागधर–3.49 हे0 25,26,27,28, 1595, 1597, 1598, 1599, 1600, 1643, 1668, 1669,1670, 1671, रांथी–54.816 हे0 खसरा नं0 986, 1538, 4070, 12493, 13095, 25959, 26002, 26064, 33342, 33344, 30351, 34683, 34686, मजिरकांडा–5.38 हे0 खसरा नं0 2290 में प्रतिपूरक वनीकरण किया जाएगा। जहां तक व्यावहारिक हो, स्थानीय स्वदेशी प्रजातियों को लगाया जाए तथा प्रजातियों की एकल प्लांटेशन से बचा जाये।

   (ख) क्षतिपूरक वनीकरण के उद्देश्य से उक्त भूमि वन विभाग को हस्तांतरित कर दी गयी है तथा प्रभागीय वनाधिकारी द्वारा अवगत कराया गया है कि *"सन् 1893 के राजपत्र के अनुसार*

1/3

यह भूमि संरक्षित वन क्षेत्र है तथा उक्त भूमि का असल दरामद राजस्व विभाग से वन विभाग के पक्ष में कर दिया गया है एवं अधिसूचना दिनांक 25.06.2018 के अनुसार इसकी वर्तमान स्थिति संरक्षित वन की है। इस हेतु इस भूमि को पृथक से संरक्षित वन क्षेत्र घोषित किये जाने की आवश्यकता नहीं है" अतः राज्य सरकार उक्त भूमि जो अब वन विभाग के पक्ष में हस्तांतरित कर दी गयी है को अपनी कार्य योजना में शामिल करना सुनिश्चित करें।

(ग) प्रत्यावर्तित किए जाने वाले क्षेत्र की के0एम0एल फाइल, सी0ए क्षेत्र, प्रस्तावित एस0एम0सी कार्य, प्रस्तादित कैचमेंट एरिया, ट्रीटमेंट क्षेत्र और डब्ल्यू0एल0एम0पी क्षेत्र को लीनियर परियोजनाओं के लिए कार्य अनुमति जारी करने से पहले सभी आवश्यक विवरणों के साथ ई–ग्रीन वॉच पोर्टल पर अपलोड किया जाएगा ।

4. वन अधिकार अधिनियम, 2006 का पूर्ण अनुपालन संबंधित जिला कलेक्टर द्वारा जारी प्रमाण पत्र से सुनिश्चित किया जाएगा
5. प्रयोक्ता अभिकरण प्रत्यावर्तित वन भूमि में पेड़ों की कटाई को यथासंभव न्यूनतम रखेगा एवं प्रभावित होने वाले वृक्षों की सं0 प्रस्ताव के अनुसार 633 trees (214 वृक्ष चम्पावत वन प्रभाग एवं 419 वृक्ष पिथौरागढ़ वन प्रभाग) से अधिक नहीं होगी एवं पेड़ राज्य वन विभाग के सख्त पर्यवेक्षण में कटेंगे।
6. राज्य वन विभाग के परामर्श से प्रयोक्ता अभिकरण ट्रांसमिशन लाईन के RoW के नीचे बौनी प्रजातियों (अधिमानतः औषधीय पौधे) के सृजन एवं रखरखाव के लिए योजना तैयार करेगा तथा इसका निष्पादन वन विभाग द्वारा किया जायेगा।
7. प्रयोक्ता अभिकरण अपनी लागत पर पक्षी डिफ्लेक्टर लगाएगा, जिन्हे पक्षियों को आहत होने से बचाने के लिए ट्रांसमिशन लाईन के ऊपरी कंडक्टर पर उपयुक्त दूरी पर लगाया जाएगा।
8. पर्यावरण (संरक्षण) अधिनियम, 1986 के प्रावधानों के अनुसार, यदि आवश्यक हो तो प्रयोक्ता अभिकरण पर्यावरणीय स्वीकृति प्राप्त करेगा।
9. केंद्र सरकार की पूर्वानुमति के बिना प्रस्ताव का ले–आउट प्लान नहीं बदला जाएगा।
10. वन भूमि एवं आस– पास की भूमि पर कोई भी श्रमिक शिविर स्थापित नहीं किया जाएगा।
11. प्रयोक्ता अभिकरण द्वारा मजदूरों को राज्यीय वन विभाग अथवा वन विकास निगम अथवा वैकल्पिक ईंधन के किसी अन्य कानूनी स्रोत से पर्याप्त लकड़ी, विशेषतः वैकल्पिक ईंधन दिया जाएगा।
12. संबंधित प्रभागीय वनाधिकारी के निर्देशानुसार, प्रत्यावर्तित वन भूमि की सीमा को परियोजना लागत पर भूमि पर सीमांकन किया जाएगा।
13. परियोजना कार्य के निष्पादन हेतु निर्माण सामग्री के परिवहन के लिए वन क्षेत्र के अंदर कोई अतिरिक्त या नया मार्ग नहीं बनाया जाएगा।
14. वन भूमि का उपयोग परियोजना के प्रस्ताव में विनिर्दिष्ट प्रयोजनों के अतिरिक्त अन्य किसी प्रयोजन हेतु नहीं किया जाएगा।
15. केंद्र सरकार की पूर्वानुमति के बिना प्रत्यावर्तन हेतु प्रस्तावित वन भूमि किसी भी परिस्थिति में किसी भी अन्य एजेंसियों, विभाग अथवा व्यक्ति को हस्तांतरित नहीं की जाएगी।
16. प्रयोक्ता अभिकरण पूर्वविर्दिष्ट स्थलों पर इस प्रकार मलवे का निस्तारण करेगा कि वह अनावश्यक रूप से तय सीमा से नीचे न गिरे। राज्य के वन विभाग के पर्यवेक्षण में तथा परियोजना की लागत पर, प्रयोक्ता अभिकरण द्वारा उपयुक्त प्रजातियों के पौधे लगाकर मलवा निस्तारण क्षेत्र को स्थिर एवं पुनर्जीवित करने का कार्य किया जाएगा। मलवे को यथा स्थान रखने हेतु दीवारें बनाई जाएंगी। निस्तारण स्थलों को राज्य के वन विभाग को सौंपने से पूर्व; इनका स्थिरीकरण एवं सुधार कार्य योजनानुसार समयबद्ध तरीके से पूरा किया जाएगा। मलवा निस्तारण क्षेत्र में वृक्षों की कटाई की अनुमति नहीं होगी।

17. यदि कोई अन्य सम्बन्धित अधिनियम/अनुच्छेद/नियम/न्यायालय आदेश/अनुदेश आदि इस प्रस्ताव पर लागू होते है तो उनके अधीन जरूरी अनुमति लेना राज्य सरकार/प्रयोक्त एजेंसी की जिम्मेवारी होगी।
18. पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय द्वारा वन एवं वन्यजीवों के संरक्षण व विकास के हित में समय–समय पर निर्धारित शर्तें लागू होंगी।

भवदीय,

(टी0 सी0 नौटियाल)
उप महानिरीक्षक, वन (के0)

प्रतिलिपि सूचनार्थ एवं आवष्यक कार्यवाही हेतु प्रेषितः

1. अपर वन महानिदेशक (एफ0सी0), पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, इन्दिरा पर्यावरण भवन, जोरबाग रोड, अलीगंज, नई दिल्ली।
2. प्रमुख वन संरक्षक एवं नोडल अधिकारी, वन संरक्षण, इन्दिरा नगर फारेस्ट कालोनी, देहरादून, उत्तराखण्ड।
3. आदेश पत्रावली।

(टी0 सी0 नौटियाल)
उप महानिरीक्षक, वन (के0)

Forest Department Permission for Second Circuit Stringing

आवश्यक / ई–मेल

कार्यालय वन संरक्षक, उत्तरी कुमाऊँ वृत्त, उत्तराखण्ड, अल्मोड़ा

Email : cfkumaon_north@rediffmail.com ☎ & Fax (05962) 231099 Fax230397

पत्रांक - 2282 / 12-1-(2) अल्मोड़ा, दिनांक, 17-2-.2023 ।

सेवा में,

1. प्रभागीय वनाधिकारी,
चम्पावत वन प्रभाग,
चम्पावत।

2. प्रभागीय वनाधिकारी,
पिथौरागढ़ वन प्रभाग,
पिथौरागढ़।

विषय :– **जनपद पिथौरागढ़ के 132 के0वी0 सिंगल सर्किट लाईन डबल सर्किट टाव पर पिथौरागढ़ से चम्पावत के निर्माण हेतु 37.2897 है0 उत्तराखण्ड लि0 को प्रत्यावर्तन।**

सन्दर्भ :– प्रभागीय वनाधिकारी, चम्पावत वन प्रभाग का पत्रांक 2525 / 12–1 दिनांक 01.02.2023 तथा प्रभागीय वनाधिकारी, पिथौरगढ़ वन प्रभाग, पिथौरागढ़ का पत्रांक 4077 / 12–1 दिनांक 30.01.2023 ।

महोदय,

विषयोंकित प्रकरण में आपके द्वारा अवगत कराया गया है कि उक्त प्रस्ताव में प्रयोक्ता ऐजेन्सी को जनपद पिथौरागढ़ के 132 के0वी0 सिंगल सर्किट लाईन डबल सर्किट टावर पर पिथौरागढ़ से चम्पावत के निर्माण हेतु 27 मी0 के कॉरिडोर में प्रभावित होने वाली 37.2897 है0 वन भूमि पर कार्य हेतु विधिवत स्वीकृति प्राप्त है। वर्तमान में उक्त परियोजना अन्तर्गत प्रस्तावक विभाग द्वारा डबल सर्किट टावर पर डबल सर्किट लाइन को खींचने की अनुमति बावत् निम्नवत स्थिति स्पष्ट हुई है :–

(1) परियोजना अन्तर्गत डबल सर्किट लाइन स्थापित हेतु पूर्व में हस्तान्तरित वन भूमि के अन्यत्र किसी अन्य नयी वन भूमि का प्रयोग नहीं किया जायेगा।

(2) परियोजना अन्तर्गत उक्त कार्य के लिए वन भूमि पर किसी भी प्रकार की नवीन संरचना, खम्बे आदि स्थापित नहीं किये जाये।

(3) डबल सर्किट लाइन खींचने में प्रयोग तारे केवल पूर्व में लगाये गये संरचना (खम्बे) में ही लगायी जाये।

(4) डबल सर्किट लाइन खींचने हेतु वन भूमि में कोई अन्य वृक्षों का पातन नहीं किया जाये।

अतः उपरोक्त परिस्थिति में प्रयोक्ता ऐजेन्सी को कार्य करने की अनुमति निर्गत किया जाना स्वीकार्य है।

भवदीय,

(आकाश कुमार वर्मा)
वन संरक्षक
उत्तरी कुमाऊँ वृत्त, उत्तराखण्ड, अल्मोड़ा

कार्यालय प्रभागीय वनाधिकारी, चम्पावत वन प्रभाग, चम्पावत।

Phone/Fax 05965-230180 Email-dfo.champawat@rediffmail.com

पत्रांक 3014 /12-1 चम्पावत, दिनांक 03-03- 2023।

सेवा में,

अधिक्षण अभियन्ता,
(परियोजना)ए0डी0बी0, हल्द्वानी,
पवर ट्रांसमिशन कॉर्पोरेशन ऑफ उत्तराखण्ड लि0।

विषय :– **जनपद पिथौरागढ़ के 132 के0वी0 सिंगल सर्किट लाईन डबल सर्किट टावर पर पिथौरागढ़ से चम्पावत के निर्माण हेतु 37.2897 हे0 वन भूमि का गैर वानिकी कार्यो हेतु पावर ट्रांसमिशन कार्पोरेशन उत्तराखण्ड लि0 को प्रत्यावर्तन।**

सन्दर्भ:– **वन संरक्षक, उत्तरी कुमाऊँ वृत्त, उत्तराखण्ड, अल्मोड़ा का पत्रांक 2282/12–1 दिनांक 17.02.2023 व आपका पत्रांक 09/SE(PI)ADB/PTCUL/Hld दिनांक 28.01.2023।**

उपरोक्त विषयक वन भूमि हस्तान्तरण प्रकरण में भारत सरकार के पत्रांक 08बी/यू0सी0 पी0/04/13/2017/एफ0सी0/112 दिनांक 25.04.2022 द्वारा 132 के0वी0 सिंगल सर्किट लाईन डबल सर्किट टावर पिथौरागढ़ से चम्पावत के निर्माण हेतु 37.2897 हे0 वन भूमि गैर वानिकी कार्य हेतु पावर ट्रांसमिशन कार्पोरेशन उ0 लि0 को प्रत्यावर्तन हेतु विधिवत स्वीकृति प्राप्त है। प्रस्तावक विभाग द्वारा अपने संदर्भित पत्रांक से उक्त प्रकरण अन्तर्गत डबल सर्किट लाईन के निर्माण हेतु अनुमति चाही गयी थी जिस क्रम में वन संरक्षक, उत्तरी कुमाऊँ वृत्त, उत्तराखण्ड, अल्मोड़ा के सन्दर्भित पत्र द्वारा प्राप्त दिशा निर्देशों के क्रम में उक्त प्रकरण में निम्नलिखित शर्तों के अधीन कार्य करने की अनुमति प्रदान की जाती है–

1– परियोजना अन्तर्गत डबल सर्किट लाईन स्थापित किये जाने हेतु पूर्व में हस्तांतरित वन भूमि के अन्यत्र किसी अन्य नयी वन भूमि का प्रयोग नहीं किया जायेगा।
2– परियोजना अन्तर्गत उक्त कार्य के लिए वन भूमि पर किसी भी प्रकार की नवीन संरचना, खम्बे आदि स्थापित नहीं किये जायेंगें।
3– डबल सर्किट लाईन खींचने में प्रयोग तारें केवल पूर्व में लगाये गये संरचना (खम्बे) में ही लगायी जायेगी।
4– डबल सर्किट लाईन खींचने हेतु वन भूमि में कोई अन्य वृक्षों का पातन नहीं किया जायेगा।

भवदीय,

प्रभागीय वनाधिकारी,
चम्पावत वन प्रभाग,चम्पावत।

पत्रांक / तद्दिनांकित।

प्रतिलिपि :– वन क्षेत्राधिकारी, काली कुमाऊँ, लोहाघाट, चम्पावत एवं बूम को सूचनार्थ एवं उपरोक्त शर्तो के अनुपालन हेतु प्रेषित।

प्रभागीय वनाधिकारी,
चम्पावत वन प्रभाग,चम्पावत।

Status of Dwarf Plantation

पॉवर ट्रॉंसमिशन कॉरपोरेशन ऑफ उत्तराखण्ड लि0
(उत्तरांखण्ड सरकार का उपक्रम)
अधीक्षण अभियन्ता (परियोजना) ए0डी0बी0, कार्यालय
220 के0वी0 उपकेन्द्र परिसर, कमलुवागांजा, हल्द्वानी–263139, जिला–नैनीताल
ईमेल– seadbhld@gmail.com

No.26/SE(P)ADB/PTCUL/HLD Dated:-30 /06/2023

Subject: - Regarding the status of dwarf plantation as mandated in Point No 06 of one forest clearance given to the 132 kv Pithoragarh-Champawat.

Superintending Engineer (ADB)
Project Monotoring Unit,
PTCUL, Dehradun.

Ref. 1- 22/SE/(P)ADB/PTCUL/HLD Dated- 19/06/2023.
2- 23/SE/(P)ADB/PTCUL/HLD Dated- 22/06/2023.
3- 4605/12-1, Champawat, Dated 26.06.2023.
4- 7112/7/1, Pithoragarh, Dated- 26.06.2023.

In reference to the above mentioned subject and your email dated 17/06/2023 regarding the status of dwarf plantation in the vicinity of ROW of 132KV Pithoragarh-Champawat line as mandated in the point no-06 of Forest Clearnace given to PTCUL by MoEFCC, G.o.I vide letter no 8B/U.C.P/04/13/2017 /A.F.C/112 Dated 25.04.2022. In this regards, undersigned vides its letter no- 22 dated 19.06.2023, & 23 Dated-22.06.2023 has requested to provide the status of dwarf plantation in the vicinity of ROW of said line as mandated the Point No.06 of forest clearance.

In the line of above the D.F.O Champawat & D.F.O Pithoragarh vides their Letter No- 4605/12-1 Dated 26.06.2023 & 7112/7-1 Dated 26.06.2023 respectively has assured that the dwarf plantation in the ROW of said line is to be completed in the Financial Year 2025-26.

This is your kind information & necessary action.

(Enclosed: As Above)

(LM Bisht)
Superintending Engineer
(PI), ADB, Haldwani

Copy to following for information and necessary action: -

1. Chief Engineer, L-I Project, (ADB), Haldwani.

Appendix X – Estimated Tree Compensation Costs

S.N	Project Details	Trees	Indicative number	Cost (INR)
1	220/33 KV (2x50 MVA) GIS Substation, Selaqui	Mango, Banyan, Neem, Jamun, present inside the SS premises, but tree felling not needed. Grass and berry shrubs clearance required.	0	-
2	132/33 KV (2x40 MVA) GIS Substation, Araghar, Dehradun	Guava, neem, mango tree within the premises, but the proposed site for SS has no trees. No felling needed.	0	-
3	132/33 KV (2x40 MVA) GIS Substation, Dhaulakhera, Nainital	5-7 trees within premises. Neem, jamun, sal, banyan. 1-2 tree felling may be needed.	2	4000/- @2000/tree
4	132/33 KV (2x40 MVA) GIS Substation, Khatima-II, US Nagar	Eucalyptus along site boundary. No tree cutting needed for SS.	0	-
5	132/33 KV (2x20 MVA) GIS Substation, Lohaghat, Champawat	No trees or vegetation at site	0	-
6	220/132/33 KV (2x160 MVA+ 2x40 MVA) AIS Substation, Manglore, Haridwar	Felling of 2-3 trees of Syzygium jambos (jamoya) at the entry of the site may be needed for which permission from forest Dept. needs to be taken	3	6000/- @2000/tree
7	Landhora	105 trees at site, maximum fruit trees small in size Guava – 78 Mango – 5 Lemon – 1 Mulberry – 1 Semal - 1 Shisham – 14 Siris – 1 Total – 105 Approx. 90 small trees may need to be felled for which permission from Forest Dept./ local authority needs to be taken.	90	135000/- (cost @1500/tree considering the very small size and girth of the guava trees during visit)
8	Sarvarkhera	Trees of Royal Palm (Roystonea regia), 1	10	20000/ @2000/tree

		tree of Ficus, Mango and few ornamental trees. Tree felling of 9-10 ornamental Royal Palm trees envisaged in the project.		
	Total		105	165,000

Note: Indicative costs. Actual costs will be calculated by the FD during joint site visit and final lay outs. The costs vary as per the type of the tree and its size

S.No	**Project Details**	**Trees**	**Indicative number**	**Cost (INR)**
1	132/11 KV, (2 X 10 MVA), Near Collectorate	No trees. Grass and bushes at site. Vegetation clearance needed.	-	
2	132/11 KV, (2 X 5 MVA), Bharauni	Crop at site. No trees	-	
3	132/11 KV, (2 X 5 MVA), Kaniya	Semal (Bombax ceiba), Sheesham, 7-8 tree cutting may be required for which permission from DFO needs to be taken	8	40000/- @5000/tree has been taken based on the tree and its girth as seen during visit
	Total		8	40000/-

Note: Indicative costs. Actual costs will be calculated by the FD during joint site visit and final lay outs. The costs vary as per the type of the tree and its size

Total Cost of Tree Cutting: PTCUL + UPCL = 165000 + 40000 = 205000/-

कार्यालय – वन क्षेत्राधिकारी, हल्द्वानी वन क्षेत्र, तराई केन्द्रीय वन प्रभाग रूद्रपुर।

पत्रांक 1568 / 23-1 / **हल्द्वानी** **दिनांक** 20/5/ **2023**

सेवा में,

प्रभागीय वनाधिकारी,
तराई केन्द्रीय वन प्रभाग,
रूद्रपुर।

विषय :– ए0डी0बी0 सहायतित हल्द्वानी परियोजना के अन्तर्गत तहसील परिसर में प्रस्तावित बहुमंजिला भवन (Surveillance Command Control Center G7) के स्थल पर विद्यमान वृक्षों के पातन हेतु संयुक्त निरीक्षण के सम्बन्ध में।

महोदय,

उपरोक्त विषयक पत्र के क्रम में तहसील परिसर हल्द्वानी के अन्तर्गत प्रस्तावित बहुमंजिला भवन के स्थल पर विद्यमान वृक्षों के पातन/मूल्याकंन के सम्बन्ध में यू0यू0एस0डी0ए के अधिकारी/कर्मचारियों के साथ तहसील परिसर हल्द्वानी का संयुक्त निरीक्षण किया गया, संयुक्त निरीक्षण के दौरान उपरोक्त प्रस्तावित क्षेत्र में बाधक बने वृक्षों की गणना कर मूल्याकंन किया गया है। जिसकी सूचना पत्र के साथ संलग्न कर भेजी जा रही है।

संलग्न :– उक्त प्रकार

D/C

भवदीय

वन क्षेत्राधिकारी,
हल्द्वानी वन क्षेत्र,
तराई केन्द्रीय वन प्रभाग रूद्रपुर।

G/Range Office Haldwani/Letter/Other Letter

हल्द्वानी वन क्षेत्र के अन्तर्गत हल्द्वानी रोडवेज व तहसील क्षेत्र में जी–7 बिल्डिंग निर्माण कार्य में प्रभावित हो रहे वृक्षों का व्यासवार एवं मूल्यांकन विवरण

क्रम सं0	वृक्ष की प्रजाति	व्यास श्रेणी										कुल वृक्षो की सं0	आयतन (घन मी0)	धनराशि
		0–1	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9	9 से ऊपर			
1	जगल जलेबी हरा खड़ा (अयोग्य)	–	4 (जड़ कॉपिस)	–	–	1	–	1	–	–	–	6	4.446	6972.00
2	कोकाट हरा खड़ा (अयोग्य)	–	1	1	–	1	–	–	–	–	–	3	1.614	2180.00
3	बकैन हरा खड़ा (अयोग्य)	–	–	1	–	–	–	–	–	–	–	1	0.255	542.00
4	सिल्वर ओक हरा खड़ा (योग्य)	–	–	–	–	–	1	–	–	–	–	1	1.713	5052.00
5	वन तिमूल हरा खड़ा (अयोग्य)	–	1	–	–	–	1	–	–	–	–	2	1.968	2638.00
6	नीम हरा खड़ा (अयोग्य)	–	–	–	–	–	–	–	–	–	1	1	2.322	5864.00
7	पेपर मलबरी हरा खड़ा (अयोग्य)	10	26	7	1	2	–	–	–	–	–	46	13.768	11274.00
8	ईमली हरा खड़ा (योग्य)	–	1	1	–	–	–	–	–	–	1	3	2.832	13034.00
9	आम हरा खड़ा (अयोग्य)	–	1	1	2	2	–	1	–	–	–	7	5.970	14530.00
10	पाखड़ हरा खड़ा (अयोग्य)	–	–	–	–	–	1	1	2	1	5	10	22.611	53769.00
11	अशोक हरा खड़ा (योग्य)	–	2	2	–	–	1	1	–	–	–	6	5.055	16325.00
12	तुन हरा खड़ा (अयोग्य)	–	–	2	1	1	1	–	–	–	–	5	5.635	38947.00
13	पीपल हरा खड़ा (अयोग्य)	–	–	–	–	–	–	–	–	–	1	1	2.322	5864.00
14	कटहल हरा खड़ा (अयोग्य)	–	–	1	1	–	–	–	–	–	–	2	0.850	1624.00
15	बेल हरा खड़ा (अयोग्य)	–	1	–	1	–	–	–	–	–	–	2	0.850	1194.00
16	सेमल हरा खड़ा (योग्य)	–	–	–	–	–	–	1	1	–	–	2	8.947	33205.00
17	शहतूत हरा खड़ा (अयोग्य)	–	–	1	–	–	–	–	–	–	–	1	0.255	542.00
	योग											99	81.413	213556.00

यूकेलिप्टिस वृक्षों का मूल्यांकन

क्रम सं0	वृक्ष की प्रजाति	व्यास श्रेणी									कुल वृक्षो की सं0	आयतन (घनमी0)	धनराशि
		10–15	15–20	20–25	25–30	30–35	35–40	40–45	45–50	50–55			
1	यूकेलिप्टिस हरा खड़ा	–	–	–	–	2	–	–	–	–	2	1.1	6330.00
	योग											1.1	6330.00

वन क्षेत्राधिकारी,
हल्द्वानी वन क्षेत्र,
हल्द्वानी केन्द्रीय वन प्रभाग रू

Appendix Y – Substation Selection Criteria

FROMAT OF SITE SELECTION FOR SUBSTATIONS				
Sl. No.	Criteria	Site-1 Address with Geo-cocordinates	Site-2 Address with Geo-cocordinates	Site-3 Address with Geo-cocordinates
1	Land (Mtr x Mtr)			
2	Size (acre)			
3	Govt /Private/Forest Land			
4	Agricultural/Waste Land			
5	Development			
6	Approximate Cost			
7	Type of soil			
8	No of owners			
9	Environment/Pollution in the vicinity			
10	Location with reference to nearest Town (Approx)			
11	HFL date			
12	Diversion of Nala/Canal required			
13	Slope			
14	Extent of leveling required			
15	Land Acquisition feasibility			
16	Rate of Govt. Land (Approx)			
17	No. of owners			
18	Extension of Approach Road			
19	Planned/unplanned development			
20	No. of Families displaced			
21	Requried Govt. value			
22	Level of site with reference to road level			
23	Distance from sea shore			
24	Approach			
25	What are the obstacles in reaching site			
26	Approach road			
27	Length of approach Road			
28	Distance from main Road			
29	Unloading facility at Railway station			
30	No of Culverts Required			
31	Community Facility			
32	Drinking Water			
33	Drainage			
34	Post Office/Telephone/Telex			
35	Market			
36	Security			
37	Amenities			
38	Availability of construction water			
39	Availability of water			
40	Nearest EHV Line			
41	Length of line between this site and nearest substation			
42	Length of Line estimate			
43	Additional crossing			
44	Frontage for line take off			
45	Telephone/Telegraph Lie			
46	Others (Distance from National park/Sanctury)			

2.4 SITE SELECTION

(a) General

With increasing constraints of transmission line corridors, difficulty in availability of land due to urbanization and economic development, emergence of stringent social & environmental regulations and public awareness, the task of site selection for a substation has become more and more complex and difficult.

The choice of a site for a substation is a compromise between technical, economic, environmental and administrative factors. The location should be determined on grid considerations. The new substation should enhance the operational flexibility, system reliability and transmission or transformation capacity after becoming a part of the network.

The first step is to locate possible sites, which are as level as possible, with enough available area, at reasonable costs, with easy access, and without restrictions on line corridors where the substation can be erected with minimum environmental impacts. It is advantageous to locate sites near to existing line corridors or even at crossing points. Sometimes such places simply do not exist and the choice will be confined to places that have some of the above characteristics. It is also worthwhile to assess the social acceptance of project.

(b) Environmental Aspects

In order to reduce the possible impacts on the natural or social environment, the following aspects need to be taken into account:

(i) The substation site

- should preferably be on fairly flat land as far as possible to save the time and cost in leveling.

- must not be flood-prone / water stagnation.
- Should not come within areas or spots / sites listed under geological interest
- Should be big enough and have a suitable layout for housing all substation equipment and services, including any future extensions, and for the development of a landscaping project.
- Should be chosen so as to avoid any damage to the natural drainage network, especially to permanent surface watercourses, and to ground-water recharge areas & to avoid any damage to the underground network.
- Should be in low-productivity farming areas or uncultivated land, avoiding areas in which the existing plant formations have a high ecological or economic value,
- Forest areas should in general be avoided, especially forest land with protected species, singular groups or riverside copses.
- The impact on vegetation of the future line corridors should be considered.
- Should be chosen so as to avoid any areas or spots listed as protected areas with flora & fauna.
- Should be away from population centers, isolated dwellings and areas of potential urban development.
- Should avoid proximity to all mines, as it would impose limitations on the substation's incoming and outgoing lines.
- Should avoid areas with tourist and/or recreational potential,
- The local town planning policy needs to be taken into account to avoid urban areas, development land or land held in reserve for possible future development,
- Substation landscaping may be covered by local regulations .
- Should avoid areas that contain items belonging to the cultural heritage,
- Should take into account the presence of any infrastructure such as radio and television antennae and/or relays, airports and aerodromes, deposits of fuel or flammable material, dumps, military sites, infrastructure that might impose limitations on the siting of the substation and the incoming lines from other substations.
- Should consider the proximity of other infrastructures like train stations and main roads for transportation of heavy equipment (transformers and reactors), water supply, medium-voltage electricity network and telephone service network.
- Should be outside and as far as possible from any areas listed as protected natural sites, especially national and natural parks,
- Landscape: Wherever possible, the substation will be sited in areas of little scenic value, avoiding any areas or spots listed in the natural inventory of outstanding landscapes.
- The best site, as far as landscaping is concerned, is such that the substation is not visible from the most common views points.

(ii) The aesthetic, noise, oil leakage / spills, waste management etc. are other environmental considerations / aspects.

(c) Technical Aspects

Topography

In mountain regions, the substation must be placed away from avalanche corridors as far as possible. For reducing leveling costs, the substation area can be divided into various terraces, increasing the total leveled area but reducing the volume of soil displacements.

Allowing line entries from various directions would help in solving problems related to line corridors. Use of digital technology and unmanned substations should be considered.

Geological and Geotechnical Characteristics of Soil

- The characteristics of soil must allow the construction of roads and foundations and the minimum bearing load should generally be about 50 kN/m^2
- A careful study is essential for sites coming under earthquake zones.
- A low value of soil resistivity is desirable and this should be measured before erection of the substation

Access to Substation

Main access to the substation

- The selected site has a profound impact on the access to the substation. One of the main endeavours should be to position the substation as close to the (future) load centre as possible. This should be done considering existing roads in the site vicinity as well as new or additional access requirements. The distance from main roads to the substation must be kept as short as possible to reduce the cost associated with constructing new access roads.
- Access roads have to be adequate to sustain heavy equipment under all weather conditions. Long access roads require design considerations similar to most secondary local roads. In such cases, any culverts or sewer crossings also need to be designed for anticipated heavy equipment loads. All road designs must comply with the required standards and specifications applicable to the area/country. Important factors to be kept in mind when considering design of access roads are among others:
  - The maneuverability and mass of the vehicles necessary for the delivery of power transformers;
  - The width and turning radius, as determined by the maneuverability of types of vehicles to be used in the various areas;
  - The road foundation design as necessitated by the axle loads of types of vehicles to be used;
  - The slope of the access road in relation to the wearing surface, as determined by the gradient ability of the types of vehicles to be used;
  - The traffic volume and type, as well as erosion potential, possibly necessitating a wearing surface (note that over the years, the initial substation access road may become a general access road into the area with increased vehicle volumes affecting the condition of the road);
  - The construction of bridges necessitated by natural watercourses;
  - Any special requirements of emergency and movement of fire fighting vehicles;
  - For EHV substations, if railroad access is a possibility, a railroad siding constructed inside the substation may be the best solution to deliver the power transformers.

Access in and Around the Substation

It is important to ensure that all equipment in the substation is easily accessible for routine maintenance activities, but also for replacement without undue impact on the remaining supply during emergencies, i.e. reducing the outage time through proper access design.

Access for Mobile Equipment

One of the primary advantages of temporary mobile equipment is its ability to be used at more than one location. Should the substation operational plan include the use of temporary mobile equipment during maintenance, emergencies, extensions or refurbishment operations, the access should be considered in the initial design phase. To accommodate the installation of the intended equipment, access roads,

substation entrances and internal access to the points of connection should be evaluated, planned and designed in such a way to ensure enough space is available to manoeuver, position and connect the equipment.

The most difficult equipment, as far as access is concerned, are power transformers and large reactors. In some cases, single phase transformers instead of three phase transformers, use of transformers with less rated power (this increase the total numbers) would be required due to transportation limitations.

Always ensure that the land / space is big enough not only to fit the substation on, but also to accommodate all the other services required during the construction phase. The space acquired / procured must make provision for all current and future requirements as well as what might be required during the construction.

Line Corridors

Line corridors have great influence on the geographical orientation of the substation and may impose the choice of a substation layout. Difficulties in the establishment of line corridors may be overcome by the use of multi-circuit or multi-circuit & multi-voltage towers for overhead line and in approach section of substation or use of underground cables / Gas Insulated Lines (GILs).

Pollution

The location of a substation should be away from the polluted area as far as possible. Pollution causes the deposition of small particles on the insulators. The formation of dry band under pollution leads to flashover across the porcelain / glass insulator due to its hydrophillic nature. Increasing the number of insulator strings, modification of insulator design to increase the specific creepage distance, regular washing, use of composite insulators, use of Room Temperature Vulcanized (RTV) Silicone Rubber coatings are some of the measures to improve the insulator performance under polluted condition.

Saline and industrial pollution can cause corrosion in supporting structures. Protective coating or the use of concrete supporting structure may therefore be needed in such areas.

GIS installation is preferable in such polluted areas as it greatly reduces the number of insulators exposed to pollution.

Whenever possible the prevailing winds should flow through the substation towards the origin of the pollution (sea, industrial zones, highways) or, the substation should be protected by some natural barrier (e.g. hills or trees).

A comparative statement of various alternative sites should be made considering various criteria discussed above including environmental aspects and an optimum choice should be made out of alternative sites.

Appendix Z – Environmental Monitoring Report Template

Environmental Safeguards Monitoring Report

Reporting Period {From Month Year to Month Year}
Date {Month Year}

Title of the Project
{ }

Prepared by the {Executing Agency} for the Asian Development Bank

Environmental Safeguards Monitoring Report – Updated Format (as of Jan 2020)
{Red text serves as guide for report preparation, please delete it when the report is finalized}

TITLE PAGE

LIST OF ABBREVIATIONS {All abbreviations used in the report should be listed here as well as being spelt out in full the first time they appear in the report}

TABLE OF CONTENTS

EXECUTIVE SUMMARY {Maximum two-page summary following table like the sample below, if necessary cross reference the relevant section of the main report for details to keep summary succinct}

Project Name	
Executing Agency	
Implementing Agency	
Environment Safeguards Categorization	
Environment Safeguards Documentation	EARF/EIA/IEE/Existing Facilities CAP/EMP
Project Stage Obtained	Design/Pre-Construction/Construction/Commissioning/O&M
Detailed Design Required Post-Approval	Yes/No – if yes include remarks on status of design progress (%) and if more than one design package, provide details if any differences between the status
Contract(s) Awarded	Yes/No – if more than one contract package, provide details
Bidding Document(s) Include EMP Cleared by ADB	Yes/No – if more than one contract package, provide details if any difference between the status
Contract(s) Awarded Include EMP Cleared by ADB	Yes/No – if more than one contract package, provide details if any difference between the status
National Environment, Health and Safety Clearance(s) Obtained	Yes/No/NA – provide details if any clearances are outstanding or there is any difference between the status of contract packages, use NA if any clearances not yet required
Contractor(s) Given Access to Site	Yes/No – if more than one contract package, provide details if any difference between the status
Construction Progress (%)	If more than one contract package, provide details if any difference between the status
Unanticipated Impacts including Change of Scope or Design	Yes/No – if yes, provide brief details as to how the IEE and EMP will be updated as required

Number of Site Inspections and Audits Undertaken by Environment Safeguards Staff in Reporting Period	
Corrective Action Required from Previous Reporting Period	Yes/No/NA – use NA if this is the first project reporting period
Outstanding Corrective Action this Reporting Period	Yes/No/NA – if yes, provide bulleted summary of the key actions still required, use NA if the response to above is No or NA
Non-Compliances Recorded this Reporting Period	Yes/No – if yes, provide bulleted summary of the key non-compliances recorded
Corrective Action Required	Yes/No – if yes, provide bulleted summary of the key actions to be taken in response to non-compliances including timeline and budget
Number of Health and Safety Incidents	Provide brief details including how they were responded to
GRM Functional	Yes/No – briefly elaborate on set up if differs to description in IEE/EMP
Number of Unresolved Grievances from Prior Reporting Period	
Number of Grievances Received in Reporting Period	
Number of Grievances Resolved this Reporting Period	
Number of Grievances Still Outstanding	Provide brief details with timeline for resolution
Number of Grievances referred to Court of Law	Provide brief details
Number of Grievances referred to the Accountability Mechanism	Provide brief details

1.0 Introduction

1.1 Brief Project Description

{Maximum two pages to succinctly convey who the executing and implementing agencies are, the project outputs, construction works involved, details of contract packages, details of construction camps and other related facilities, national and ADB environmental safeguards project categorizations, and the environment safeguard documents (dates) applicable to the project}

{Include maps and plans showing the project site locations and project area of influence}

{Include table and/or organogram of environmental safeguards staffing and relationships between executing and implementing agencies, consultants, contractors, subcontractors, lenders, etc.}

1.2 Project Progress Status and Implementation Schedule

{Describe the implementation stage reached (design, pre-construction, construction, commissioning or O&M) and the % progress, main project activities and milestones achieved during the reporting period, including bidding documents issued and contracts awarded during the reporting period etc. No need to repeat progress information included in previous monitoring reports if no change, cross reference the previous monitoring reports if needed}

{Highlight any unanticipated impacts in relation to change in the project scope, locations or alignments of components, construction methods, and/or implementation schedule during the reporting period, if none confirm this.}

{Highlight any changes in the project organization and environmental safeguards staffing during the reporting period, if none confirm this}

{Report on any unanticipated impacts and updates to IEE/EMP that were required during the reporting period, status of delivery of documents, required amendments, consultation and disclosure undertaken etc.}

{The project Gantt chart may be included}

{Include a simplified table like the sample below to report progress}

Project Component/Stage	Target Completion Date {Revised Target Date, if delayed}	Progress Status {not yet started; ongoing; completed}	Percent Completed	Remarks
e.g. Substations (construction phase) • Contract award • Construction (site clearance, earthworks, civil works, installation of equipment, …)		Completed	100%	Contract awarded to XYZ contractor, copy of EMP included

		Ongoing	85%	There was a delay in the delivery of equipment…

2.0 Compliance to National Regulations and International Agreements

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where the requirements of regulations or agreements were breached along with details of responses taken to rectify the breach once identified. Include all the applicable National Regulations and International Agreements following the sample table below}

National Regulation or International Agreement	Compliance Requirements under the Regulation or Agreement including any Environmental Clearances Required	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}

3.0 Compliance to Environmental Covenants from the ADB Loan Agreement

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where covenants were breached along with details of responses taken to rectify the breach once identified. Include all the applicable Loan Agreement covenants on environment following the sample table below}

Schedule #, Para. #	Covenant	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-

			compliance including timeline and budget}

4.0 Compliance to Project Administration Manual (PAM)

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where tasks allocated to the executing or implementing agency and any consultants have not been undertaken along with details of responses taken to rectify the situation once identified. Include all applicable organizations with responsibility for environmental safeguards following the sample table below}

Organization	Tasks	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}
Executing Agency			
Implementing Agency			
Consultants…			

5.0 Compliance to Contract

{Status of compliance and further action to ensure ongoing compliance; if there is partial or no compliance recommendations for corrective action are required. Provide explanations of any instances where tasks allocated to the contractor have not been undertaken along with details of responses taken to rectify the situation once identified. Include all contract packages and provisions relating to environment, health and safety management following the sample table below}

Contract Package	Contract Provisions	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide sufficient details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance

			including timeline and budget}
Package 1			
Package 2			
Package 3…			

6.0 Compliance to Environmental Management Plan

{With reference to the EMP of the project, include a table following sample table below with the compliance status during the reporting period, with sufficient details (evidence) to show how compliance was achieved, or corrective action to be taken if there was non-compliance including timeline and budget}

{Flag if previous environmental monitoring report(s) included corrective action plan, if it did details of that corrective action plan should be incorporated into the EMP table and compliance status reported}

{Provide explanations of any instances where performance standards were temporarily exceeded during the reporting period, along with details of any response taken to rectify the exceedance once identified, even if at the end of the reporting period the project is deemed as being compliant}

{Copies of clearances, CEMP, construction method statements, and other documentation produced in accordance with EMP during the reporting period should be included as an appendix}

Item #	Requirement	Prior Corrective Action	Compliance Status {complied; partially complied; not complied; still ongoing or n/a at current stage of the project}	Remarks {provide sufficient details (evidence) to show how compliance was achieved; or explain the corrective action to be taken if there was non-compliance including timeline and budget}

7.0 Environmental Supervision and Monitoring Results

7.1 Environmental Supervision

{With reference to the EMP capacity development plan summarize trainings for the executing and implementing agencies, contractors, and subcontractors, and other activities completed. Include as appendices the training agenda,

attendance sheets, and photos. If no trainings or other activities in reporting period, please confirm. Copies of training records related to EMP during the reporting period should be included as an appendix}

Trainings	Number and Position of Participant/s	Location/s and Date/s	Remarks

{With reference to the EMP budget table summarize details of budget allocated for EMP implementation and the current spend profile}

Activity	Allocated Budget	% Spend	Remarks
TOTAL			

{Site inspections and audits completed – summarize the number and type of site visits, persons involved, the issues covered, and status of compliance with them, the number of non-compliance notices given out to the contractor as a result of the site visit, and the checklists/reporting format used (sample of checklists and reports to be included as an appendix)}

Date	Type and Purpose of Visit	Location/s Visited	EA, IA, Consultant Staff Participating	Remarks

7.2 Quantitative Environmental Monitoring

{Environmental monitoring results – summarize in a table the reporting period's quantitative monitoring activities and data obtained in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified}

Typically, this section will include the results of:

- Noise and vibration surveys
- Water quality surveys
- Air quality surveys

- Flora and fauna surveys

{Indicate the monitoring locations using a map or plan, dates, times, duration of samples as applicable, weather conditions as applicable, parameters measured, equipment used, standards, tests, and limits used etc.}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Graphs can be used in this section to show trends; however, large tables of data or multiple graphs should be attached as an appendix.

{Calibration and QA certifications of monitoring equipment and laboratories analyzing samples should be included as an appendix}

7.3 Pollution Control Monitoring

{Pollution control monitoring results – summarize any pollution incidents during the reporting period in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Include the pollution control trainings/drills/inspections conducted during the reporting period following the sample table below. Include as appendices the training/drill/inspection agenda, attendance sheets, and photos. If no trainings/drills/inspections, please confirm}

Trainings/Drills/ Inspections	Number and Position of Participant/s	Location/s and Date/s	Remarks

{If there were any materials used, solid or hazardous waste, or wastewater generated in the reporting period report following the sample table below. If no materials used or waste generated, please confirm}

Type of Materials/Waste	Approximate Volume (units)	Source or Destination	Remarks

Material examples: Transformer Oil Sand for Fill			
Waste examples: Sanitary Wastewater Spoil from Earthworks Old Transformers Hazardous Waste			

7.4 Occupational and Community Health and Safety Monitoring

{Health and safety monitoring results – summarize the reporting period's health and safety activities and data obtained in accordance with the Environmental Monitoring Plan (EMoP) of the project. Provide explanations of any instances where performance standards were exceeded along with details of responses taken to rectify the exceedance once identified}

{Corrective actions with timeline and budget are required to ensure any exceedances will be prevented in the future}

{Include the occupational and community trainings/drills/inspections conducted during the reporting period following the sample table below. Include as appendices the training/drill/inspection agenda, attendance sheets, and photos. If no trainings/drills/inspections, please confirm}

Trainings/Drills/ Inspections	Number and Position of Participant/s	Location/s and Date/s	Remarks

{If there was any near-miss or accident, illness, or other occupational or community health and safety related incident during the reporting period (or a previously reported incident with ongoing rectification) report following the sample table below. Include as appendices work safety checklists, incident reports, and other relevant supporting documents. If no incidents, please confirm}

	Number and Position of Person/s Involved	Location/s and Date/s of Incident	Detailed Description of Incident	Time-bound Corrective Action
Fatality				
Non-fatal Injury (Lost Time)				
Non-fatal Injury (Minor)				
Near-miss				
Illness				
Other Incidents				

8.0 Meaningful Consultation and Grievance Redress

{Meaningful consultation – report on any ongoing consultation undertaken, and main issues raised by consultees; detailed consultation records should be included as an appendix. If no ongoing consultation, please confirm}

Date	Format/Venue	Participants (Occupation, M/F)	Main Issues Raised

{Include a brief description of the GRM, provide a flowchart, list of grievance redress committee members and any trainings they have received}

{If there was any grievance or complaint, regardless informal or minor, during the reporting period (or previously reported complaint with ongoing rectification) provide the corrective action taken following the sample table below. Detailed grievance records and response reports should be included as an appendix}

Complainant/s or Affected Persons	Location/s and Date/s of Complaint	Description of Grievance/Complaint	Timeline*	Time-bound Corrective Action

* To be solved within 2 weeks

8.0 Conclusions and Recommendations

{Summarize the project's environmental performance during the reporting period based on the previous sections and, if any non-compliance identified, provide detailed recommendations including responsibilities, timeliness and budget for the preparation and completion of corrective action}

{If non-compliance is major or not readily addressed then a separate corrective action plan may need to be prepared. For minor and readily addressed non-compliances the corrective action plan can be incorporated into this final section of the environmental monitoring report following the sample table below}

Non-compliance	Corrective Action to be Taken	Responsibility	Timeline	Budget

APPENDICES

Photographs {Include relevant photographs of the project site and project area of influence taken during the reporting period to provide evidence of compliance and/or non-compliance. For each photo, provide a caption with description of what it illustrates, accurate location, and date taken}

Supporting Documents
{E.g. Maps and plans
Sample checklists and reports
Clearances and documentation
Training records
Detailed monitoring data, laboratory results etc.
Calibration and QA certificates
Consultation records
Meeting agendas and attendance records
Grievance records
Environment, health and safety reports}